



5. INTERNATIONAL FOOD, AGRICULTURE AND VETERINARY SCIENCES CONGRESS

17 - 19 March 2023

Kafkas University, Kars, Türkiye

PROCEEDINGS BOOK (VOLUME-2)



EDITORS:

Prof. Dr. Tarkan ŞAHİN
Ass. Prof. Mükremin ÖLMEZ



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CONGRESS ID

**5. INTERNATIONAL FOOD, AGRICULTURE AND VETERINARY SCIENCES
CONGRESS**

DATE-PLACE

17 - 19 March 2023

Kafkas University, Kars, Türkiye

EDITOR

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Ass. Prof. Mükremin ÖLMEZ

EVALUATION PROCESS

All applications have undergone a double-blind peer review process

TOTAL NUMBER OF PAPERS: 426

THE NUMBER OF PAPERS FROM TÜRKİYE: 202

OTHER COUNTRIES: 224

PARTICIPANT COUNTRIES (38):

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Hungary, Ukraine, Republic of North Macedonia, Brasil, Spain, Kirgizistan,
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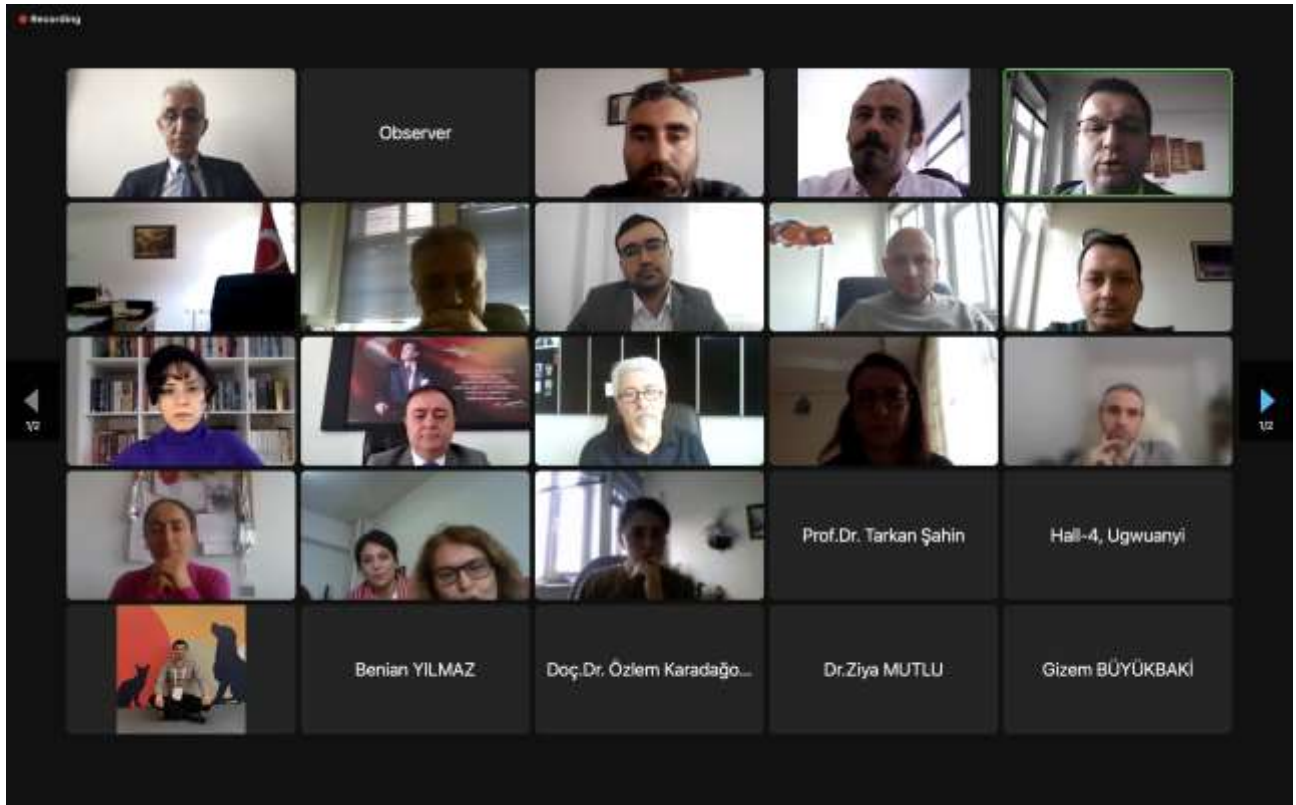
Secretary

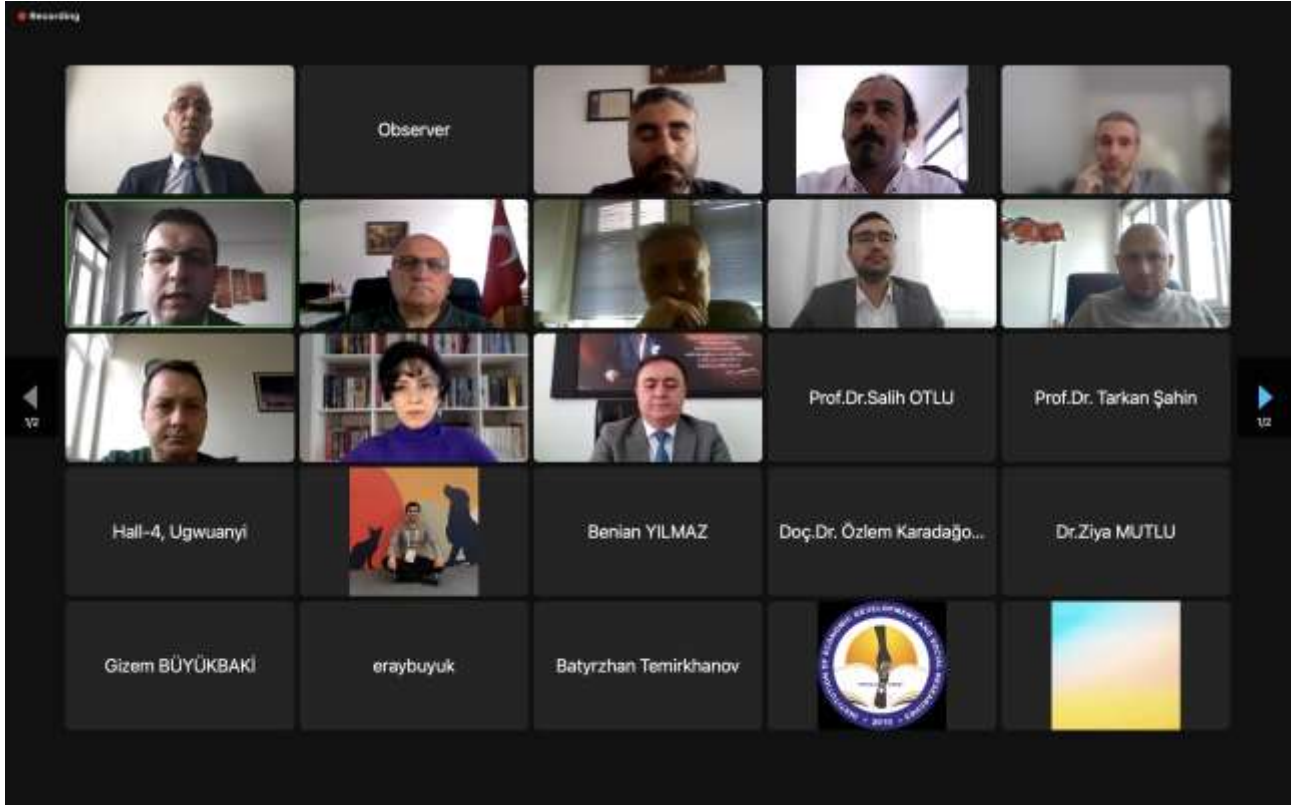
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PHOTO GALLERY





Kayıtlı... | **hall5-Abedeh Rezaei ekranını görüntüleyiniz** | Seçenekleri Gözetle | Katılı 09:46:50 | Görüntüle



Investigation of minocycline effect on expression changes of *BCL-2* protooncogene on MCF7 breast cancer cells.

Presenter : Abedeh Rezaei
Master: Dr. Mohammad Khalaj-Kondori
March 2023


1 atamın katılıyor

Dr. Ali Hader (Moderatör Se...)
Hall-5 Observer
Hall-5 Observer
Anam Shahzadi-Hall 5
hall5-Abedeh R...
hall5-Abedeh Rezaei
aYESHA
aYESHA

Ödülün Çık

Sesli Aç | Videoyu Başlat | Katılımcılar | Sohbet | Ekran Paylaşımı | Kaydı Durdur/Durdur | Ara Odalar | Reaksiyonlar | Uygulamalar

Kayıtlı... | **Immacolata Belviso ekranını görüntüleyiniz** | Seçenekleri Gözetle | Katılı 09:33:21 | Görüntüle



5th INTERNATIONAL FOOD, AGRICULTURE AND VETERINARY SCIENCES CONGRESS

• 17 - 19 March 2023 Kafkas University, Kars, Türkiye

Web Page: www.gthk.org
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Sesli Aç | Videoyu Başlat | Katılımcılar | Sohbet | Ekran Paylaşımı | Kaydı Durdur/Durdur | Ara Odalar | Reaksiyonlar | Uygulamalar

The screenshot displays a Zoom meeting with the following layout:

- Top Row:**
 - Participant: A man with glasses wearing a red shirt.
 - Text Box: "coordinator: Ali..."
 - Participant: A woman with dark hair.
 - Participant: A man with grey hair.
- Second Row:**
 - Participant: A woman with dark hair.
 - Participant: A man (mostly obscured by shadow).
 - Participant: A woman with light hair.
 - Image: A logo featuring a stylized atom or molecule.
- Bottom Row (Large Tiles):**
 - Text Box: "Observer Hall 1"
 - Text Box: "Hall-1 İpek"
 - Participant: A small video tile of a woman.
- Zoom Toolbar (Bottom):** Includes icons for chat, gallery view, screen sharing, and other standard Zoom controls.



5. INTERNATIONAL FOOD, AGRICULTURE AND VETERINARY SCIENCES CONGRESS

17 - 19 March 2023

Kafkas University, Kars, Türkiye

CONGRESS PROGRAM

Meeting Id: 842 7974 2853

Passcode: 171819

<https://us02web.zoom.us/j/84279742853?pwd=VU9RMzUyc2FIRFFtbytXSXJRODk2UT09>



PARTICIPANT COUNTRIES:

Türkiye, Azerbaijan, Pakistan, Iran, Nigeria, Romania, Algeria, Malaysia, Hungary, Ukraine, Republic of North Macedonia, Brasil, Spain, Kirgizistan, Italy, Mozambique, México, Morocco, Serbia, Russia, Indonesia, Qatar, Portugal, India, Kosovo, France, Turkish Republic of Northern Cyprus, USA, Iraq, Bénin, United Arab Emirates, Germany, Poland, Bulgaria, Vietnam, Bosnia & Herzegovina, France, Ethiopia

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- ✓ Kongremizde Yazım Kurallarına uygun gönderilmiş ve bilim kurulundan geçen bildiriler için online (video konferans sistemi üzerinden) sunum imkanı sağlanmıştır.
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- ✓ The participant must be connected to the session 15 minutes before the presentation time.
- ✓ All congress participants can connect live and listen to all sessions.
- ✓ Moderator is responsible for the presentation and scientific discussion (question-answer) section of the session.

Points to Take into Consideration - TECHNICAL INFORMATION

- ✓ Make sure your computer has a microphone and is working.
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- ✓ Requests such as change of place and time will not be taken into consideration in the congress program.

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exp. Hall-1, Ali ÖZDEMİR**



Meeting ID: 842 7974 2853

Passcode: 171819

**5. ULUSLARARASI
GIDA, TARIM VE
VETERİNER
BİLİMLERİ KONGRESİ**

Kafkas University, Kars, Türkiye
17-19 Mart 2023

**5. INTERNATIONAL
FOOD, AGRICULTURE
AND VETERINARY
SCIENCES CONGRESS**

Kafkas University, Kars, Türkiye
17 - 19 March 2023



-Opening Ceremony-

17.03.2023

Time (Ankara): 11:00-12:00

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Session-1, Hall-1**17.03.2023****Moderator: Prof. Dr. Murat GÜLMEZ****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 14:00 – 16:00**

Title	Author(s)	Affiliation
EFFECTS OF PASTEURIZED SHEEP'S MILK USE ON PRODUCTION AND MATURATION OF SIIRT HERBY CHEESE	Murat GÜLMEZ Kübranur YILDIZ BAYHAN Sefa ÜNER	Siirt University, Türkiye
MORINGA OLEIFERA AS A FUNCTIONAL FOOD COMPONENT	Zeliha ERASLAN Özge SÜFER	Osmaniye Korkut Ata University, Türkiye
MEAT DEFECTS (MYOPATHY) IN BROILERS AND PRACTICES FOR REDUCING	Assist. Prof. Ahmet YAMAN	Bolu Abant İzzet Baysal University, Türkiye
THE RISING TREND OF PLANT-BASED MILK AND BY COMPARISON WITH ANIMAL SOURCES OF MILK	Assist. Prof. Hülya YAMAN	Bolu Abant İzzet Baysal University, Türkiye
THE EFFECT OF POPPY PULP ON SOME TEXTURAL AND SENSORY PROPERTIES OF PROBIOTIC WHITE CHEESE TELEME	Naciye Selinay GÜN Dr. Zehra ALBAY Prof. Dr. Bedia ŞİMŞEK	Süleyman Demirel University, Türkiye
THE EFFECT OF COOLING RATE ON NUTRITIONAL VALUE OF HOT MEALS	Aysu Çağla YENİSOY Cihan Kaan COŞKUN Neşe ŞAHİN YEŞİLÇUBUK	İstanbul Teknik University, Türkiye
CLEAN LABEL ALTERNATIVES OF NITRATES AND NITRIDES USED IN MEAT AND MEAT PRODUCTS	Assist. Prof. Betül KARSLIOĞLU	Hasan Kalyoncu University, Türkiye
USAGE OF PROTEIN BASED NANOFIBER IN FOOD INDUSTRY	Assist. Prof. Elif Tuğçe AKSUN TÜMERKAN	Ankara Yıldırım Beyazıt University, Türkiye
NUTRITIONAL VALUE OF SHRIMP BOILING WATER AND POTENTIAL USAGE IN FOOD INDUSTRY	Assist. Prof. Elif Tuğçe AKSUN TÜMERKAN	Ankara Yıldırım Beyazıt University, Türkiye

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Session-1, Hall-2**17.03.2023****Moderator: Prof. Dr. Mitat ŞAHİN****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 14:00 – 16:00**

Title	Author(s)	Affiliation
INVESTIGATION of Salmonella spp., L.monocytogenes and S.aureus PRESENCE in HALLOUMI/HELLIM CHEESE SOLD in NORTHERN CYPRUS	Fatma Işın MAHAN Assoc. Prof. Beyza H. ULUSOY	Tarım Ve Doğal Kaynaklar Bakanlığı, Lefkoşa Kktc Yakın Doğu Üniversitesi Lefkoşa Kktc
SOME QUALITY CHANGES OCCURING IN POTATOES STORED AT DIFFERENT TEMPERATURES	Hafize CİN Assoc. Prof. Engin DEMİRAY	Pamukkale University, Türkiye
PSYCHOBOTICS IN FERMENTED FOODS	Neslihan AYAĞ Prof. Dr. Elif DAĞDEMİR Dr. Sümeyra IŞIK	Atatürk University, Türkiye
COLD BREW COFFEE: CHEMICAL AND SENSORY PROPERTIES	Ceyda DADALI Assoc. Prof. Emine NAKİLCİOĞLU	Ege University, Türkiye
THE NUTRITIVE VALUE AND HEALTH BENEFITS OF TIGERNUT (<i>Cyperus esculentus</i> L.)	Assoc. Prof. Emine NAKİLCİOĞLU Ceyda DADALI	Ege University, Türkiye
METABOTICS	Berfin ELMAS DEMİRALP Prof. Dr. Zerrin ERGİNKAYA	Çukurova University, Türkiye
POSTBIOTICS: HEALTH EFFECTS AND POTENTIALITY IN FUNCTIONAL FOODS	Dr. Vildan AKDENİZ	Ege University, Türkiye
PROBIOTICS AND MICROENCAPSULATION APPLICATIONS	Assist. Prof. Nurdan ARSLANKOZ İŞLEYEN Lect. Dr. Muhammet Fatih İŞLEYEN	Bolu Abant İzzet Baysal University, Türkiye
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Session-1, Hall-3**17.03.2023****Moderator: Assoc. Prof. Mustafa Makav****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 14:00 – 16:00**

Title	Author(s)	Affiliation
EFFECT OF OSMOTIC DEHYDRATION WITH VACUUM PRETREATMENT ON MASS EXCHANGE AND DRYING KINETICS OF RED BEET	Dr. Latife Betül GÜL	Giresun University, Türkiye
EFFECT OF NARINGENIN ON N ^E -(CARBOXYMETHYL) LYSINE (CML) FORMATION IN MEATBALLS	Ress. Assist. Dr.Mehmet Emin AYDEMİR Assoc. Prof. Serap KILIÇ ALTUN Assoc. Prof. Kasım TAKIM	Harran University, Türkiye
ANTIMICROBIAL EFFECT OF HERBAL LIQUID EXTRACTS ON COLD SMOKED SALMON (<i>SALMO SALAR</i>)	Dr. Mutlu PILAVTEPE-ÇELİK İsmail ACAR	Kocaeli University, Türkiye
EFFECT OF HIGH PRESSURE HOMOGENIZATION ON CONFORMATIONAL AND FUNCTIONAL PROPERTIES OF SESAME PROTEIN ISOLATE	Tuğba BASKINCI Osman GÜL	Kastamonu University, Türkiye
BIOACTIVE PROPERTIES OF TARRAGON (<i>ARTEMISIA DRACUNCULUS</i> L.) EXTRACT AND ESSENTIAL OIL	Buse DURMAZ Gülten TİRYAKİ GÜNDÜZ	Ege University, Türkiye
THE EFFICACY OF ULTRASOUND TREATMENT COMBINED WITH PLANT MATERIALS ON FOODBORNE PATHOGENS	Prof. Dr. Gülten TİRYAKİ GÜNDÜZ Ayça KORKMAZ VURMAZ Özge AKGÜL	Ege University, Türkiye
EVALUATION OF SMOKED FISH (<i>Oncorhynchus mykiss</i>) BY-PRODUCTS IN NOODLE MANUFACTURING	Bekir TUFAN	Karadeniz Teknik University, Türkiye
CLEAN LABELING OF BAKERY PRODUCTS	Assist. Prof. Görkem ÖZÜLKÜ	Yıldız Teknik University, Türkiye
MULTIDISCIPLINARY INVESTIGATION OF ANOREXIA NERVOSA	Dr. Füsün SUNAR Dr. Umay Bilge BALTACI	KTO Karatay University, Türkiye Ahi Evran University, Türkiye
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Session-1, Hall-4**17.03.2023****Moderator: Prof. Dr. Fatih BÜYÜK****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 14:00 – 16:00**

Title	Author(s)	Affiliation
EFFECT OF CHICKPEA SEED TREATMENT WITH TRICHODERMA ASPERELLUM IN THE CONTROL OF FUSARIUM EQUISETI, THE CAUSAL AGENT OF ROOT ROT	Adnani M, El Hazzat N, Msairi S, El Alaoui MA, Mouden N, Selmaoui K, Benkirane R, OuazzaniTouhami A, Douira A	Université Ibn Tofail, Morocco Université Mohammed 1er, Morocco
COMPARATIVE PATHOGENIC CAPACITY OF THREE FUNGAL SPECIES ONTO DETACHED LEAVES OF SABRINA STRAWBERRY VARIETY	Najoua Mouden, Amina Ouazzani Touhami, Benkirane Rachid, Karima Selmaoui, Douira allal	Université Mohammed 1er Oujda, Maroc (Morocco) Université Ibn Tofail, Kénitra, Maroc (Morocco)
MORPHOBIOLOGICAL CHARACTERISTICS OF THE REDTAIL CATFISH PHRACTOCEPHALUS HEMIOLIOPTERUS (BLOCH & SCHNEIDER, 1801)	Vitalii Sapunov Ph.D. Oleh Marenkov	Oles Honchar Dnipro National University, Dnipro, Ukraine
BACTERIOLOGICAL QUALITY OF RAW OVINE MILK	Ferenc Peles Andualem Tonamo István Komlósi	University of Debrecen, Debrecen, Hungary
FOOD AND VECTOR-BORNE PARASITIC INFECTIONS	Yusuf Muhammad Sanyinna, Ibrahim Shuaibu, Ridwan Nuhu Ahmed, Yusuf Ibrahim Alhaji, Nasiru Mohammed, Amina Muhammad	Nigerian Army University Biu, Nigeria. Kebbi State University of Science and Technology, Nigeria. Sokoto State University, Nigeria. Umaru Ali Shinkafi Polytechnic, Nigeria. State College of Basic and Remedial Studies, Sokoto, Nigeria.
ACRYLAMIDE: THE DANGER IN OUR DAILY FOOD	Toader George, Palade Aurelian Relu, Toader Elena Violeta, Ilie Leonard	USAMV Bucharest, Bucharest, Romania Academy of Economic Studies, Bucharest, Romania
DISTRIBUTION OF PARASITES OF MONOGENEA CLASS IN THE FISH OF PRIDNEPROVSKY REGION	Anna Iliukhina Oleh Marenkov Oleg Shugurov	Oles Honchar Dnipro National University, Ukraine.
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Session-1, Hall-5**17.03.2023****Moderator: Shaukat Ali****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 14:00 – 16:00**

Title	Author(s)	Affiliation
GROWTH AND YIELD OF RICE USING MAJA FRUIT WASTE LIQUID ORGANIC FERTILIZER	Purwaningsih, Sri Rahayu	Tanjungpura University, Pontianak, West Kalimantan Pancabhakti University, Pontianak, West Kalimantan
LISTERIA MONOCYTOGENES IN FOOD PRODUCTS IN BRAZIL (2017-2022): A SYSTEMATIC REVIEW	Paula Milena Melo Casais, Tonya Azevedo Duarte	Universidade Federal da Bahia
BIOLOGICAL APPLICATIONS OF PROBIOTICS IN AQUACULTURE AND FISH FARMING INDUSTRIES	Saiqa Andleeb, Sundas Nasreen, Shaukat Ali	University of Azad Jammu and Kashmir / Government College University, Lahore, Pakistan
A NEW PERSPECTIVE OF FOOD REGULATION: FOOD SAFETY AND THE USE OF BLOCKCHAIN	Maura Mattalia Eugenia Jona Ludovica Lano	University of Turin
BIOACTIVE COMPOUNDS OF NUGGET HOP FOR COSMETIC USE	Briolanza DOS SANTOS, Vanessa PAULA, Luís PEDRO, Olívia R. PEREIRA, Hugo GOES, Susana M. CARDOSO, Maria João SOUSA	Instituto Politécnico de Bragança, Portugal University of Lisbon, Portugal University of Aveiro, Portugal
NUTRITIONAL PROFILE AND BIOACTIVE CONSTITUENTS OF POMELO FRUIT	Simple Sharma, Barinderjit Singh	I. K. Gujral Punjab Technical University, India
NUTRITIONAL PROFILE AND BIOACTIVE CONSTITUENTS OF POMELO FRUIT	Simple Sharma, Barinderjit Singh	I. K. Gujral Punjab Technical University, India
HEAVY METALS IN HEN EGG, AMOUNT AND HAZARDS	Sara Bazzaz	Shahid Beheshti University of Medical Sciences, Tehran, Iran.

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Session-1, Hall-6**17.03.2023****Moderator: Favour Chukwuemeka Uroko****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 14:00 – 16:00**

Title	Author(s)	Affiliation
PLASMA AS A PROMISING TECHNOLOGY IN THE FOOD SYSTEMS: STATE OF THE ART AND NEW TRENDS	Hedayat Hosseini, Fatemeh Habibollahi, Bahare Mohammadi, Amin Abbasi	Shahid Beheshti University of Medical Sciences, Tehran, Iran
DEVELOPMENT OF EDIBLE FOOD PACKAGING FILMS FROM FINGER MILLET STARCH	Naina Gautam Raj Kumar Rishabh Kumar Saran Shashikant Yadav	Research Scholar, Dr B R Ambedkar National Institute of Technology Jalandhar, Department of Chemical Engineering, Jalandhar (Punjab) India Scientist, Central Building Research Institute (CBRI), Roorkee (Uttarakhand) India Assistant Professor, Chitkara University Department of Civil Engineering, CUIET-Applied Engineering, (Punjab) India Assistant Professor, Dr B R Ambedkar National Institute of Technology Jalandhar, Department of Chemical Engineering, Jalandhar (Punjab) India
ECONOMICS OF SELECTED VEGETABLES IN KHYBER PAKHTUNKHWA-PAKISTAN	Auzair Javaid Butt, Irfan Ullah, Harun Uçak	The University of Agriculture, Pakistan. Alanya Alaaddin Keykubat University, Türkiye
ASSESSING BIO-DIVERSE FOODS IN DIETARY INTAKE SURVEYS-A CASE STUDY CONSIDERING RANDOM SELECTED SAMPLES	Samanda Gjoni, Flavia Gjata, Florida Hajderaj, Emirjana Hasanaj, Klodjana Lamaj, Aurora Manaj, Manjola Sala, Megisa Sulenji, Nertila Mucollari	Agricultural University of Tirana, Tirana, Albania
MONITORING THE OCCURANCE OF OCHRATOXIN A IN GREEN AND ROASTED COFFEE IN IRAN-SHIRAZ MARKET BY USING HPLC-FLD	Marzieh Rashedinia, Zahra Hasanzadeh, Shoreh Alipour, Zeinab Bedroud, Mohammad javad Khoshnoud	Shiraz University of Medical Sciences, Shiraz, Iran
PROBIOTIC EDIBLE FILM WITH AQUEOUS CLOVE EXTRACT	Lejaniya Abdul Kalam Saleena, Liew Phing Pui	UCSI University Kuala Lumpur, Malaysia
FOOD SECURITY AND RELIGIOUS CONFLICT IN NIGERIA: CHALLENGING THE CHALLENGES	Favour Chukwuemeka Uroko Gladys Akabike	University of Nigeria Nsukka
LCMS STUDY OF THE INDIGENOUS FRUITS AND VEGETABLES OF INDIAN HIMALAYAN REGION	Murtaza Gani, Tanveer Alam, Khalid ul Islam Rather	HNB Garhwal University Srinagar (Garhwal) Uttrakhand India. High End Instrumentation Lab, India

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Session-2, Hall-1**17.03.2023****Moderator: Assoc. Prof. Mehmet ARSLAN****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 16:30 – 18:30**

Title	Author(s)	Affiliation
UNDERSTANDING FOOD LITERACY: A REVIEW	Dr. Banu Akgün Nurcan AYŞAR GÜZELSOY İlkem DEMİRKESEN MERT Vér ANDRÁS Gabriella JANKÓ-KNAPP Angel Martinez SANMARTÍN Ahmet BUDAKLIER	Gıda ve Yem Kontrol Merkez Araşt. Enst. Müd., Bursa, Türkiye Tarımsal Araştırmalar ve Politikalar Genel Müdürlüğü, Ankara, Türkiye. Széchenyi István University, Győr, Macaristan. National Technological Centre for the Food and Canning Industry, Murcia, İspanya
DETERMIANTION OF MICROBIAL FLORA IN TRADITIONALLY PRODUCED SALTED FISH IN TRABZON AND ARTVIN PROVINCES	Assist. Prof. Nurcan ERBİL Assoc. Prof. Yusuf ALAN	Ardahan University, Türkiye
DETERMINATION OF SOME BIOLOGICAL CHARACTERISTICS OF <i>CUCURBITA MOSCHATA</i> DUCHESNE FRUIT GROWN IN THE TBILISI REGION	Assoc. Prof. Zehra Tuğba MURATHAN Assist. Prof. Nurcan ERBİL Assoc. Prof. Mehmet ARSLAN	Ardahan University, Türkiye
SUSTAINABLE TECHNOLOGIES TO IMPROVE THE OXIDATIVE STABILITY OF FISH OIL	Esra SOLAK Hasene Keskin ÇAVDAR Sibel FADİLOĞLU	Gaziantep University, Türkiye.
FUNCTIONAL PASTA PRODUCTION WITH USED COFFEE GROUND	Lect. Kübra TOPALOĞLU GÜNAN Lect. Tuğçe BOĞA Ress. Assist. İkbâl Ertuğrul DİKEÇ Assoc. Prof. Perihan YOLCI ÖMEROĞLU Assoc. Prof. Ömer Said TOKER Prof. Dr. Enes DERTLİ	Maltepe University, Türkiye Uludağ University, Türkiye Yıldız Teknik University, Türkiye
NUTRITIONAL VALUE AND FUNCTIONAL PROPERTIES OF AMARANT SEED	Murat ATASEVEN Prof. Dr. Osman KOLA Assoc. Prof. Oktay TOMAR	Adana Alparslan Türkeş Bilim ve Teknoloji University, Türkiye Kocaeli University, Türkiye
GENERAL PROPERTIES OF AMARANTH AND THE CHEMICAL COMPOSITION OF SEEDS	Murat ATASEVEN Prof. Dr. Osman KOLA Assoc. Prof. Oktay TOMAR	Adana Alparslan Türkeş Bilim ve Teknoloji University, Türkiye Kocaeli University, Türkiye
DETERMINATION OF FUNGAL FLORA OF CHEESES THAT MADE AT HOME AND SOLD COMMERCIALY IN ÇANKIRI PROVINCE	Aysu AYTAÇ Deniz ÇAKAR Beyza AKSOY Seçil Akıllı ŞİMŞEK	Çankırı Karatekin University, Türkiye

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Session-2, Hall-2**17.03.2023****Moderator: Prof. Dr. Serpil DAĞ****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 16:30 – 18:30**

Title	Author(s)	Affiliation
THE INHIBITION EFFECTS OF SOME PHENOLIC COMPOUNDS ON BOVINE MILK LPO (LACTOPEROXIDASE) ENZYME ACTIVITY	Dr. Serpil GERNİ Dr. Cansu ÖZTÜRK Prof. Dr. Hasan ÖZDEMİR Prof. Dr. Ö. İrfan KÜFREYİOĞLU	Atatürk University, Türkiye
THE EFFECT OF PACKAGING TYPE AND STORAGE CONDITIONS ON MICROELEMENT CONTENT OF TRADITIONALLY PRODUCED MALATYA CHEESE	Doğan YAŞAR Şenol KÖSE	Van Yüzüncü Yıl University, Türkiye
DEVELOPMENT OF COMPOSITE FOOD PACKAGING MATERIALS FROM SYNTHETIC AND BIODEGRADABLE POLYMERS WITH IMPROVED ENVIRONMENTAL PROPERTIES	Burcu COŞKUN Adnan Fatih DAĞDELEN	Bursa Teknik University, Türkiye
DEEP EUTECTIC SOLVENTS AND UTILIZATION IN EXTRACTION OF FOOD COMPONENTS	Ress. Assist. Dr. H. Betül YELER	Pamukkale University, Türkiye
ESCHERICHIA COLI IN THE BACTERIOLOGICAL QUALITY OF WATER	Prof. Dr. Mustafa GÜRSER Ress. Assist. Pınar ŞEKERCİ KELEŞ	Atatürk University, Türkiye Ardahan University, Türkiye
ENCAPSULATION APPLICATIONS IN FOOD TECHNOLOGY	Öğretim Gör. Kübra KORKMAZ	Batman University, Türkiye
PRODUCTION OF MICROENCAPSULATED CREAM POWDER BY SPRAY DRYING METHOD	Murat Emre TERZİOĞLU Hüsamettin Tunç İhsan BAKIRCI	Atatürk University, Erzurum, Türkiye.

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Session-2, Hall-3**17.03.2023****Moderator: Prof. Dr. Nebahat BİLGE****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 16:30 – 18:30**

Title	Author(s)	Affiliation
PLANT-BASED PROTEINS AND THEIR USAGE IN THE FOOD INDUSTRY	Gamze Nur OLGUN Ress. Assist. İzzet TÜRKER Assoc. Prof. Hilal İŞEROĞLU	Tokat Gaziosmanpaşa University, Türkiye
ANTIMICROBIAL RESISTANCE IN FOOD PATHOGENS	Prof. Dr. Nebahat BİLGE Ress. Assist. Gönül Damla ALTUNTAŞ	Kafkas University, Türkiye
FLEXIBLE PACKAGING IN THE CIRCULAR ECONOMY	Assoc. Prof. Özlem ESMER Betül ER	Ege University, Türkiye
EFFECTS OF FLUCONAZOLE ON SURVIVAL, DEVELOPMENT AND SOME ADULT TRAITS OF <i>DROSOPHILA MELANOGASTER</i> (MEIGEN)	Lect. Dr.Gökçe ÜSTÜNDAĞ Prof. Dr. Kemal BÜYÜKGÜZEL Prof. Dr. Ender BÜYÜKGÜZEL	Zonguldak Bülent Ecevit University, Türkiye
DESIGN AND OPTIMIZATION OF RAPID MASSAGE ON A PNEUMATIC PULSATOR IN MILKING MACHINES	Halil ÜNAL Zahra AMİN	Bursa Uludağ University, Türkiye
THE INVESTIGATION OF SACRIFICED MEAT DURING EID AL-ADHA FESTIVAL IN TERMS OF FOOD SAFETY	Assist. Prof. Muhsin ÖZTÜRK Ress. Assist. Betül YILDIRIM Assist. Prof. Dr., Elif GÜNALAN	İstanbul Sağlık ve Teknoloji University, Türkiye
THE INVESTIGATION OF FOOD LABELS OF BABY BISCUITS WHICH SALE ON ONLINE SHOPPING WEBSITES IN THE TÜRKİYE, USA and GERMANY	Kader ÇELİK Bengi Su TUNCER Assist. Prof. Elif GÜNALAN	İstanbul Sağlık ve Teknoloji University, Türkiye
PRODUCTION OF FUNCTIONAL BONE BROTH ENRICHED WITH THE ADDITION OF GRAPE SEEDS	Ress. Assist. Ertürk BEKAR Dr. Öğr. Büşra ACOĞLU ÇELİK Arş. Gör.Taha Turgut ÜNAL Fatma ERSOY Fatih Furkan KARAKOL Sedef Irmak BESİMOĞLU Yonca UZUN	Bursa Uludağ University, Türkiye

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Session-2, Hall-4**17.03.2023****Moderator: Ahmad ALSALEH****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 16:30 – 18:30**

Title	Author(s)	Affiliation
ADVANCES IN MILK BASED SEROLOGICAL TECHNIQUES FOR THE SCREENING OF BOVINE BRUCELLOSIS	Muhammad Shahbaz SHARIF Evrin GENÇ Özlem BÜYÜKTANIR YAŞ Oktay GENÇ	Ondokuz Mayıs University, Türkiye
MODELLING OF SENSORY AND TEXTURAL PROPERTIES OF FRESH TYPE KASHAR CHEESES	Dr. Pınar KIZILKAYA Dr. İzzet ÖZHAMAMCI Dr. Bilge Sayın BÖREKÇİ Dr. Mehmet BAYGIN Dr. Akif Göktuğ BOZKURT	Ardahan University, Türkiye
INVESTIGATION OF MINERALS IN FRUIT PEELS POWDER: ULTRASOUND ASSISTED EXTRACTION FOLLOWED BY FLAME ATOMIC ABSORPTION SPECTROMETRY	Dr. Mahmood Ahmed	University of Education, Lahore-Pakistan
POTENTIAL OF FOOD-BASED CURCUMIN AS CAPPING AGENTS AND ANTIOXIDANTS IN COLON CANCER TREATMENT	Nurhidayatullaili Muhd Julkapli, Lina Adnan Al-Ani	Universiti Malaya, Malaysia
ABOUT OPTIMUM AND INADMISSIBLE SOIL BULK DENSITY PLOUGHED UP	Oksana Bihun	NSC "ISSAR named after O.N. Sokolovsky", Kharkiv, Ukraine
DOSE AND DOSE EFFECT OF SOME DRUGS IN CERTAIN STAGES OF EMBRYONIC DEVELOPMENT OF THE CHICKEN EGG	Beadini A, Hasani L, Elezi A	University of Tetovo, Republic of North Macedonia
OFF-SEASON PRODUCTIVITY FROM BLACKBERRY CULTIVARS IN REGIONS WITH LITTLE CHILLING: promising management for application in Mozambique and African regions	Gabriel Laquete de Barros, Alexandre Dias da Silva, Alisson Rocha de Aragão, Rafael Pio	Universidade Federal Rural do Semi-Árido -Mossoró, Rio Grande do Norte, Brasil
RISK ASSESSMENT OF MERCURY CONTENT IN DURUM WHEAT FROM TURKIYE	Ahmad ALSALEH	Yozgat Bozok University, Türkiye
RELATIONSHIP BETWEEN THE YELLOW INDEX AND THE B-CAROTENE CONTENT IN JERSEY COW CREAM	Mahsa Dehnavi, Javier Mateo, Ana B. Rodríguez, Irma Caro, F. Javier Giraldez	University of León, Spain. INATEGA group Ctra. Spain. University of Valladolid, Spain CSIC-Universidad de León, Spain

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Session-2, Hall-5**17.03.2023****Moderator: Anna Kopiczko****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 16:30 – 18:30**

Title	Author(s)	Affiliation
MYCOFLORA CONTAMINATION OF DRIED SMOKED FISH FROM MARKETS IN KADUNA, KADUNA STATE, NIGERIA	Shitu, S., Imam, Z. I., Abdullahi, M. G.	Kaduna Polytechnic, Kaduna State, Nigeria
BIOECONOMY: A MECHANISM FOR SOLVING THE FOOD CRISIS	Olena Budiakova	Kyiv National University of Technologies and Design, Kyiv, Ukraine
FOOD PRACTICE AND BMI AMONG COLLEGE GIRLS: AN ASSOCIATION	Shylaja Jeyapaul Dr. Raji Kaliaperumal	King Khalid University, Saudi Arabia
SOCIAL, BEHAVIOURAL AND OTHER DETERMINANTS OF FOOD CHOICE AMONG EUROPEAN ORIGIN YOUNG WOMEN: THE RESULTS OF CROSS-SECTIONAL OBSERVATIONAL STUDY	Anna Kopiczko Monika Lopuszanska-Dawid Patrycja Widlak Małgorzata Jusiakowska - Piputa	Józef Piłsudski University of Physical Education in Warsaw, Faculty of Physical Education, Department of Human Biology, Warsaw, Poland Witelon Collegium State University, Faculty of Health and Physical Culture Sciences, Department of Public Health, Legnica, Poland
IMPORTANCE OF CULINARY CULTURE IN VIETNAMESE BELIEFS CASE STUDY: SOUTHWEST VIETNAM	Bui Man Nghi Nguyen Thi Hoai Ngoc Dao Thanh Tam	University of Architecture Ho Chi Minh City, Viet Nam
3D FOOD PRINTING TECHNOLOGY	Dr. Rabia Shabir Ahmad	Department of food Science, GCUF
REGIONAL SUPERFOODS AS POTENTIAL OF REGIONAL INDUSTRY OF HOSPITALITY	Olena A. Lykholat Tetyana Y. Lykholat Maksim O. Kvitko Yuriy V. Lykholat	<i>University of Customs and Finance, Dnipro, Ukraine</i>
BULGUR: NUTRITIONAL AND THERAPEUTIC PERSPECTIVES	Amara Rasheed, Farhan Saeed, Muhammad Afzaal, Bushra Niaz, Muzzamal Hussain, Muhammad Ahtisham Raza, Huda Ateeq	Department of Food Science, Faculty of Life Sciences, Government College University Faisalabad, Faisalabad, Pakistan

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Session-2, Hall-6**17.03.2023****Moderator: Dr. Faisal Zulhumadi****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 16:30 – 18:30**

Title	Author(s)	Affiliation
ANTI-ULCER EFFECT OF ALGERIAN FICUS CARICA L. FRUITS EXTRACT AGAINST HCL-ETHANOL INDUCED GASTRIC MUCOSAL INJURY IN MICE “VALORIZATION OF A LOCAL VARIETY”	Leila KEBAL Noureddine DJEBLI	University Abd El Hamid Ibn Badis Mostaganem, Faculty of natural and life sciences, Department of Biology, Mostaganem, Algeria
ANTIOXIDANTS: A NEW QUALITY PARAMETER FOR PROCESSED FOODS	Muhammad Kamran Khan Muhammad Faizan Afzal	Department of Food Science, Government College University Faisalabad, Pakistan
THE LEGAL REGULATION FOR LABORATORY ANALYZES OF FOOD DURING THE IMPORT OF REPUBLIC OF NORTH MACEDONIA AND THEIR ECONOMIC JUSTIFICATION	Vasilka Poposka Trenevsk Blagica Sekovska Elena Davitkovska	Skopje at Ss. Cyril and Methodius University in Skopje, Republic of North Macedonia
JOKER#2 OR DERIVATION OF LACKING DATA IN BIOLOGICAL SYSTEMS	László Pitlik, Dániel Váradi	Kodolányi János University and MY-X research team Hungary
DRONE APPLICATION IN PADDY FARMING: MALAYSIA AND INDONESIA COMPARISON	Faisal Zulhumadi Wan Nadzri Osman Mohamed Najib Salleh Herman Shah Anuar	Universiti Utara Malaysia, School of Technology Management and Logistics, Technology Management Department, Sintok, Malaysia
EATING PATTERNS AND HEALTH BENEFIT SCORE ZONE OF UNIVERSITY STUDENTS IN SAUDI ARABIA	Shylaja Jeyapaul Dr. Raji Kaliaperumal	King Khalid University, Saudi Arabia
PASTORALISTS SOURCES OF INFORMATION ON MANAGEMENT PRACTICES OF CATTLE DISEASES AND PARASITES IN NORTH EAST, NIGERIA	Bashir M.B., Ndaghu A.A., Anonguku I., Wambai A.A, Nuhu F.	Ahmadu Bello University, Zaria, Kaduna State, Nigeria Modibbo Adama University Yola, Adamawa State Sarwuan Tarka University, Makurdi, Benue State Wurkum Chieftdom Karim Lamido, Taraba State

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Session-1, Hall-1**18.03.2023****Moderator: Prof. Dr. Salih OTLU****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 10:00 – 12:00**

Title	Author(s)	Affiliation
THE USE OF ELECTRONIC NOSE IN FOODS	Candan CANÖZER Assoc. Prof. Şenol KÖSE	Van Yüzüncü Yıl University, Türkiye
POTENTIAL USE OF BLACK CHICKPEA AS AN ENRICHMENT MATERIAL IN CEREAL PRODUCTS	Assist. Prof. Ezgi ÖZGÖREN	Pamukkale University, Türkiye
DETERMINATION OF THE EFFECTS OF DIFFERENT PACKAGING TECHNOLOGIES ON THE NUTRITIONAL VALUES OF FRESH-CUT SPINACH	Assoc. Prof. Özlem KIZILIRMAK ESMER Inna CHISACOVA Aysima YEDİLER	Ege University, Türkiye
SOME QUALITY PARAMETERS OF KARS GRUYERE CHEESE	Assist. Prof. Tuğba KILIÇ Assist. Prof. Gülcen KOYUNCU	Kilis 7 Aralık University, Türkiye
ISOLATION OF A NOVEL LYTIC BACTERIOPHAGE INFECTING <i>SHIGELLA SONNEI</i> CAUSING EPIDEMICS	Assist. Prof. Medine ÇOTAK Assist. Prof. Ayşe KARACALI TUNÇ Büşra Merve SARITAŞ	Iğdır University, Türkiye
OBTAINING BARLEY OIL FROM MALT WASTE	Müge GÜZEY	Bursa Teknik University, Türkiye
OXIDATIVE INFLUENCE OF DIETARY OXYCLOZANIDE ON MIDGUT AND FAT BODY TISSUE OF GALLERIA MELLONELLA	Lect. Cihat ÇELİK Prof. Dr. David W. Stanley Prof. Dr. Ender BÜYÜKGÜZEL	Zonguldak Bülent Ecevit University, Türkiye Biological Control of Insects Research Laboratory, USDA/Agricultural Research Service, Columbia, MO, USA
DETECTION OF THE SUSCEPTIBILITY OF PROBIOTIC BACTERIA TO ANTIBIOTICS BY E-TEST METHOD	Emine Mine ÇOMAK GÖÇER Firuze ERGİN ZEREN	Akdeniz University, Türkiye
NEUROENDOCRINE CONTROL OF FOOD INTAKE AND REGULATION	Dr. Saltuk Buğra BALTACI Dr. Aylin ÜSTÜN	İstanbul Medipol University, Türkiye

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Session-1, Hall-2**18.03.2023****Moderator: Prof. Dr. Tarkan ŞAHİN****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 10:00 – 12:00**

Title	Author(s)	Affiliation
MORKARAMAN CİNSİ TOKLULARDA GLUTEN İLE BESLEMENİN KESİM VE KARKAS ÖZELLİKLERİ	Dr. Mazhar Burak CAN Prof. Dr. Halit İMİK	Ataturk University, Türkiye
DETERMINATION OF SILAGE QUALITY IN MIXTURES OF TRITICALE AND COMMON VETCH AT DIFFERENT INCLUSION RATES	Prof. Dr. Tarkan ŞAHİN Ress. Assist. Tuğçe Merve BERBEROĞLU Benian YILMAZ Ebrar FİLİZOĞLU Assist. Prof. Mükremin ÖLMEZ	Kafkas University, Türkiye
SILENT DANGER MYCOTOXINS AND THEIR BIOLOGICAL DETOXIFICATION	Öğr. Gör. Taner LEVENDOĞLU Prof. Dr. Taylan AKSU	Van Yüzüncü Yıl University, Türkiye
EFFECT OF STARTER CULTURE INOCULATION ON COLOR STABILITY OF DRY FERMENTED SAUSAGES DURING RIPENING PERIOD	Dr. Gülay Merve BAYRAKAL Assist. Prof. Funda YILMAZ EKER Dr. Esra AKKAYA	İstanbul University, Türkiye
DETERMINATION OF THE IN VITRO DIGESTIBILITY OF SOME LOW QUALITY ROUGHAGE SOURCES	Samet KUZGUN Assoc. Prof. Mustafa SALMAN	Ondokuz Mayıs University, Türkiye
SUSCEPTIBILITY PROFILES OF <i>B. CEREUS</i> STRAINS TOWARDS CERTAIN ANTIBIOTICS ISOLATED FROM PLANT- DERIVED FOODS	Assist. Prof. Semiha YALÇIN Assist. Prof. Başak Gökçe ÇÖL Prof. Dr. Harun AKSU	Muğla Sıtkı Koçan University, Türkiye İstanbul Gelişim University, Türkiye İstanbul Üniversitesi- Cerrahpaşa, University, Türkiye.
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Session-1, Hall-3**18.03.2023****Moderator: Assoc. Prof. Kanber KARA****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 10:00 – 12:00**

Title	Author(s)	Affiliation
NUTRIENT COMPOSITION AND IN VITRO RUMINAL FERMENTATION OF CROWN VETCH FORAGE	Assoc. Prof. Kanber KARA	Erciyes University, Türkiye
CONCENTRATION AND PREVALENCE OF MYCOTOXIN IN EXTRUDED DRIED TYPE DOG FOODS	Assoc. Prof. Kanber KARA	Erciyes University, Türkiye
THE EFFECT OF VITAMIN-MINERAL COMBINATION TREATMENT ON SOME FERTILITY PARAMETERS IN AKKARAMAN EWES DURING THE BREEDING SEASON	Assist. Prof. Mükremin ÖLMEZ Prof. Dr. Tarkan ŞAHİN Prof. Dr. Mehmet Akif YÖRÜK Assist. Prof. Buket BOĞA KURU Assoc. Prof. Özlem KARADAĞOĞLU Assoc. Prof. Mushap KURU Hatice Gizem BÜYÜKBAKİ	Kafkas University, Türkiye
POTENTIAL USE OF METHYL SULFONYL METHANE IN ANIMAL NUTRITION	Ress. Assist. Dr. Emre YILMAZ, Ress. Assist. Dr. Soner UYSAL Dr. Ayşe UYSAL Ress. Assist. Şermin TOP	Atatürk University, Türkiye
IgY AND ITS IMPORTANT OF ANIMAL HEALTH	Assist. Prof. Mükremin ÖLMEZ Sakine DALĞA Prof. Dr. Tarkan ŞAHİN Prof. Dr. Mitat ŞAHİN	Kafkas University, Türkiye Tarsim Van Bölge Müdürlüğü, Van, Türkiye Kırgızistan-Türkiye Manas University, Kırgızistan
EFFECTS OF DIFFERENT POWDER OREGANO (<i>Origanum vulgare L.</i>) LEVELS ON GROWTH PERFORMANCE OF BROILERS	Assoc. Prof. Özlem KARADAĞOĞLU Lect. Rozhan Riaz Hatice Gizem BÜYÜKBAKİ Prof.Dr.Tarkan ŞAHİN	Kafkas University, Türkiye
DETERMINATION OF RELATIVE FEED VALUE AND IN VITRO TRUE DIGESTIBILITY OF HUNGARIAN VETCH-OAT MIXTURE	Zeki KILIN Prof. Dr. Zehra SELCUK	Ondokuz Mayıs University, Türkiye.
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Session-1, Hall-4**18.03.2023****Moderator: Assoc. Prof. Tauseef ur Rehman****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 10:00 – 12:00**

Title	Author(s)	Affiliation
PHYTOCHEMICAL ANALYSIS AND IN VITRO ANTHELMINTIC ACTIVITY OF METHANOLIC AND ETHYL ACETATE EXTRACTS OF AZADIRACHTA INDICA (NEEM)	Tauseef ur Rehman	Department of Parasitology, Faculty of Veterinary and Animal Sciences, The Islamia University of Bahawalpur
CORRELATION BETWEEN CYSTIC OVARIAN DISEASE AND HORMONAL IMBALANCES	Kave Koorehpaz	Urmia university, Faculty of Veterinary Medicine, Department of Theriogenology and Obstetrics, Urmia, Iran.
TREATMENT PROTOCOLS OF BENING PROSTATIC HYPERPLASIA IN MALE DOGS	Kave Koorehpaz	Urmia university, Faculty of Veterinary Medicine, Department of Theriogenology and Obstetrics, Urmia, Iran.
IMPORTANCE OF PHYSIOTHERAPY IN VETERINARY SCIENCES: A MINIREVIEW	Humera Tahir Syed Muhammad Shah Ibrar Ahmed	Shahida Islam College of Rehabilitation Sciences, Department of Physiotherapy, Lodhran, Pakistan. University Institute of Physiotherapy, The University of Lahore, Pakistan Department of Animal Nutrition and Nutritional Diseases, Faculty of Veterinary Sciences, Selcuk University, Konya, Türkiye
USE OF MUSTARD OIL CAKE AS ALTERNATIVE PROTEIN SOURCE TO FISH MEAL IN PRACTICAL DIETS FOR FINGERLING <i>HETEROPNEUSTES FOSSILIS</i> (BLOCH)	Noorin Zafar	Department of Zoology, Aligarh Muslim University, Aligarh, India.
PLATELETE FEATURES IN YAROSLAV CALVES	Nadezhda Viktorovna Vorobyeva	South-West state University, Kursk, Russia All-Russian Research Institute of Physiology, Borovsk, Russia
FUNCTIONAL ACTIVITY OF PLATELETS IN PIGS IN THE MIDDLE OF EARLY ONTOGENESIS	Elena Sergeevna Tkacheva	Vologda State Dairy Farming Academy named after N.V. Vereshchagin, Vologda, Russia
PLATELET ACTIVITY FOR HEIFERS AGED OVER ONE YEAR	Maya Dmitrievna Shumova, Valentin Alekseevich Bilkov	Vologda State Dairy Farming Academy named after N.V. Vereshchagin, Vologda, Russia
GENERAL BLOOD PARAMETERS IN REPEATED COWS	Ilnura Ibragimovna Fayzullina, Alexander Grigorievich Kudrin	Vologda State Dairy Farming Academy named after N.V. Vereshchagin, Vologda, Russia

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Session-1, Hall-5**18.03.2023****Moderator: Dr. Ali Haider****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 10:00 – 12:00**

Title	Author(s)	Affiliation
THE EXAMINATION OF THE TOTAL PROTEIN AND FIBER CONTENT OF DIFFERENT MUSHROOM POWDERS	Gréta Törös Dr. Ferenc Peles Péter Hajdú Dr. József Prokisch	University of Debrecen, Hungary
INVESTIGATION OF MINOCYCLINE EFFECT ON EXPRESSION CHANGES OF BCL-2 PROTOONCOGENE ON MCF7 BREAST CANCER CELLS	Abedeh Rezaei Mohammad Khalaj-Kondori	University of Tabriz, Tabriz, Iran
DEVELOPMENT OF A NEW VACCINE ADJUVANT BASED IN ZNO AND COTTONSEED OIL NANOEMULSION	Gustavo Sobrevilla- Hernández Diana G. Zarate-Triviño Sara P. Hernández-Martínez Paola L. García-Coronado Moisés A. Franco-Molina	Universidad Autónoma de Nuevo León, San Nicolás de los Garza, Nuevo León, México.
GENETIC APPROACHES TO AMELIORATE HEAT STRESS CHALLENGES IN LIVESTOCK	J.M.Kamali G. Kalaignazhal M. V. Silpa V. Sejian	Rajiv Gandhi Institute of Veterinary Education and Research
TRANSPORTATION STRESS IN FARM ANIMALS: IMPACT ASSESSMENT AND STRATEGIES TO AMELIORATE	E. Binuni Rebez V. Sejian	Rajiv Gandhi Institute of Veterinary Education and Research
IN-VITRO CATALYTIC AND ANTIBACTERIAL POTENTIAL OF GREEN SYNTHESIZED CUO NANOPARTICLES AGAINST PREVALENT MULTIPLE DRUG RESISTANT BOVINE MASTITIS STAPHYLOCOCCUS AUREUS	Anwar Ul-Hamid Hatim Dafalla Abbas Saeed Hakeem Ali Haider Muhammad Ikram	Faculty of Veterinary and Animal Sciences, Muhammad Nawaz Shareef University of Agriculture (MNSUA), Multan 66000, Pakistan
HEALING EFFECTS OF A TEUCRIUM POLIUM CREAM ON EXPERIMENTAL WOUNDS IN THE RABBIT	Belfarhi Leila	University of Annaba
CHEMICAL, PHYSICAL, ELECTRICAL, OPTICAL AND MAGNETIC PROPERTIES OF CANCER CELLS AND MODULATION IN THESE PROPERTIES FOR CANCER THERAPY	Rishav Sharma, Rishabha Malviya	Galgotias University, Greater Noida, Uttar Pradesh India
MEASURING FARM ANIMAL EMOTIONS—SENSOR-BASED APPROACHES	Harshita Singh	Banasthali Vidhyapith university, Rajasthan, India

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Session-1, Hall-6**18.03.2023****Moderator: Major Gheorghe Giurgiu****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 10:00 – 12:00**

Title	Author(s)	Affiliation
EFFECTS OF SACCHAROMYCES CEREVISIAE LIVE CELLS AND CULTURE ON GROWTH AND PRODUCTIVE PERFORMANCE IN LACTATING NILI RAVI BUFFALOES	Saeed Ahmed, Mohsin Ali, Mubashar Ali, Nisar Ahmad, Burhan Azam, Farooque Latif	University of Veterinary and Animal Sciences, Lahore. Buffalo Research Institute, Bhuneki, Pattoki. SRC, Lahore.
SUPPLEMENTATION OF MANGO (<i>Mangifera indica</i>) AS A NUTRACEUTICAL PRODUCT IN THE DIET OF POULTRY	Muhammad Waqas Mustafa Salman	Ondokuz Mayıs University, Faculty of Veterinary Medicine, Department of Animal Nutrition and Nutritional Diseases, Samsun, Türkiye
ANTICIPATING CUSTOMER NEEDS AND INCREASING SATISFACTION WITH ZOOS	Roland Schmuck	University of Pécs Faculty of Business and Economics, Department of Leadership and Organizational Sciences, Pécs, Hungary
ENVIRONMENTAL ENRICHMENT IN CAPTIVE BEAR ENCLOSURES	CARMEL PRINS ARUNIMA K.M. D. SREEKUMAR V. SEJIAN	Veterinary Intern, Rajiv Gandhi Institute Of Veterinary Education and Research, Puducherry India
CLIMATE RESILIENT GOAT PRODUCTION IN THE TROPICAL REGIONS	Devamalini B S Edwiga J N Silpa M V Nameer P O Sejian V	College of Climate Change and Environmental Science, Student, Kerala Agricultural University, Kerala, India Rajiv Gandhi Institute Of Veterinary Education And Research, Dean,
IMPACT OF HEAT STRESS ON THE GROWTH PERFORMANCE IN GOATS	GAYATHRI B S ANUPAMA R SILPA M V NAMEER P O SEJIAN V	Kerala Agricultural University, College of Climate Change and Environmental Science, Student, Thrissur, India
MOLECULAR SURVEY OF THE PARASITIC NEMATODE <i>CONTRACAECUM</i> SPP. IN FISH (<i>PLANILIZA ABU</i>) DESTINED FOR HUMAN CONSUMPTION	Hebba mahmowd Muayad A. Hussein Marwa Jawad Firas Alali	Ministry of Education, Mosul, Iraq. Department of biomedical engineering, University of Technology, Baghdad, Iraq. Department of Biology, College of Sciences, University of Kerbala, Karbala, Iraq. Department of Veterinary microbiology and Parasitology, College of Veterinary Medicine, University of Kerbala, Karbala, Iraq.
SUBCHRONIC AND CHRONIC EXPOSURE TO HEXACONAZOLE INDUCED OXIDATIVE STRESS AND HISTOPATHOLOGICAL CHANGES IN THE LIVER OF ALBINO RATS	Mariam Jalal Latifa Ez-Zaher	University Ibn Zohr, Faculty of Science, Laboratory of Cell Biology and Molecular Genetics, Agadir, Morocco
EFFECT OF DIETARY SUPPLEMENTATION OF FENUGREEK SEEDS ON NUTRIENT DIGESTIBILITY, SOME RUMEN AND BLOOD PARAMETERS OF LAMBS	Hoger HIDAYET Kamal MUSTAFA	College of Veterinary Medicine, University of Duhok, Duhok, Iraq.

NATURAL MODULATION OF THE GUT MICROBIOTA IN DOGS WITH SPINAL CORD INJURY	Major Gheorghe Giurgiu, Prof. dr. Manole Cojocaru	Deniplant-Aide Sante Medical Center, Biomedicine, Bucharest, Romania Titu Maiorescu University, Faculty of Medicine, Bucharest, Romania
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Session-2, Hall-1**18.03.2023****Moderator: Assoc. Prof. Mushap KURU****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 12:30 – 14:30**

Title	Author(s)	Affiliation
THE USE OF MELATONIN FOR BREEDING CONTROL IN QUEENS	Fatih BÜYÜKBUDAK Murat FINDIK	Ondokuz Mayıs University, Türkiye
OESTRUS MANAGEMENT IN BUFFALOES	Fatih BÜYÜKBUDAK Murat FINDIK	Ondokuz Mayıs University, Türkiye
THE EFFECT OF ESTRUS SYNCHRONIZATION ON PREGNANCY RATE IN ABAZA GOATS DURING THE BREEDING SEASON	Assoc. Prof. Mushap KURU Assist. Prof. Buket BOĞA KURU	Kafkas University, Türkiye
INFECTION-RELATED ABORTIONS IN DAIRY COWS	Gülşah SARAL Fırdev BİNLİ	Ondokuz Mayıs University, Türkiye
DEFENSE MECHANISM OF THE BREAST GLAND AND REDUCING THE RISK OF MASTITIS IN RUMINANTS	Selinay ALKAYA Nevzat SAAT	Balıkesir University, Türkiye
COMPARISON OF BLOOD SERUM AND URINARY AMH CONCENTRATIONS IN CATS	Assoc. Prof. Semra KAYA Assoc. Prof. Serap KORAL TAŞCI Assist. Prof. Murat Can DEMİR Res. Assist. Dr. Muhammet Ali KARADAĞ Res. Assist. Merve Sena KUMCU Prof. Dr. Cihan KAÇAR Res. Assist. Dilem Gülece ERMUTLU Assoc. Prof. Mushap KURU	Kafkas University, Türkiye
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Session-2, Hall-2**18.03.2023****Moderator: Assoc. Prof. Semra KAYA****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 12:30 – 14:30**

Title	Author(s)	Affiliation
A NEW GENERATION ALTERNATIVE FOR CONTROL of REPRODUCTION IN DOGS - GnRH AGONIST IMPLANTS	Muhammet Ali KARADAĞ Duygu KAYA	Kafkas University, Türkiye
B-MOD AND DOPPLER ULTRASONOGRAPHY IN A COW WITH UTERINE TORSION	Assist. Prof. Murat Can DEMİR Prof. Dr. Cihan KAÇAR	Kafkas University, Türkiye
PESTIVIRUS INFECTION IN PREGNANT SHEEP AND THEIR FOETUSES: AN OVERVIEW OF PAST DATA AND COMPARISON WITH CURRENT LITERATURE	Dr. Can ÇOKÇALIŞKAN	T.C. Tarım ve Orman Bakanlığı, Şap Enstitüsü Ankara, Türkiye
CLINICAL APPROACH TO BREAST HYPERPLASIA IN CATS	İpek İNAN Murat FINDIK	Ondokuz Mayıs University, Türkiye
CARE AND FEEDING IN CAT AND DOG NEONATES	İpek İNAN Murat FINDIK	Ondokuz Mayıs University, Türkiye
A CASE OF UTERINE PROLAPSE IN A KANGAL BITCH	Assist. Prof. Murat Can DEMİR Ress. Assist. Dr. Muhammet Ali KARADAĞ Ress. Assist. Merve Sena KUMCU Assoc. Prof. Mushap KURU Assoc. Prof. Semra KAYA Prof. Dr. Cihan KAÇAR	Kafkas University, Türkiye

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Session-2, Hall-3**18.03.2023****Moderator: Assoc. Prof. Enes AKYÜZ****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 12:30 – 14:30**

Title	Author(s)	Affiliation
DETECTION OF SHEEPPOX VIRUS IN TICKS SAMPLED FROM IZMIR REGION	Mehmet Berat NAYİR Tunahan ÇOMAK Ender DİNÇER Mehmet Özkan TİMURKAN	Dokuz Eylül University, Türkiye
INVESTIGATION OF CRIMEAN-CONGO HEMORRHAGIC FEVER VIRUS (CCHFV) SEROPREVALENCE IN SHEEP	Mustafa ÜĞDÜL Hasbi Sait SALTİK	Burdur Mehmet Akif Ersoy University, Türkiye
VACCINATION STRATEGY FOR PROTECTING NEWBORN CALVES FROM BOVINE ROTAVIRUS AND BOVINE CORONAVIRUS INFECTIONS	Vet. Hek. İbrahim Oktay KURT Prof. Dr. Yakup YILDIRIM	Burdur Mehmet Akif Ersoy University, Türkiye
MACROSCOPIC AND MICROSCOPIC INVESTIGATION OF CANALIS ALIMENTARIUS IN HAMADRYAS BABOON (<i>PAPIO HAMADRYAS</i>)	Assist. Prof. Fatma İŞBİLİR	Siirt University, Türkiye
SEROPREVALENCE OF EPIZOOTIC HEMORRHAGIC DISEASE VIRUS (EHDV) IN DOMESTIC RUMINANTS IN BLACK SEA REGION OF TÜRKİYE	Hanne Nur KURUÇAY Cüneyt TAMER	Ondokuz Mayıs University, Türkiye
RISK ASSESSTMENT ABOUT EFFECTIVENESS OF BIOSECURITY PRACTICES ON HORSE PROPERTIES IN TÜRKİYE	Assist. Prof. Ömer Barış İNCE Assist. Prof. Yavuzkan PAKSOY Dr. Ahmet SAİT	Necmettin Erbakan University, Türkiye Pendik Veterinary Control Institute Directorate Viral Diagnostic Laboratory, Türkiye
CANINE PAPILLOMAVIRUS (CPV) INFECTION DIAGNOSIS AND TREATMENT; PHYLOGENY AND EPIDEMIOLOGY WITH MUCOSAL AUTO-THERAPY REMISSION, TARANTULA CUBENSIS VENOM, LEVAMISOLE+AZITHROMYCINE MEDICATION AND SELF-HEALING, 57 CASES	Assist. Prof. Bilge Kaan Tekelioğlu Assoc. Prof. Çağla Parkan Yaramış Prof. Dr. Nuri TURAN Çağrı AVCİ Vet.Hek. Kasım BERBER5 Prof. Dr. Aydın GÜREL Damla HAKTANIR Assoc. Prof. Kılıncım SÖNMEZ Assist. Prof. Özge Erdoğan BAMAÇ Prof.Dr. Aysun YILMAZ Marie Noelle-Issautier Prof. Dr. Hüseyin YILMAZ	Çukurova University, Türkiye İstanbul Rizem Veteriner Kliniği, Rize, Türkiye İstanbul Cerrahpaşa University, Türkiye Vet.Hek. 69003, Lyon, Fransa.
SCHMALLEMBERG VIRUS INFECTION	Yağmur ÇETİNKAYA	Ondokuz Mayıs University, Türkiye
INVESTIGATION OF LENTIVIRUS INFECTION IN SHEEP IN DENİZLİ PROVINCE	Assist. Prof. Ömer Barış İNCE Dr. Ahmet SAİT	Necmettin Erbakan University, Türkiye Pendik Veterinary Control Institute Directorate, Türkiye

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Session-2, Hall-4**18.03.2023****Moderator: Ivan Pavlovic****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 12:30 – 14:30**

Title	Author(s)	Affiliation
EFFECTS OF CITRUS MAXIMA JUICE ON MATERNAL HIGH FAT-DIET INDUCED CHANGES ON FOETAL MORPHOLOGY, HAEMATOLOGY AND SERUM BIOCHEMISTRY PROFILES IN FEMALE ALBINO RATS	Rita I. Odo, Hillary E. Ugwuanyi, Ifunanya G. Nze	University of Nigeria, Nsukka
SEVERE MORTALITY IN CULTURED BALZANII CICHLID (GYMNOGEOPHAGUS BALZANII) DUE TO NEMATODE INFECTION	Hooman Rahmati-Holasoo	University of Tehran, Tehran, Iran
IMPROVING ANIMAL HEALTH THROUGH FEED HYGIENE	Promise Goodness Adeleye	University of Ilorin, Nigeria
EXPLORING THE ROLE OF EXTENSION SERVICES ON THE IMPROVEMENT OF FOOD SECURITY IN RURAL AREAS	Promise Goodness Adeleye	University of Ilorin, Nigeria
HYDROLOGY AND NUTRIENT ENRICHMENT IN PISCICULTURE - A REVIEW	Vidya Padmakumar Murugan Shanthakumar	Department of Zoology, Bangalore University, Bangalore, India
INVESTIGATION ON PARASITIC INFECTIONS IN THE ORNAMENTAL FISH FARM IN BOJNURD, IRAN	Hooman Rahmati-Holasoo, Hosseinali Ebrahimzadeh Mousavi	University of Tehran, Tehran Iran.
COCCIDIOSIS OF PET DOGS IN BELGRADE AREA DURING 2021	Ivan Pavlovic	Scientific Institute of Veterinary Medicine of Serbia, Belgrade, Serbia
BIOLOGICAL AND ANTI NEWCASTLE DISEASE VIRAL SCREENINGS OF L. SERRIOLA EXTRACTS IN POULTRY	Rahat Andleeb & Asma Ashraf	Department of Zoology, Government College University Faisalabad, Pakistan.
MOLECULAR INVESTIGATION OF ENTEROTOXINS IN METHICILLIN RESISTANT <i>STAPHYLOCOCCUS AUREUS</i> ISOLATED FROM BOVINE MILK AND OCCUPATIONAL DAIRY WORKERS IN PAKISTAN	Muhammad Ijaz Arslan Ahmed Muhammad Umar Javed Nauman Zaheer Ghumman Hamza Rasheed Farwa Anwaar Syed Faizan Ali Shah	Department of Veterinary Medicine, Faculty of Veterinary Science, University of Veterinary and Animal Sciences, Lahore- Pakistan

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Session-2, Hall-5**18.03.2023****Moderator: Dr. Irshad Ahmad****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 12:30 – 14:30**

Title	Author(s)	Affiliation
IMPROVEMENT OF MEDICAL WASTE STORAGE PROCEDURES	Sofija Sančanin, Aleksandra Sančanin, Branislav Sančanin	Hamad General Hospital - Doha, Qatar Union - Nikola Tesla University - Belgrade, Serbia
USING THE GIBSON ASSEMBLY METHOD TO INSERT GRNA AND ASSEMBLE THE PLASMID	Yousef Vatanparast Gholam Hossein Ebrahimipour	Department of Microbiology and Microbial Biotechnology, Faculty of Life Sciences and Biotechnology, Shahid Beheshti University, Tehran, Iran
IN VITRO EFFECTS OF PHYSIOLOGICAL AND MECHANICAL STIMULATION OF D-HUSK-BASED CARDIAC BIOCONSTRUCTS	Anna Maria Sacco ¹ , Veronica Romano ¹ , Immacolata Belviso ¹ , Giulia Ricci ² , Marcella Cammarota, Daria Nurzynska, Diana Massai, Giovanni Putame, Cristiano Amarelli, Ciro Maiello, Fabrizio Schonauer, Stefania Montagnani, Franca Di Meglio, Clotilde Castaldo	University of Naples Federico II, Naples, Italy Università della Campania Luigi Vanvitelli, Naples, Italy Politecnico di Torino, Turin, Italy Monaldi Hospital, Naples, Italy
RAPID AND EFFECTIVE METHOD TO DECELLULARIZE BIOLOGICAL TISSUES USING A HAND-MADE SAMPLE-HOLDER	Veronica Romano, Immacolata Belviso, Anna Maria Sacco, Clotilde Castaldo, Franca Di Meglio, Daria Nurzynska, Fabrizio Schonauer, Stefania Montagnani	Department of Public Health, University of Naples "Federico II", Italy
IN VITRO REMODELING OF HUMAN DECELLULARIZED DERMAL MATRIX BY CARDIAC PROGENITOR CELLS	Immacolata Belviso, Anna Maria Sacco, Veronica Romano, Giulia Ricci, Marcella Cammarota, Daniele Bravoco, Fabrizio Schonauer, Cristiano Amarelli, Clotilde Castaldo, Franca Di Meglio	University of Naples Federico II, Naples, Italy Università della Campania Luigi Vanvitelli, Naples, Italy Monaldi Hospital, Naples, Italy
THE RELATIONSHIP BETWEEN THE ACTION OF ERADICATE MOSQUITO NEST (PSN) WITH THE PRESENCE OF AEDES AEGYPTI LARVAE IN BAKUNG VILLAGE BIRINGKANAYA DISTRICT MAKASSAR CITY	Dr. Erniwati Ibrahim , SKM, M.Kes	Hasanuddin University, Indonesia
EFFECT OF EXTRA-CAPORAL SHOCK WAVE THERAPY IN MYOFASCIAL TRIGGER POINTS (MFTP) USING DOPPLER ULTRASONOGRAPHY	Dr. Irshad Ahmad	King Khalid University, Abha, Saudi Arabia
THE RELATIONSHIP OF THE ROLE OF JUMANTIK CADRE TO THE FREE LARVA RATE (ABJ) THROUGH THE 1 HOUSE 1 JUMANTIK MOVEMENT DURING THE COVID-19 PANDEMIC IN THE WORK AREA OF THE BALLAPARANG HEALTH CENTER	Dr. Erniwati Ibrahim, SKM, M.Kes, Sherli Wahyuni, SKM, M. Kes	Hasanuddin University, Indonesia

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Session-2, Hall-6**18.03.2023****Moderator: Dr. Muhammad Haseeb Ahmad****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 12:30 – 14:30**

Title	Author(s)	Affiliation
BIOMEDICAL APPLICATIONS OF 3D-BIOPRINTING TECHNIQUE: ADVANCES AND PROSPECTIVES	Gupta Swati Sanjaykumar, Rishabha Malviya	Galgotias University, Greater Noida, Uttar Pradesh, India
PERFORMANCE ASSESSMENT OF SUPERVISED MACHINE LEARNING TECHNIQUES FOR CLASSIFYING THE CHRONIC DIABETES DISEASES	C.Rajeev Karthika Natarajan	VIT - AP University, Research Scholar, School of Computer Science and Engineering, Amaravati, Andhra Pradesh, India.
A SYSTEMIC REVIEW OF HOW VITAMIN D SUPPLEMENTS CURE THE DEPRESSION SYMPTOMS IN ADULTS	Dr. Hina Khalid, Javeria Shafiq, Asad Ali Bukharee	Hajvery University Lahore, Pakistan
JUICING UP NEUROPROTECTION: EXPLORING PUNICALAGIN'S POTENTIAL AS A THERAPEUTIC AGENT FOR MITOCHONDRIAL BIOGENESIS IN PARKINSON'S AND OTHER NEURODEGENERATIVE DISEASES	Disha G., Dr. Panadreesh M D	Adichunchangiri University, Research scholar, Department of Biochemistry, Mandya, India
PLASTIC BIODEGRADATION: A NOVEL APPROACH TO PROTECT HUMAN HEALTH AND THE ENVIRONMENT	K.R.Padma K.R.Don	Sri Padmavati Mahila Visvavidyalayam (Women's) University, Tirupati, AP Bharath Institute of Higher Education and Research (BIHER) Bharath University, Chennai, Tamil Nadu, India
DISCOVERY OF NEW ANTI-CANCER AGENTS VIA BIOINFORMATIC APPROACH	El Rhabori Said El Aissouq Abdellah Chtita Samir Khalil Fouad	Laboratory of Processes, Materials and Environment (LPME), Sidi Mohamed Ben Abdellah University, Faculty of Science and Technology, Fez, Morocco
FOURIER TRANSFORM INFRARED SPECTROSCOPY: A NOVEL APPROACH FOR CHARACTERIZATION OF FRYING PROCESS	Dr. Muhammad Haseeb Ahmad	Government College University Faisalabad
ROLE OF INTERNET OF THINGS IN MAKING THE AGRICULTURE SMARTER	Dr. Anu Sheetal Dr. Harminder Singh Dr. Meet Kumari Dr. Amit Grover Dr. Reecha Sharma	Guru Nanak Dev University, Amritsar, Punjab, India Chandigarh University, Mohali, Punjab, India
NUTRITION AND UNIVERSITY EDUCATION	Jose A. R. Cembranos Irene Fernandez-Marcos	Universidad Complutense de Madrid and IPARCOS, Spain

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Session-3, Hall-1**18.03.2023****Moderator: Prof. Dr. Adem KARA****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 15:00 – 17:00**

Title	Author(s)	Affiliation
FOODBORNE BACTERIAL ZONOSSES IN ONE HEALTH APPROACH	Onur TAŞ	Ondokuz Mayıs University, Türkiye
DIVERSIFICATION OF VIRULENCE AND / OR TOXIGENIC PROPERTIES OF E.COLI SUBTYPES, SEROGROUPS AND SEROTYPES ISOLATED FROM CATTLE, SHEEP AND GOAT FECES BY MULTIPLEX PCR	Sibel KIZIL Fatma Esin KIRIK Aziz Utku ÖNEL Murat YILDIRIM Cansu ÖNLEN GÜNERİ Efsun Melike ÇEÇEN	University of Kırıkkale, Türkiye Niğde Ömer Halis Demir University, Türkiye Health Sciences University, Türkiye.
ISOLATION OF <i>MUCOR PIRIFORMIS</i> , <i>RHIZOPUS STOLONIFER</i> AND <i>FUSARIUM</i> SPP. FROM COCKATIEL	Prof. Dr. Banur BOYNUKARA Prof. Dr. Timur GÜLHAN Senem ÖZTÜRK KÖSE Ahsen Kubilay ALBAYRAK	Namık Kemal University, Türkiye Ondokuz Mayıs University, Türkiye Aydın Adnan Menderes University, Türkiye Tekirdağ Namık Kemal University, Türkiye
INVESTIGATION OF THE EFFECTS OF EXPERIMENTALLY ADMINISTERED FAVIPIRAVIR (T-705) ON HEART TISSUE HISTOLOGY IN RATS	Assist. Prof. Aykut ULUCAN Assist. Prof. Seda YAKUT Prof. Dr. Adem KARA	Bingöl University, Türkiye Erzurum Teknik University, Türkiye
PATHOMORPHOLOGIC AND IMMUNOHISTOCHEMICAL INVESTIGATION OF SPLEEN TISSUE IN EXPERIMENTAL AA AMYLOIDOSIS MODEL IN MICE	Assist. Prof. Aykut ULUCAN	Bingöl University, Türkiye
EVALUATION OF HEMOGRAM DATA OF DOGS IN ADANA REGION	Halil YAVUZ Yavuzkan PAKSOY	Necmettin Erbakan University, Türkiye
EVALUATION OF CANINE PARVOVIRUS INFECTION BY MOLECULAR, SEROLOGICAL, EPIDEMIOLOGICAL, HEMATOLOGICAL AND C-REACTIVE PROTEIN LEVELS	Pınar PALANCI Assist. Prof. Bilge Kaan TEKELİOĞLU	Çukurova University, Türkiye

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Session-3, Hall-2**18.03.2023****Moderator: Prof. Dr. Özgür ÇELEBİ****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 15:00 – 17:00**

Title	Author(s)	Affiliation
ALKALINE PHOSPHATASE, TOTAL PROTEIN, GLUCOSE AND ALBUMIN LEVELS IN RAHWAN HORSES IN ARDAHAN REGION	Assist. Prof. Cemalettin AYVAZOĞLU	Ardahan University, Türkiye
DETERMINATION OF ANTIMICROBIAL POTENTIALS OF SOME SHAKING TEAS FOR SALE COMMERCIALY	Biyolog Seda ÇİTİL Assist. Prof. Elif ÇELİK Assoc. Prof. Aliye GÜLMEZ SAĞLAM Prof. Dr. Özgür ÇELEBİ Prof. Dr. Salih OTLU	Kafkas University, Türkiye
SPECIES-BIOTYPE DETERMINATION OF BRUCELLA ISOLATES OBTAINED FROM SHEEP AND CATTLE ABORTIONS	Assist. Prof. Elif ÇELİK Assoc. Prof. Aliye GÜLMEZ SAĞLAM Ress. Assist. Seda DURHAN Prof. Dr. Fatih BÜYÜK Assist. Prof. Mustafa Reha COŞKUN Prof. Dr. Salih OTLU Prof. Dr. Mitat ŞAHİN	Kafkas University, Türkiye
SALMONELLA ABORTUS EQUI IN MARES: A CRITICAL APPROACH TO LABORATORY DIAGNOSIS	Dr. Derya KARATAŞ YENİ	Necmettin Erbakan University, Türkiye
INVESTIGATION OF SOME IMPORTANT BACTERIAL AGENTS FROM ABORTED BOVINE AND SHEEP FETUSES BY MOLECULAR METHODS	Assoc. Prof. Aliye GÜLMEZ SAĞLAM Dr. Öğr. Üyesi Elif ÇELİK Prof. Dr. Özgür ÇELEBİ Prof. Dr. Fatih BÜYÜK Araş. Gör. Eray BÜYÜK Prof. Dr. Mitat ŞAHİN	Kafkas University, Türkiye
THE USE OF MICROSENSORS IN DIAGNOSIS: AN EXAMPLE OF APTAMER	Evrin GENÇ Görkem TOPAL Oktay GENÇ Özlem BÜYÜKTANIR YAŞ	Ondokuz Mayıs University, Türkiye
ISOLATION OF <i>ARCOBACTER</i> SPP. FROM CATTLE CARCASSES, MOLECULAR TYPING AND ANTIBIOTIC SUSCEPTIBILITY OF ISOLATES	Assoc. Prof. Harun HIZLISOY Kübra TANK Ress. Assist. Mukaddes BAREL Kürşat KÖSKEROĞLU	Erciyes University, Türkiye
THE EFFECT OF PASTURE HABITS OF CATTLE IN THE NARMAN DISTRICT OF ERZURUM PROVINCE ON COLOSTRUM GAMMA-IMMUNOGLOBULIN (IgG) LEVELS	Assist. Prof. Muhammet Ali TUNÇ Assoc. Prof. Betül APAYDIN YILDIRIM	Atatürk University, Türkiye
DETERMINATION OF β -LACTAM, AMINOGLYCOSIDE AND QUINOLONE RESISTANCE IN FAECAL <i>E. coli</i> ISOLATES FROM CAT AND DOG	Assoc. Prof. Belgi DİREN SİĞİRCİ Dr. Baran ÇELİK Dr. Barış HALAÇ Dr. Ayşe Ilgın KEKEÇ Assoc. Prof. Beren BAŞARAN KAHRAMAN Prof. Dr. A.Funda BAĞCIGİL Prof. Dr. Seyyal AK	İstanbul -Cerrahpaşa University, Türkiye

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Session-3, Hall-3**18.03.2023****Moderator: Prof. Dr. Emine ATAĞİŞİ****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 15:00 – 17:00**

Title	Author(s)	Affiliation
AMELIORATIVE EFFECT OF BEE POLLEN CISTUS CRETICUS L. ON THE OXIDANT-ANTIOXIDANT SYSTEM IN STREPTOZOTOCIN-INDUCED DIABETIC RATS	Prof. Dr. Sibel TAŞ Prof. Dr. Melahat DİRİCAN Prof. Dr. Aycan BİLİŞİK TOSUNOĞLU Prof. Dr. Emre SARANDÖL	Bursa Uludağ University, Türkiye
DISTRIBUTION OF LACTOBACILLI IN POULTRY AND THEIR RESISTANCE PROFILES TO MACROLIDE-LINCOSAMIDE-STREPTOGRAMIN (MLS) ANTIBIOTICS	Canan KENAR NİZAMLIOĞLU Assoc. Prof. Belgi DİREN SİĞIRCI Prof. Dr. Serkan İKİZ	Pendik Veterinary Control Institute, Mycoplasma Reference Laboratory, Istanbul, Türkiye Istanbul University-Cerrahpaşa, Türkiye
AN ALTERNATIVE STRATEGY IN POULTRY INDUSTRY: GENOME EDITING	Asst. Prof. Zühal GÜNDÜZ Assoc. Prof. Onur YILMAZ Asst. Prof. Nezih ATA	Aydın Adnan Menderes University, Aydın, Türkiye
ASSESSMENT OF GENETIC DIVERSITY AND CONSERVATION STRATEGIES IN SMALL RUMINANTS REARED IN TÜRKİYE	Asst. Prof. Zühal GÜNDÜZ Asst. Prof. Nezih ATA Assoc. Prof. Onur YILMAZ	Aydın Adnan Menderes University, Aydın, Türkiye
EFFECTS OF A-LIPOLIC ACID ON POLYPHENOL OXIDASE ACTIVITY IN SPLEEN TISSUE OF RATS TREATED WITH ACITRETIN AND METHOTREXATE	Assoc. Prof. Emine DIRAMAN Emine İNCİLAY TORUNOĞLU Dr. Fatma Gönül SEZGİN	Ondokuz Mayıs University, Türkiye Necmettin Erbakan University, Türkiye
5-HT ₃ RECEPTOR AGONIST SR-57227 AGGRAVATES HYDROGEN PEROXIDE (H ₂ O ₂)-INDUCED OXIDATIVE DAMAGE IN C6 GLIOMA CELL LINE	Araş. Gör. Onur DURNA Assoc. Prof. Ahmet Şevki TAŞKIRAN	Sivas Cumhuriyet University, Türkiye
INVESTIGATION OF SERUM AST, ALT, ALP and GGT ACTIVITIES IN PERIPARTURIENT COWS	Ress. Assist. Dr. Serpil AYGÖRMEZ Ress. Assist. Lale BAŞER Prof. Dr. Emine ATAĞİŞİ	Kafkas University, Türkiye
BIOCHEMICAL ANALYSIS OF SOME INDICATORS OF PROTEIN METABOLISM IN THE PERIPARTURIENT PERIOD IN DAIRY COWS	Prof. Dr. Emine ATAĞİŞİ Ress. Assist. Dr. Serpil AYGÖRMEZ Ress. Assist. Lale BAŞER	Kafkas University, Türkiye
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Session-3, Hall-4**18.03.2023****Moderator: Luca Esposito****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 15:00 – 17:00**

Title	Author(s)	Affiliation
A NEW MODEL OF CIRCULAR ECONOMY WITH BIOGAS: FOOD, ENERGY AND SOIL FERTILITY	Luca Esposito	University of Salerno, Department of economics and statistics, Fisciano, Italy University of Eastern, Karelian Institute Finland, Joensuu
MICROWAVE PYROLYSIS OF PURE AND MIXED PLASTIC WASTES INTO HYDROGEN AND VALUABLE CARBON USING SODIUM ZEOLITE CATALYST	Rishmail Saleem, Shazia Shukrullah, Muhammad Yasin Naz	University of Agriculture Faisalabad, 38040, Pakistan
USING NANOTECHNOLOGY TO ENHANCE NUTRIENT BIOACCESSIBILITY	Christian Chapa Jazmín Cristina Stevens	Universidad Autónoma de Ciudad Juárez, Instituto de Ciencias Biomédicas, Ciudad Juárez, México
BIOACTIVE PEPTIDES OF PLANT ORIGIN	Margherita-Gabriella De Biasi	University of Naples Federico II, Via Domenico Montesano 49, 80131 Napoli, Italy
PROTECTIVE EFFECTS OF MELATONIN AGAINST OXIDATIVE STRESS CAUSED BY IRON CHRONIC ADMINISTRATION COMPARED TO EDTA CHELATOR	A. Rezqaoui, L. Ibouzindine, A. Elhamzaoui, M. Y. El Brouzi, A. El hessni, A. Mesfioui	Ibn Tofail University, Kenitra, Morocco
VERTEBRATE DIVERSITY AT MARGALLA HILLS NATIONAL PARK, PAKISTAN	Irfan Aslam, Roheela Yasmeen	Lahore Garrison University, Lahore
USING COST-EFFECTIVE BIOADSORBENTS TO REMOVE AQUEOUS WASTE	Djellouli Amir, Berredjem Yamina, Hattab Zhour, Khechai Mohamed, Barbari Fateh, Abdesselam Bouguerra	Université mohammed chérif mesaadia de Souk-Ahras, Algeria University of soukahras, Algeria Badji Mokhtar-Annaba University, Algeria. University of Biskra, Algeria Center for Scientific and Technical Research on Arid regions CRSTRA, Algeria Laboratory of Physics of Matter and Radiation (LPMR)
REVOLUSION IN THE WORLD OF COMBUSTION	Rumyantsev V.R. Savinov V.P.	Engineering Primary and Scientific Institute named after. Yu.M. Potebni ZNU
STATUS OF WATER SUPPLY AND SANITATION IN HADEJIA LOCAL GOVERNMENT, JIGAWA STATE, NIGERIA	Nura Isyaku Bello, Ahmad Said Abubakar, Hassan Adamu, Muslim Musa Yakubu	Aliko Dangote University of Science and Technology, Wudil Aminu Kano College of legal and Islamic Studies

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Session-3, Hall-5**18.03.2023****Moderator: Dr. Syed Makhdoom Hussain****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 15:00 – 17:00**

Title	Author(s)	Affiliation
COVID-19 AWARENESS, ATTITUDES AND PRACTICES AMONG RESIDENTS OF THE ASIR IN SAUDI ARABIA	Habab M Yassin, Sazada Siddiqui, Abeer Alahmari	King Khalid University, Saudi Arabia Alneelain University, Sudan
DISTRIBUTION ROUTES OF THE INVASIVE ALIEN SPECIES I. GLANDULIFERA ROYLE IN THE ISKAR RIVER GORGE BETWEEN PLANA AND LOZENSKA MOUNTAINS (SOUTHWESTERN BULGARIA)	Plamen Glogov	Forest Research Institute- Bulgarian Academy of Sciences, Sofia, Bulgaria
SILVER NANOPARTICLES FORMULATION ENCAPSULATED BY MUCILAGE HYDROGEL FOR SUSTAINED RELEASE OF DRUG	Fozia Anjum, Muhammad Shahid	Govt. College University, Pakistan University of Agriculture, Pakistan
DURABILITY OF SUSTAINABLE CONCRETE SUBJECTED TO ELEVATED TEMPERATURE	Subhashish Dey	Seshadri Rao Gudlavalleru Engineering College, Gudlavalleru, A.P. India
DETERMINATION OF SOME PHYSICOCHEMICAL PARAMETERS AND SOME HEAVY METALS IN WATER SAMPLES FROM RUMA RIVER, MALLAMAWA RIVER AND JIBIA DAM IN KATSINA STATE, NIGERIA	Adam Sulaiman Umar Fatima Binta Suleiman, Abubakar Sani	Federal Polytechnic Daura, School of Engineering Science and Technology, Department of Science Laboratory Technology, Katsina State, Nigeria
WATER TREATMENT PROCESSES AND USED TECHNOLOGIES	Mohamed Saed Ali, Dr. Suman Lata, C.Mohan	Sharda University
UTILIZATION OF PLANT PROTEIN SOURCES AND SUPPLEMENTS IN AQUA-FEEDS: A NEW APPROACH FOR SUSTAINABLE AQUACULTURE	Dr. Syed Makhdoom Hussain	Government College University, Faisalabad, Pakistan
SENSITIVITY ANALYSIS OF KINETIC RATE REACTIONS FOR THERMAL DEGRADATION OF PLASTIC WASTE AT A FIXED TEMPERATURE USING STATISTICALLY ASSUMED EXPONENTIAL FACTORS AND ACTIVATION ENERGIES	Rao Adeel Un Nab, Hammad Hussain, Shazia Shukrullah, Muhammad Yasin Naz, Abdul Ghaffar	University of Agriculture Faisalabad, 38040, Pakistan.
MICROWAVE PYROLYSIS OF HIGH-DENSITY POLYETHYLENE AND POLYPROPYLENE USING SODIUM ZEOLITE CATALYST AND ACTIVATED CARBON	Rishmail Saleem,, Hammad Hussain, Shazia Shukrullah, Muhammad Yasin Naz, Abdul Ghaffar	University of Agriculture Faisalabad, 38040, Pakistan.

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Session-3, Hall-6**18.03.2023****Moderator: Dang Hoang Xuan Huy****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 15:00 – 17:00**

Title	Author(s)	Affiliation
POTENTIAL IMPACTS OF BRINE DISCHARGE ON MARINE LIFE	Ben Ahmed Samia Jridi Mouna	King Khalid University, Faculty of science, Chemistry department, Abha, KSA
EVALUATING THE PRODUCTION EFFICIENCY OF OFFSHORE PURSE SEINE FISHING IN CA MAU PROVINCE, VIETNAM	Dang Hoang Xuan Huy, Nguyen Trong Luong, Nguyen Thi My Dung	Nha Trang University, Vietnam. Fisheries Sub-Department of Ca Mau Province, Vietnam
EFFECTS OF HUMAN SETTLEMENT ON THE ENVIRONMENT IN THE DISTRICT OF TOGBA (BENIN)	Pamphile HOUNDJ Kevin Ponce Anselme DOVONOU Raymond D. KOUMAGNON	University of Abomey-Calavi / Benin
INTEGRATION OF ISLAMIC VALUES IN BIOLOGY SCIENCE LEARNING	Adinda Riski Amalia	State Islamic University K.H. Abdurrahman Wahid Pekalongan, Indonesia
EFFECT OF VEGETABLE WASTAGE INCORPORATED <i>SPIRULINA</i> DIET ON THE PIGMENTATION OF GOLD FISH	Vikranti Patel Kapila Manoj Ankit Chaudhari	Dept. of Aquatic Biology, Veer Narmad South Gujarat University, Surat 395007, Gujarat, India
CLIMATE RESILIENT LIVESTOCK PRODUCTION: SIGNIFICANCE OF IDENTIFYING AGRO ECOLOGICAL ZONES SPECIFIC BREEDS	K. Devadharshini G. Kalaignazhal M. V. Silpa V. Sejian	Rajiv Gandhi Institute of Veterinary Education and Research, Kurumbapet, Pondicherry-605009, India
SHELTER MANAGERMENTAL STRATEGIES FOR PROTECTING GOATS FROM CLIMATIC STRESS	ARUNIMA K.M CARMEL PRINS D. SREEKUMAR V. SEJIAN	Veterinary Intern, Rajiv Gandhi Institute Of Veterinary Education and Research , Puducherry India
DIFFERENT BIOMARKERS FOR QUANTIFYING HEAT STRESS RESPONSE IN LIVESTOCK	G. Kalaignazhal K. Devadharshini M. V. Silpa V. Sejian	Rajiv Gandhi Institute of Veterinary Education and Research, Kurumbapet, Pondicherry-605009, India

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Session-4, Hall-1**18.03.2023****Moderator: Prof. İsa ÖZAYDIN****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 17:30 – 19:30**

Title	Author(s)	Affiliation
THE EFFECT OF CLINOPTILOLITE ADDED TO THE EXTENDER IN COOLED DOG SPERM ON SPERMA QUALITY	Nurdan COŞKUN ÇETİN Fikret KARACA	Hatay Mustafa Kemal University, Türkiye
A CASE OF TOTAL URINARY BLADDER TUMOR AND BLADDER STONES IN A DALMATIAN DOG	Prof. Dr. Ali BELGE Lect. Eser ÇAKMAKÇI Ahmet Ege ERDOĞAN Fatma YİĞİT GÖK	Aydın Adnan Menderes University, Türkiye
PARTIAL AMPUTATION OF FORELIMB AND PROSTHETIC LEG APPLICATION IN A HOLSTEIN CALF	Prof. Dr. Ali BELGE Lect. Eser ÇAKMAKÇI Vet. Hekim Ahmet GÜRSEL Vet. Hekim Ahmet Ege ERDOĞAN Vet. Hekim Gecer ÇELİK	Aydın Adnan Menderes University, Türkiye
A CASE OF UVEODERMATOLOGICAL SYNDROME IN A HUSKY DOG: A CLINICAL REPORT	Prof. Dr. Ali BELGE Assoc. Prof. Songül ERDOĞAN Lect. Eser ÇAKMAKÇI Vet. Hekim Gaye DEĞİRMENCİ	Aydın Adnan Menderes University, Türkiye
CASE OF KERATOMALACIA IN A CHINCHILLA BREED CAT AND ITS MEDICAL TREATMENT	Prof. Dr. Ali BELGE Lect. Eser ÇAKMAKÇI Vet. Hekim Ceyda ÇAKAR Vet. Hekim Fatma YİĞİT GÖK Vet. Hekim Gaye DEĞİRMENCİ	Aydın Adnan Menderes University, Türkiye
A RETROSPECTIVE VIEW OF EYE DISEASES IN SMALL BREED DOGS (2015-2019): 153 CASES	Assist. Prof. Çağrı GÜLTEKİN	Yakın Doğu Üniversitesi, Veteriner Fakültesi, Cerrahi Anabilim Dalı, Lefkoşa, KKTC
EVALUATION OF FACIAL THERMAL WINDOWS IN DOGS BEFORE AND AFTER GENERAL ANESTHESIA	Ress. Assist. Ayşe Başak Kapçak Assist. Prof. Mümin Gökhan Şenocak Assoc. Prof. Elif Doğan	Kastamonu University, Türkiye e Kastamonu University, Türkiye
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Session-4, Hall-2**18.03.2023****Moderator: Prof. Dr. Barış SARI****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 17:30 – 19:30**

Title	Author(s)	Affiliation
MACROANATOMIC AND MORPOMETRIC INVESTIGATION OF THE BROWN BEAR HUMERUS	Assoc. Prof. Gülseren KIRBAŞ DOĞAN Assoc. Prof. İftar GÜRBÜZ Assoc. Prof. Yasin DEMİRASLAN	Kafkas University, Türkiye Mehmet Akif Ersoy University, Türkiye
THE EFFECT OF BETAIN ADDITIONAL ON BREAST MALONDIALDEHYDE AND GLUTATION LEVELS IN QUAILS	Assoc. Prof. Mustafa MAKAV Prof. Dr. Tarkan ŞAHİN	Kafkas University, Türkiye
THE FIRST CASE OF EUCLINOSTOMUM SP. ON A WHITE PELICAN (PELECANUS ONOCROTALUS) IN TÜRKİYE	Prof. Dr. Meral Aydenizöz Assoc. Prof. Emrah Şimşek Assist. Prof. Aykut Zerek Res. Assist. İpek Erdem Prof. Dr. Mehmet Yaman	Kırıkkale University, Türkiye Muğla Sıtkı Koçman University, Türkiye Hatay Mustafa Kemal University, Türkiye
THE PREVALENCE OF GASTROINTESTINAL NEMATODES IN CATTLE IN AĞRI REGION	Assist. Prof. Nilgün AYDIN Cuma SALTAN Assoc. Prof. Gencay Taşkın TAŞÇI	Kafkas University, Türkiye
DETECTION AND PREVALENCE OF CRYPTOSPORIDIOSIS AND COCCIDIOSIS IN GURCU GOATS	Assist. Prof. Neslihan ÖLMEZ Assist. Prof. Nilgün AYDIN Prof. Dr. Barış SARI Assoc. Prof. Gencay Taşkın TAŞÇI	Kafkas University, Türkiye
THE PREVALENCE OF ECTOPARASITES IN DOGS BROUGHT TO VET CLINICS WITH COMPLAINTS OF SKIN DISORDER	Assoc. Prof. Sami GÖKPINAR Tuğçe UĞUR Gizem ÇUBUKÇU	Kırıkkale University, Türkiye Vetvital Veteriner Kliniği, Ankara, Türkiye.
GHRELIN AND ITS RELATIONSHIP WITH THE GASTROINTESTINAL SYSTEM	Miray AYKOÇ Assist. Prof. Ece KOÇ YILDIRIM	Aydın Adnan Menderes University, Türkiye
BLOOD CLOT IN THE URINARY BLADDER OF A CAT: A CASE REPORT	Assoc. Prof. Ekin Emre ERKİLİÇ Dr. Uğur YILDIZ Assist. Prof. Emin KARAKURT Araş. Gör. Yusuf Umut BATI Araş. Gör. Hilmi NUHOĞLU Araş. Gör. Ersin TANRIVERDİ Veteriner Hekim Gizem ÖNAL Prof. Dr. Burhan ÖZBA Prof. Dr. Ali Haydar KIRMIZIGÜL	Kafkas University, Türkiye
FORENSIC ENTOMOLOGY	Talha TAŞ Abdüllatif EMİRİKCİ Mustafa Furkan PALA Assist. Prof. Onur KÖSE Prof. Dr. Ramazan ADANIR	Mehmet Akif Ersoy University, Türkiye
A RARE CASE OF CEBOCEPHALY AND ARHINIA IN A KILIS GOAT KID	Assoc. Prof. Ahmet UYAR	Hatay Mustafa Kemal University, Türkiye

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Session-4, Hall-3**18.03.2023****Moderator: Darwin H. Pangaribuan****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 17:30 – 19:30**

Title	Author(s)	Affiliation
EFFECTS OF INTERCROPPING WITH MAIZE ON THE GROWTH AND TOLERANCE TO DROUGHT AND SALINITY OF TOMATO PLANTS (<i>SOLANUM LYCOPERSICUM</i> L.)	Rana Choukri Mohamed Faize Maria Manuela Rigano Manuel Rodriguez-Concepcion Jaime F. Martinez-Garcia Michel Havaux Mourad Baghour	University Mohammed I, Faculty of Nador, Department of Biology, Nador, Morocco. University Chouaib Doukkali, Faculty of Sciences, Department of Biology, El Jadida, UNINA, University of Naples, Naples, Italy Institute for Plant Molecular and Cell Biology, CSIC, Spain Institute for Plant Molecular and Cell Biology, CSIC, Spain AM, CNRS-CEA-Aix Marseille University, Marseille, France University Mohammed I, Faculty of Nador, Department of Biology, Nador, Morocco.
EFFECT OF THE CONTRIBUTION OF WASTE SLUDGE PRODUCED AT THE URBAN WASTEWATER TREATMENT PLANT OF THE CITY OF BOUIRA ON THE VEGETATIVE GROWTH AND YIELD OF CROPS	T.IDIR, N. MAIZI	University of Science and Technology (USTHB) Houari Boumediene, Algeria University Akli Mohand Oulhadj, Algeria
FEATURES OF LIGULOSIS RUTILUS RUTILUS AND ABRAMIS BRAMA IN THE DNIPRO RESERVOIR	Victoria Stanislavivna Sydorenko	Dnipro National University named after Oles Honchar, Ukraine
FUNCTIONAL FEATURES OF PLATELETS IN CALVES AT THE END OF EARLY ONTOGENE	Svetlana Yurievna Zavalishina, Marina Veniaminovna Mekhanikova	Vologda State Dairy Farming Academy named after N.V. Vereshchagin, Vologda, Russia
THE EFFECT OF VERMICOMPOST AND P FERTILIZER ON GROWTH, YIELD AND SOIL HEALTH OF SWEET CORN (<i>ZEAMAYS</i> L.)	Darwin H. Pangaribuan, Yohanes Cahya Ginting, Chatya Novtri Anisa, Lamria Stefani M. Sihite	Universitas Lampung, Indonesia
IMPORTANCE OF FORENSIC ENTOMOLOGY DURING INVESTIGATION OF CRIMES	Srdjan B. Segic, Gordana B. Mauna	University in Belgrade, Serbia
EFFECT OF TOXIC SOLVENT EXTRACTION OF THE CALOTROPIS PROCERA PLANT ON HEPATIC AND RENAL FUNCTION	Belfarhi Leila	University of Annaba
BIOGENIC SYNTHESIS OF SILVER NANOPARTICLES USING LEAF EXTRACTS OF CHROMOLAENA ODORATA, TITHONIA DIVERSIFOLIA, AND SOLENOSTEMON MONOSTACHYUS	Olawepo, Gabriel Kehinde and Adeniran, Deborah Adeola	University of Ilorin, Nigeria

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Session-4, Hall-4**18.03.2023****Moderator: Prof. Dr. Jafar Massah****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 17:30 – 19:30**

Title	Author(s)	Affiliation
GENERATING ELECTRICITY FROM ALGAE & SEVERAL DIFFERENT PLANTS	Sadaf rashidi, jafar massah	College of Abouraihan, university of Tehran, Iran
DEVELOPMENT OF AN ELECTRICAL HEATER FOR PROTECTING TREE IN WINTER	Jafar Massah	College of Abouraihan, university of Tehran, Iran
SOIL ADHESION REDUCTION BY THE ELECTRO-OSMOTIC METHOD	Prof. Dr. Jafar Massah	College of Abouraihan, university of Tehran, Iran
ROLE OF POLYPHENOLIC RICH EXTRACT FROM EUPHORBIA MILII FLOWERS ON VARIOUS SPECIES OF FREE RADICALS-AN IN VITRO STUDY	Dr. Anila L. Dr. M S Hashim	NSS College, Nilamel, Kollam, Kerala, INDIA
INVESTIGATION OF THE ANTI-INFLAMMATORY ACTIVITY AND NUTRITIONAL VALUE OF THE LEAVES OF CALOPOGONIUM MUCUNOIDES	Mercy EbereEgele, Osmund Chukwuma Enechi, Christian ChijiokeAmah, Jacob Ikechukwu Okoro, Ursula ChidimmaObelenwa	Coal City University, Nigeria Godfrey Okoye University University of Nigeria Nsukka, Nigeria Alex Ekwueme Federal University, Nigeria
DISTRIBUTION AND CONTROLLED STORAGE OF THE MEDICINAL SPECIES GLYCYRRHIZA GLABRA L.	Stanislava Stateva	Institute of Plant Genetic Resources, „ Konstantin Malkov” Sadovo, Plovdiv, Bulgaria
BIOCHEMICAL INVESTIGATION OF CRUDE EXTRACTS PREPARED FROM THE MEDICINAL PLANT ERINACEA ANTHYLLIS	Soumia Mouffouk, Chaima Mouffouk and Hamada Haba	Université de Batna-1, Batna 05000, Algérie
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Session-1, Hall-1**19.03.2023****Moderator: Prof. Dr. Ekrem LAÇIN****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 10:00 – 12:00**

Title	Author(s)	Affiliation
WHY DOES FOOTPAD DERMATY OCCUR IN BROILER CHICKENS?	Ayşe UYSAL Prof. Dr. Ekrem LAÇIN Assoc. Prof. Fatih YILDIRIM Assoc. Prof. Murat GENÇ Assist. Prof. Uğur ÖZENTÜRK	Atatürk University, Türkiye
THE IMPORTANCE OF USE OF LITTER IN SHEEP	Ayşe UYSAL Prof. Dr. Ekrem LAÇIN Ress. Assist. Şermin TOP Ress. Assist. Dr. Emre YILMAZ Ress. Assist. Dr. Soner UYSAL	Atatürk University, Türkiye
THE IMPORTANCE OF MATERNAL CARE FOR CHICK WELFARE	Assist. Prof. Ugur OZENTURK	Atatürk University, Türkiye
DETERMINATION OF GENOTYPIC STRUCTURE IN ILE DE FRANCE SHEEP IN TERMS OF <i>KZSS1</i> g.2124T>A POLYMOPHISM	Assoc. Prof. Deniz DİNÇEL Emine Mutlu	Bursa Uludağ University, Türkiye
YOLK SAC UTILIZATION IN POULTRY	Ress. Assist. Merve Gündüz Assoc. Prof. Arda Sözcü Ahmet Kaşif	Bursa Uludağ University, Türkiye
BREEDING CAUSES OF REPEAT BREEDER SYNDROME IN CATTLE	Assoc. Prof. Murat GENÇ Prof. Dr. Ömer ÇOBAN Ayşe UYSAL	Atatürk University, Türkiye
EXAMINATION OF HERD MANAGEMENT SYSTEM MODULES AND DESIGN OF AN IOT SUPPORTED MODEL	Lec. Dr. Kamil Aykotalp GÜNDÜZ Prof. Dr. Fatih BAŞÇİFTÇİ Assist. Prof. Züleyha Yılmaz ACAR	Selçuk University, Türkiye
IDENTIFICATION AND TRACKING OF COWS USE OF YOLOv7 + SORT ASSOCIATION	Dr. Cafer Tayyar BATI Assoc. Prof. Gazel SER	Van Yüzüncü Yıl University, Türkiye
POTENTIAL EFFECT OF HIVE COLOR ON HONEY BEE COLONY PERFORMANCE	Dr. Cengiz ERKAN Yesribe ÖZTÜRK	Van Yüzüncü Yıl University, Türkiye
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Session-1, Hall-2**19.03.2023****Moderator: Prof. Dr. Mehmet Akif YÖRÜK****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 10:00 – 12:00**

Title	Author(s)	Affiliation
COMPARISON OF LAYING PERFORMANCE, EGG QUALITY AND BONE CHARACTERISTICS OF COMMERCIAL AND TURKISH LAYING HEN GENOTYPES KEPT IN A FREE-RANGE SYSTEM	Assoc. Prof. Arda Sözcü Prof. Dr. Aydın İpek Ress. Assist. Merve Gündüz	Bursa Uludağ University, Türkiye
INVESTIGATION OF THE OPPORTUNITIES THAT HONEY BEES CAN BENEFIT FROM THEIR ANTENNAS AND VIBRATION FREQUENCY IN FINDING THE DIRECTION	M. Kazım Kara Çiğdem EGE TAYMUŞ	Iğdir University, Türkiye
THE SITUATION AND IMPORTANCE OF SILK WORM FOR TURKEY	Ferhat Mazlum ODUNCU Prof. Dr. Muzaffer DENLİ	Dicle University, Türkiye
THE EVALUATION OF THE REPRODUCTION AND GROWTH PERFORMANCE OF KIVIRCIK SHEEP BREEDS IN BALIKESİR PROVINCIAL CONDITIONS	Assist. Prof. Muharrem SATILMIŞ Assist. Prof. Murat ER	İzmir Bakırçay University, Türkiye
THE DETERMINATION GROWTH PERFORMANCE AND SOME BODY SIZES OF LAMBS IN QARADOLAQ	Orkhan HAJIYEV Prof. Dr. Filiz AKDAĞ	Göyçay, AZERBAIJAN Ondokuz Mayıs University, Türkiye
THE RELATIONSHIP BETWEEN LIVE WEIGHT AND TAIL MEASUREMENTS IN AKKARAMAN, KARAYAKA AND HERİK LAMBS FED A HIGH FORAGE AND CONCENTRATE DIET	Buket BAYIR Doç.Dr. Mustafa UĞURLU Ress. Assist. Akif UYSAL Deniz AY Furkan ATALAR Prof. Dr. Filiz AKDAĞ Prof. Dr. Bülent TEKE	Ondokuz Mayıs University, Türkiye
THE EFFECT OF BREED AND TEMPERAMENT FACTORS ON SOME BEHAVIORAL TRAITS IN MALE LAMBS	Buket BAYIR Ress. Assist. Akif UYSAL Deniz AY Prof. Dr. Filiz AKDAĞ	Ondokuz Mayıs University, Türkiye
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Session-1, Hall-3**19.03.2023****Moderator: Prof. Dr. Vedat BARAN****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 10:00 – 12:00**

Title	Author(s)	Affiliation
EFFECTS OF THE COVID-19 PROCESS ON VETERINARY	Raziye Filiz AKKUŞ Prof. Dr. Vedat BARAN	Ardahan University, Türkiye
AN ADVENTURE IN THE PANDEMIC PROCESS: SHEEP RAISING IN ARDAHAN	Raziye Filiz AKKUŞ Prof. Dr. Vedat BARAN	Ardahan University, Türkiye Kafkas University, Türkiye
ANIMAL POPULATION CALCULATION FOR BIOFUEL PRODUCTION FROM ANIMAL WASTE FATS	Fatıma Büşra ASLAN Prof. Dr. Kırallı MÜRTEZAOĞLU Prof. Dr. Mehmet MELİKOĞLU	Gazi University, Türkiye
DETERMINATION OF NUTRITION KNOWLEDGE LEVEL OF STUDENTS OF FACULTY OF VETERINARY MEDICINE: EXAMPLE OF SAMSUN	Uzm. Dyt. Pınar Demir Prof. Dr. Dilek ÇELİKLER	Ondokuz Mayıs University, Türkiye
CALF LOSSES AND ECONOMIC EFFECTS IN DIYARBAKIR DAIRY FARMS	Ümit AVCIOĞLU Adem AKSOY Abdülbaki BİLGİÇ M. Sinan AKTAŞ M. Ali TUNÇ	Atatürk University, Türkiye
TRANSFORMATION OF LIVESTOCK ENTERPRISES IN THE CONTEXT OF HEALTH AND PRODUCTIVITY IN THE AGE OF ARTIFICIAL INTELLIGENCE	Assist. Prof. Onur OKTAYSOY Assist. Prof. Ethem TOPÇUOĞLU	Kafkas University, Türkiye İstanbul Arel University, Türkiye
A RESEARCH ON THE “TÜRK BAYTARLAR CEMİYETİ MECMUASI” NOT PUBLISHED PERIODICALLY	Assist. Prof. Aytaç Ünsal Adaca	Ankara University, Türkiye
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Session-1, Hall-4**19.03.2023****Moderator: Dr. Jyoti Pandey****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 10:00 – 12:00**

Title	Author(s)	Affiliation
CHARACTERIZATION OF QUERCUS ILEX ACORNS AND THEIR ASSOCIATED BIO-AGGRESSORS	Dalila Mecellem	University of Bouira, Faculty S NVST, Department of agronomy, Algeria
ASSESSMENT OF FARMERS' ADAPTATION STRATEGIES TO FLOOD RELATED LOSSES IN ONE AREA OF EKITI STATE, NIGERIA	Jibrin, S., Salihu, I. T., Mohammed, U. H., Abdullahi, A. and Mohammed, Y	Federal University of Technology Minna, Niger State, Nigeria
EFFECTS OF RHIZOCTONIA SOLANI INFECTION ON CHLOROPHYLL BIOSYNTHESIS AND CARBOHYDRATE CONTENT OF PEANUT SEEDLING	Fatemeh Afaridoon Mona Sorahinobar Khadijeh Kiarostami Samira Shahbazi	Alzahra University, Tehran, Iran
BIOACTIVE COMPOUNDS AND ANTIBACTERIAL EFFECTS OF GOSSYPIMUM BARBADENSE L. LEAVES: AN ETHANOLIC EXTRACT STERILIZED WITH AN AUTOCLAVE AND SYRINGE FILTER	Ahmed Salisu Kamaluddeen Kabir Yusuf Hassan Abubakar Sani Maryam Saddiq	Umaru Musa Yar'adua University, Nigeria
PREPARATION OF NANOFORMULATIONS OF F.VULGARE WITH ENHANCED BIOLOGICAL POTENTIAL	Tanzeela Khalid, Tahir Farooq, Ghulam Hussain, Arruje Hameed	Government College University, Pakistan
SEA WATER DESALINATION PLANTS BY SWRO FROM ALGERIAN WEST COAST: CURRENT SITUATION	Mehtougui Mohamed Samir, Baaloudj Affef, Kerfouf Ahmed	Djillali Liabes University, Algeria Guelma University, Algeria
ACETIC ACID FOLIAR SPRAY ENHANCED DROUGHT STRESS TOLERANCE IN SOYBEAN	Oqba Basal, Urin Munkhbat, Szilvia Veres	University of Debrecen, Hungary
AGRITECH INDIA: MODERNIZATION OF THE AGRICULTURE FIELD USING NEW TECHNOLOGIES	Jyoti Pandey, Praveen Garg, Sulekha Tripathi, Shree Ram Agrawal	VIMS, College, Satna
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Session-1, Hall-5**19.03.2023****Moderator: Dr. Priyanka Das****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 10:00 – 12:00**

Title	Author(s)	Affiliation
NATURAL DIET COMPOSITION OF THE DEEP-WATER ROSE SHRIMP <i>PARAPENEUS LONGIROSTRIS</i> (DECAPODA, DENDROBRANCHIATA, PENAEIDAE), FROM ALGERIAN WEST COAST	Ghizlène Hadjei Aouel, Mahmoud Adnane Benallal, Ahmed Kerfouf	University of Tlemcen, Algeria University of Sidi Bel Abbes, Algeria
NUTRIENT BASED LAND SUITABILITY OF BORO PADDY AND WHEAT AND PROFIT MARGIN ASSESSMENT: A CASE FROM WEST BENGAL, INDIA	Priyanka Das, Assistant Professor	Malda Women's College, Malda, West Bengal, India
GAMIFICATION OF SCIENCE COMMUNICATION: USING GAMES TO ENGAGE AND EDUCATE PEOPLE ABOUT SCIENTIFIC CONCEPTS	Anshul JAIN	Jagran Lakecity University, Jagran School Of Creative Studies, Bhopal, India
BIOREMEDIATION: A SOLUTION TO DAIRY AND POULTRY WASTE DISPOSAL	Rohan Srivastava, Saimah Khan	Integral University, Lucknow
FUNCTIONALIZED REAGENTS IN CHEMICAL ANALYSIS OF AGRICULTURAL SOILS	Serghey A. Shapovalov	Research Institute of Chemistry, V N. Karazin Kharkiv National University, Svobody Sq., 4, Kharkiv 61022, Ukraine
FUNCTIONAL GROUPS OF INVERTEBRATES ACCORDING TO TROPHIC PREFERENCE	Chiriac Luiza - Silvia, Dumitru T. Murariu	Institute of Biology Bucharest of Romanian Academy Faculty of Biology, University of Bucharest
OVERCOMPACTION OF THE ARABLE LAYER OF THE SOIL AND ADAPTATION OF AGRICULTURAL CROPS TO ITS MANIFESTATION	Kateryna Romanchuk Svitlana Krylach	National Scientific Center "Institute for Soil Science and Agrochemistry Research named after O.N. Sokolovsky", Kharkiv, Ukraine
HEAT STRESS IMPACT ON IMMUNE RESPONSE IN GOATS	EDWIGA J N DEVAMAILINI B S SILPA M V NAMEER P O SEJIAN V	Kerala agricultural university, Student, College of climate change and environmental science, Thrissur, india

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Session-1, Hall-6**19.03.2023****Moderator: Sementsova Katerina****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 10:00 – 12:00**

Title	Author(s)	Affiliation
HEAT STRESS IMPACT ON THE REPRODUCTIVE PERFORMANCE IN GOATS	ANUPAMA R GAYATHRI B S SILPA M V NAMEER P O SEJIAN V	Kerala Agricultural University, Student, College of Climate Change and Environmental Science, Thrissur, India Rajiv Gandhi Institute of Veterinary Education and Research, Dean,
LIQUID VIBRATIONS IN CYLINDRICAL AND CONICAL SHELLS WITH AND WITHOUT BAFFLES	Elena Sierikova Elena Strelnikova Yehor Kononenko	National University of Civil Defence of Ukraine, Kharkiv, Ukraine A.M. Podgorny Institute for Mechanical Engineering Problems NAS of Ukraine, Kharkiv, Ukraine
DEFORMATIONS TREATMENT IN LIQUID HYDROCARBON RESERVOIRS	Elena Sierikova Elena Strelnikova Kirill Degtyarev	National University of Civil Defence of Ukraine, Kharkiv, Ukraine A.M. Podgorny Institute for Mechanical Engineering Problems NAS of Ukraine, Kharkiv, Ukraine
IMPLEMENTATION OF PRECISION FARMING MEASURES BASED ON TAKING INTO ACCOUNT THE SPATIAL DISTRIBUTION OF NITROGEN COMPOUNDS IN ARABLE SOILS	Irina Plisko Karina Kutsova	National Scientific Center «Institute for Soil Science and Agrochemistry Research named after O.N. Sokolovsky», Kharkiv, Ukraine
THE ENVIRONMENTAL AND ECONOMIC IMPACTS OF THE USE OF RECYCLED ASPHALT DURING THE PREVENTIVE MAINTENANCE OF ROADWAYS IN THE UAE	Aishah H.O. Al Shehhi, Gul Ahmed Jokhio	The British University in Dubai, United Arab Emirates
CORN RESILIENCE IN THE FACE OF CLIMATE CHANGE: CASE OF SNOPTIC STATIONS IN BENIN	GNIHATIN B. A. DARIUS, AKPO ARISTIDE B.	Université d'Abomey-Calavi, Bénin
IRRIGATION AS A FACTOR OF ECOLOGICAL-AGROMELIORATIVE STATE OF IRRIGATED SOILS	Ludmila Vorotyntseva Roman Panarin	National Scientific Center «Institute for Soil Science and Agrochemistry Research named after O.N. Sokolovsky», laboratory of irrigated soil, Kharkiv, Ukraine.
DATE SYRUP, A REMEDY TO MALNUTRITION	Aymen Naz Eman	Government College University Faisalabad, Applied Sciences, Food science and technology, Faisalabad, Pakistan
ON THE PROBLEMS OF PREPARING RAW MATERIAL AND METROLOGICAL CERTIFICATION OF STANDARD SAMPLES OF SOIL CONTAMINATED WITH HEAVY METAL IMPURITIES	Sementsova Katerina	National Scientific Center "Institute for Soil Science and Agricultural Chemistry, AN name Sokolovsky "

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Session-2, Hall-1**19.03.2023****Moderator: Prof. Dr. Ebru KARADAĞ SARI****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 12:30 – 14:30**

Title	Author(s)	Affiliation
EFFECT OF CAPSAICIN ON MESENCHYMAL STEM CELLS OF ADIPOSE TISSUE	Dr. Ece İNCEBİYİK Prof. Dr. Hatice Erdost	Bursa Uludağ University, Türkiye
INVESTIGATION OF THE EFFECTS OF DANDELION (<i>TARAXACUM OFFICINALE</i>) ON CATALASE RELEASE IN LIVER TISSUE OF DIABETIC RATS	Assist. Prof. Şükran YEDİEL ARAS Prof. Dr. Ebru KARADAĞ SARI	Kafkas University, Türkiye
EXPRESSION OF ADIPOKINES IN GASTROINTESTINAL SYSTEM OF RATS FED WITH CAPSAICIN	Aylin ELARSLAN Tuncay İLHAN	Bursa Uludağ University, Türkiye
PYROPTOSIS and THE MECHANISM OF PYROPTOSIS	Arzu GEZER Ebru Karadağ SARI	Atatürk University, Türkiye
HISTOLOGICAL EFFECT OF THE ADDITION OF ASHOT (<i>CYMBOCARPUM ANETHOIDES</i>) AS A FEED ADDITIVE ON LIVER TISSUE IN LAYER QUAILS (<i>COTURNIX COTURNIX JAPONICA</i>).	Assoc. Prof. Gökhan NUR Assoc. Prof. Pınar Aksu KILIÇLE Assist. Prof. Mükremin ÖLMEZ Şafak SANDAYUK	İskenderun Teknik University, Türkiye Kafkas University, Türkiye
INVESTIGATION OF ESCHERICHIA COLI O157:H7 PREVALENCE IN CATTLE RAISED IN EDİRNE REGION (TÜRKİYE) BY REAL-TIME PCR	Vet. Hek. Yunus Emre KARATOPAK Prof. Dr. Fatih BÜYÜK	Kafkas University, Türkiye

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Session-2, Hall-2**19.03.2023****Moderator: Assist. Prof. Mert SEZER****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 12:30 – 14:30**

Title	Author(s)	Affiliation
COMPARISON OF BOVINE TUBERCULOSIS FILIATION DATA	Dr. Şahin ÇAKIR Dr. Ediz Kağan ÖZGEN	Tarım ve Orman Bakanlığı, Ankara, Türkiye
COMPARISON OF LIVER AND RENAL FUNCTION TESTS IN MALE AND FEMALE GURCU GOATS	Assist. Prof. Mert SEZER Ress. Assist. Yusuf Umut BATI Ress. Assist. Tahir GEZER Assist. Prof. Enes AKYÜZ	Kafkas University, Türkiye
GENOTOXIC ASSESSMENT OF AMOXICILLIN IN RAINBOW TROUT (<i>Oncorhynchus mykiss</i>) BY COMET ASSAY AND MICRONUCLEUS TEST	Assist. Prof. Ceren ANLAS Prof. Dr. Oya USTUNER	Istanbul University- Cerrahpasa, Istanbul, Türkiye
NASAL ARTERITIS IN A BELGIAN MALINOIS DOG	Assist. Prof. Şükrü DEĞİRMENÇAY Ress. Assist. Emre EREN	Atatürk University, Türkiye
THE EFFECT OF COLOSTRUM QUALITY ON SOME BIOCHEMICAL PARAMETERS IN CALVES WITH NEONATAL SEPSIS	Assist. Prof. Mert SEZER Assist. Prof. Enes AKYÜZ Assoc. Prof. Mushap KURU	Kafkas University, Türkiye
CRIMEAN CONGO HEMORRHAGIC FEVER AND REPELLENTS USED TO PROTECT AGAINST TICKS	Assist. Prof. Pınar Portakal	Çankırı Karatekin University, Türkiye
A FATAL THREAT TO CATS: FELINE INFECTIOUS PERITONITIS	Büşra TALAN Serkan İrfan KÖSE	Hatay Mustafa Kemal University, Türkiye
INVESTIGATION OF FACTORS AFFECTING COLOSTRUM QUALITY IN HOLSTEIN COWS UNDER STANDARDIZED CONDITIONS	Lect. Mustafa GÜVEN Lect. Dr. Halime KARA	İzmir Bakırçay University, Türkiye Ankara Yıldırım Beyazıt University, Türkiye

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Session-2, Hall-3**19.03.2023****Moderator: Prof. Dr. Ebubekir CEYLAN****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 12:30 – 14:30**

Title	Author(s)	Affiliation
A CASE AND TREATMENT OF RESISTANT PYOTHORAX IN A CAT	Umut Fikret Korkmaz Dr. Vet. Hek. Duygu KAHRAMAN Assist. Prof. Dr. Mehmet Fatih BOZKURT Prof. Dr. Ebubekir CEYLAN	Ankara University, Türkiye Arbor Vitae Veteriner Kliniği, Ankara, Türkiye
RESTRICTIVE LEFT TO RIGHT PATENT DUCTUS ARTERIOSUS IN A POMERIAN DOG	Hatice Betül ŞAHİN Merve Cansu KILIÇKAYA Büşra Burcu Erol Assoc. Prof. Amir NASERİ	Selcuk University, Türkiye
CAUSES AND DIAGNOSIS OF FEVER IN CAT AND DOGS	Ahmet Batuhan ÖNCEL Şima ŞAHİNDURAN	Burdur Mehmet Akif Ersoy University, Türkiye
DIALYSIS IN DOGS AND CATS	Ceren KÖKLÜKAYA Prof. Dr. Şima ŞAHİNDURAN	Burdur Mehmet Akif Ersoy University, Türkiye
WHAT HAPPENED AS A RESULT OF INTRAVENOUS ADMINISTRATION OF ORAL MELOXICAM SUSPENSION IN A CAT?	Assist. Prof. Osman Safa TERZİ Doktora Öğr. Refet Erand ERATAM Enes Arda ARSLAN	Ankara University, Türkiye
THE EFFECTS OF STEM CELL USE ON PROGNOSIS IN PATIENTS WITH CHRONIC RENAL FAILURE IN CATS: A CASE REPORT	Assist. Prof. Osman Safa TERZİ Uzm. Dr. Akife KAYA	Ankara University, Türkiye
SEPSIS, SEPSIS BIOMARKERS AND CYTOKINES IN CALVES	Lect. Ali Burak DÖRTKARDEŞ Prof. Dr. Şima ŞAHİNDURAN	Mehmet Akif Ersoy University, Türkiye
ECHOCARDIOGRAPHIC EVALUATION OF PULMONARY HYPERTENSION AND ISOLATED RIGHT-SIDED CONGESTIVE HEART FAILURE IN A MIX-BREED DOG	Assist. Prof. Merve IDER	Selcuk University, Türkiye

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Session-2, Hall-4**19.03.2023****Moderator: Dr.R.Srinivasan****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 12:30 – 14:30**

Title	Author(s)	Affiliation
POWDERED POLYHERBAL ANTI-DANDRUFF SHAMPOO: FORMULATION, CHARACTERIZATION, AND ANTIMICROBIAL ACTIVITY	R.Jothi lakshmi, R.Devi, Dr.R.Srinivasan, M.Vasanth Kumar	Bharath institute of higher education and research. Chennai.
BIOETHANOL PRODUCTION AND USE OF DISTILLERS'S WET GRAINS AS DAIRY COWS' FEED	Srdan B. Segić , Gordana B. Mauna	University of Belgrade, Belgrade
BaHPO ₄ DEPOSITED ON DIFFERENT SUBSTRATES FOR THE ELECTRO-DEGRADATION OF RHODAMINE B	A.AHDOUR, A.TAOUFYQ, L.ANEFLOUS, A.BENLHACHEMI, B.BAKIZ	Ibn Zohr university faculty of science, Department of chemistry, Agadir, Morocco.
HIGHLY EFFICIENT SUN-LIGHT-ACTIVE CN/ BIC/SW NANOCOMPOSITES FOR PHOTOCATALYTIC DEGRADATIONS OF DYES	Brahim Ennasraoui, Hamza Ighnih, Mohamed Rhaya, Redouane Haounati, Hassan Ouachtak, Naima Hafid, Amane Jada, Abdelaziz Ait Addi	Ibn Zohr University, Agadir, Morocco. Centre Régional des Métiers de l'Education et de la Formation Souss Massa, Morocco Université de Haute Alsace (UHA), F-68100 Mulhouse, France
EFFECT OF SPECIFIC SURFACE FOR REMOVAL OF METHYLENE BLUE DYE USING TWO TYPE OF NATURAL SAND BEFORE AND AFTER GRINDING	SAID ET-TALEB	Ibnou Zohr University, Faculty of Applied Sciences, Ait Melloul, Morocco
TRANSMISSION COEFFICIENT AND THE INTERSUBBAND TRANSITIONS IN ZNO/ [MG] _x [ZN] _(1-x) O UNSTRESSED QUANTUM WELL HETEROSTRUCTURES	Lhoucine MOUDOU, Mohamed AL-HATTAB, Khalid RAHMANI, Ibrahim MAOUHOUBI, Jamal GUERROUM	Sultan Moulay Slimane University, Béni Mellal - Morocco. Mohammed V university in Rabat, Morocco
SYNTHESIS, DESCRIPTION, TOXICITY, ANTIBACTERIAL AND ANTIFUNGAL ESTIMATION OF SCHIFF-BASE OF DRUG SUBSTANCE	Rehab K. Al-Shemary	University of Baghdad, Iraq
SYNTHESIS, CHARACTERIZATION, BIOLOGICAL ACTIVITY AND DNA BINDING OF PYRIDAZINE CONTAINING IMIDAZOLIDINE MOIETY	Rehab Kadhim Raheem Alshemary	University of Baghdad, Baghdad, Ira
CRYSTAL STRUCTURE AND ELECTRONIC STRUCTURE OF QUATERNARY SEMICONDUCTORS Cu ₂ ZnTiSe ₄ AND Cu ₂ ZnTiS ₄ FOR SOLAR CELL ABSORBER	Guerroum Jamal, Youssef Lachtioui, Bajjou Omar, Al-Hattab Mohamed, Moudou Lhoucine	Sultan Moulay Slimane University - Department of Physics PhD béni-mellal Morocco

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Session-2, Hall-5**19.03.2023****Moderator: Matloob Ahmad****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 12:30 – 14:30**

Title	Author(s)	Affiliation
QUATERNARY SALTS: SYNTHESIS AND ENZYME INHIBITION STUDIES	Matloob Ahmad, Tooba Jabeen, Imran Ahmad Khan	Department of Chemistry, Government College University, Faisalabad, Pakistan
CONSTRUCTED WETLANDS COUPLED WITH TUBESETTLER AND AERATION FOR HOSPITAL WASTEWATER TREATMENT	Zeba Ali Mumtaj, Abdul Rahman Khan, Saimah Khan	Integral University, Lucknow
STUDIED THE EFFECT OF COW URINE AS A NUTRIENT ON THE GROWTH OF SPIRULINA MAXIMA IN INDOOR CULTURE	Ankit Chaudhari Kapila Manoj Vikranti Patel	Veer Narmad South Gujarat University, India
RELATIVISTIC ELASTIC SCATTERING OF HYDROGEN ATOM (2S-2S) BY ELECTRON IMPACT IN THE PRESENCE OF A LINEARLY POLARIZED LASER FIELD	Mouloud ABARAGH, El mostafa HROUR, Moha EL IDRIS, Souad Taj, Bouzid MANAUT	Polydisciplinary Faculty, Laboratory of Research in Physics and Engineering Sciences Sultan Moulay Slimane University, Superior School of Technology of Beni Mellal Research Team in Theoretical Physics and Materials (RTTPM)
THIAZINES: SYNTHESIS AND ANTIVIRAL ACTIVITY	Matloob Ahmad, Ayesha Rafiq	Government College University, Faisalabad, Pakistan
CHITOSAN/STARCH-DOPED MnO_2 NANO COMPOSITE SERVED AS DYE DEGRADATION, BACTERIAL ACTIVITY, AND IN SILICO MOLECULAR DOCKING STUDY (PUBLISHED IN MATERIALS TODAY NANO IN 2022)	Anum Shazadi Iram Shahzadi	Faculty of Pharmacy, The University of Lahore, Lahore, Pakistan Punjab University College of Pharmacy, University of the Punjab, Lahore, Pakistan.
DIESEL ENGINE EMITTED CARBON MONOXIDE EMISSIONS FOR COMPLETE OXIDATION USING HOPCALITE CATALYSTS AND ITS APPLICATIONS: A REVIEW	Subhashish Dey	Seshadri Rao Gudlavalleru Engineering College, Gudlavalleru, A.P. India
REVIEW OF THE MECHANICAL CHARACTERISTICS OF NATURAL FIBER REINFORCED EPOXY COMPOSITES	Ahmed Umar, Ibrahim Sada, Abubakar Sani	Umaru Musa Yaradua University
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Session-2, Hall-6**19.03.2023****Moderator: Dr. Harminder Singh****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 12:30 – 14:30**

Title	Author(s)	Affiliation
PATHOLOGICAL AND FUNCTIONAL ASPECTS OF MULTIORGAN FAILURE IN ALCOHOL USE DISORDER	R. THIRUCHELVI Dr. P.Brindha Devi	Vels Institute of Science Technology and Advanced Studies (VISTAS), India
COMPARATIVE STUDY OF CROSS- AND UNCROSS-LINKED ARABINOXYLANS EXTRACTED FROM MAIZE BRAN	Muhammad Ahtisham Raza, Farhan Saeed, Muhammad Afzaal, Bushra Niaz, Muzzamal Hussain, Amara Rasheed, Ali Imran	Government College University Faisalabad, Pakistan
ELECTRICAL ENERGY GENERATION FROM AGRICULTURE WASTE	Dr. Harminder Singh Dr. Anu Sheetal	Department of Mechanical Engineering, Guru Nanak Dev University, Amritsar, Punjab, INDIA
DEVELOPMENT OF AN INTELLIGENT IRRIGATION CONTROL AND REAL-TIME MONITORING HUB	Felix Michael Oguche, Zsolt Zoltán Fehér	University of Debrecen, Institute of Water and Environmental Management, Debrecen, Hungary
FACTORS AFFECTING AGRITOURISM PARTICIPATION BY FARMER HOUSEHOLDS IN CAN THO CITY, VIETNAM	Thi-Hoang-Anh TRAN	Can-Tho University, Can-Tho City, Vietnam
DIAGNOSTICS OF THE EROSION STATE OF ARABLE LANDS USING DRONE AND VERIFICATION WITH DATA ON THE GRANULOMETRIC COMPOSITION OF THE SOIL	Maksym Solokha Nadiya Vynokurova	National Scientific Center „Institute for Soil Science and Agrochemistry Research named after O.N. Sokolovsky”, Ukraine
DEVELOPING EFFICIENT ENVIRONMENTALLY FRIENDLY BIOFERTILIZERS	Konul Gahramanova Aygün Almammodova Sabiya Osmanova	¹ Institute of Additives of Chemistry named after acad. A.M.Kuliev, Baku, Azerbaijan

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Session-3, Hall-1**19.03.2023****Moderator: Assist. Prof. Gül Esma AKDOĞAN****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 15:00 – 17:00**

Title	Author(s)	Affiliation
TAXONOMIC REINVESTIGATION OF ENDEMIC PLANT SPECIES FROM KARS PROVINCE VIA PHYLOGENETIC ANALYSIS	Asiye ULUĞ Funda Özdemir DEĞİRMENCİ Gül Esma AKDOĞAN	Kafkas University, Ahi Evran University, Department of Crop Science, Kırşehir
INVESTIGATION OF THE EFFECTS OF USING BIOCHAR AGAINST IRRIGATION WATER SALINITY ON SOME YIELD-RELATED PHYSICAL PROPERTIES OF RADISH (<i>RAPHANUS SATIVUS</i> L.)	Elif YAGANOGLU Caner YERLİ	Atatürk Üniversitesi, Erzurum, Türkiye Van Yüzüncü Yıl Üniversitesi, Van, Türkiye
DETERMINATION OF SUITABLE MOWING TIME FOR HERBAGE YIELD AND QUALITY IN HUNGARIAN VETCH (<i>VICIA PANNONICA</i> CRANTZ)	Dr.Ziya MUTLU Assoc. Prof. Sabahaddin ÜNAL Berna EFE	Tarla Bitkileri Merkez Araş. Ens İzzet Baysal University, Türkiye
ELUCIDATING THE INHERITANCE PATTERN OF SOME PHYSIOLOGICAL CHARACTERISTICS IN SOYBEAN (<i>GLYCINE MAX</i> L.) UNDER HEAT STRESS	Dr. Volkan Mehmet ÇINAR Prof. Dr. Aydın ÜNAY	Aydın Adnan Menderes University, Türkiye
ESSENTIAL OIL COMPONENTS OF <i>TEUCCRIUM CHAMAEDRYSL.</i> SUBSP. <i>CHAMAEDRYSL.</i> AND <i>TEUCCRIUM DIVARICATUM</i> SIEBER SUBSP. <i>DİVARİCATUM</i> SIEBER GROWING NATURALLY IN TÜRKİYE	Lect. Tuğba ÇAKIR Assist. Prof. Ömer ÇEÇEN Assist. Prof. Hasan MARAL	Karamanoğlu Mehmetbey University, Türkiye.
POSSIBILITIES OF BIOLOGICAL CONTROL ON SESAME MOTH <i>Antigastra catalaunalis</i> DUP. (LEPIDOPTERA: PYRALIDAE) AND TOBACCO WHITEFLY <i>Bemisia tabaci</i> (HEMIPTERA: ALEYRODIDAE) IN ANTALYA SESAME FIELDS	Hasan PART Prof. Dr. İsmail KARACA	Isparta Uygulamalı Bilimler University, Türkiye
DETERMINATION OF THE EFFECTS OF GIBBERELIC ACID CONCENTRATIONS ON GERMINATION AND EMERGENCE PERFORMANCE OF SOME FLAX (<i>Linum usitatissimum</i> L.) VARIETIES	Prof. Dr. Sema BAŞBAĞ Şilan ÇİÇEK Lect. Nazlı AYBAR YALINKILIÇ	Dicle University, Türkiye Muş Alparslan University, Türkiye

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Session-3, Hall-2**19.03.2023****Moderator: Assist. Prof. Neslihan ÖLMEZ****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 15:00 – 17:00**

Title	Author(s)	Affiliation
THE RELATIONSHIP BETWEEN NITROGEN FERTILIZATION AND FUNGAL DISEASES IN WHEAT PLANT	Süreyya Betül RUFAİOĞLU Berfin KILINÇ Muhammed Oday TALİP	Harran University, Türkiye
EFFECT OF SOME METAL IONS ON CULTURE MUSHROOM POLYPHENOL OXIDASE ENZYME	Dr. Cansu ÖZTÜRK	Atatürk University, Türkiye
RESPONSE OF DRY MATTER ACCUMULATION, YIELD AND BREAD-MAKING QUALITY OF BREAD WHEAT TO ORGANIC AND INORGANIC FERTILIZATION	Assist. Prof. Ali YİĞİT	Aydın Adnan Menderes University, Türkiye
EFFECT OF SILICONE APPLICATION ON MACRO AND MICRO ELEMENTS OF WHEAT (<i>Triticum aestivum</i> L. Ceyhan-99) GROWN UNDER SALT STRESS	Dr. Hakan GÜNEŞ Assist. Prof. Emel DIRAZ YILDIRIM	Kahramanmaraş Sütçü İmam University, Türkiye
NUT CHARACTERISTICS OF SOME HAZELNUT VARIETIES AND GENOTYPES IN NORTHWEST AZERBAIJAN	Ashı ERDOĞDU Ashı GÜL Assist. Prof. Burak AKYÜZ Prof. Dr. Ümit SERDAR Fagan AGHAYEV	Ondokuz Mayıs University, Türkiye Azerbaycan Devlet Tarım Üniversitesi, Azerbaycan
SYNTHESIS OF POLYCARBOXYLIC ACID DERIVATIVE CHEATING AGENTS AND INVESTIGATION OF THEIR USAGE IN PLANT NUTRITION	Dr. Dilek ÜNLÜER BİRİNCİ	Karadeniz Teknik University, Türkiye Sakarya University, Türkiye
DETERMINING THE PHYSICAL PROPERTIES OF SOME GREENFIELD PLANTS	Assist. Prof. Zeynep DUMANOĞLU Prof. Dr. Kağan KÖKTEN Lect. Selim ÖZDEMİR	Bingöl University, Türkiye Sivas Teknoloji University, Türkiye
APPLICATIONS FOR ETHNOVETERINARY USES OF PLANTS FROM THE ASTERACEAE FAMILY	Ress. Assist. Ebru Kuruldak Dr. Seçil Karahüseyin	İstanbul University, Türkiye Çukurova University, Türkiye

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Session-3, Hall-3**19.03.2023****Moderator: Assoc. Prof. Çağdaş AKPINAR****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 15:00 – 17:00**

Title	Author(s)	Affiliation
THE AGRICULTURE IN UZBEKISTAN AT THE FIRST HALF OF XIX TH CENTURY	Prof. Dr. Nisbet Mehdiyeva	Baku State University Azerbaijan
THE IMPORTANCE OF EXPERIENCE OF NETHERLANDS IN DEVELOPMENT OF AGRICULTURE (ON THE BASE OF EXAMPLE OF XV – XVII TH CENTURIES)	Ayten MEHDIYEVA	Azerbaijan State Pedagogical University, Baku, Azerbaijan
INVESTIGATION OF CAUSAL AGENTS OF DISEASES IN KIWI FRUIT ORCHARDS OF MIDDLE BLACK SEA REGION OF TURKIYE	Ümit ESER Sevilay SAYGI Demet ÇELİK ERTEKİN Abdullah BALTAÇI İlyas DELİGÖZ	Karadeniz Tarımsal Araştırma Enstitüsü Müdürlüğü, Türkiye Gıda Kontrol Laboratuvar Müdürlüğü, Samsun, Türkiye
THE DETERMINATION OF EFFICIENCY OF DIFFERENT SPRAYING PROGRAMS AGAINST POWDERY MILDEW (Erysiphe necator Schw.) IN VINEYARD IN THE BLACK SEA REGION	Ümit ESER Abdullah BALTAÇI	Karadeniz Tarımsal Araştırma Enstitüsü, Samsun, Türkiye
CLUSTERING OF CITIES IN TÜRKİYE BASED ON AGRICULTURE AND LIVESTOCK INDICATORS	Hakan SERİN Assist. Prof. Muslu Kazım KÖREZ Prof. Dr. Mehmet Emin TEKİN	Selçuk University, Türkiye
RISK FACTORS RELATED TO WHEAT CULTIVATION	Gözde Hafize YILDIRIM Nuri YILMAZ	Ordu University, Türkiye
EFFECTS OF DIFFERENT SYNTHETIC AND ORGANIC FERTILIZER APPLICATIONS ON SOME YIELD AND QUALITY CHARACTERISTICS OF SILAGE CORN (ZEA MAYS)	Gözde Hafize YILDIRIM Nuri YILMAZ Ayşe Özge Şimşek Soysal	Ordu University, Türkiye
PREPARATION OF CHELATING COMPOUNDS INCLUDING METAL AS MICRONUTRIENT FERTILIZER, MEASUREMENT OF THEIR BIOLOGICAL ACTIVITIES, AND INVESTIGATION OF THEIR USAGE IN AGRICULTURE	Selda DURMUŞOĞLU Ertuğ YILDIRIM Sümeyye ÇAKMAK	Karadeniz Teknik University, Türkiye Sakarya University, Türkiye
SEASONAL CHANGES IN NUTRITIONAL STATUS OF CONVENTIONAL AND ORGANIC APPLE ORCHARD	Assoc. Prof. Çağdaş AKPINAR	Osmaniye Korkut Ata University, Türkiye

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Session-3, Hall-4**19.03.2023****Moderator: Dr. Muhammad Ikram****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 15:00 – 17:00**

Title	Author(s)	Affiliation
BIOAUGMENTATION AND BIOSTIMULATION OF CRUDE OIL CONTAMINATED SOIL: PROCESS PARAMETERS INFLUENCE	Lekan Taofeek Popoola, Adeyinka Sikiru Yusuff, Abel Adekanmi Adeyi, Oluwagbenga Olawale Omotara	Afe Babalola University, Ado-Ekiti, Ekiti State, Nigeria
RECYCLING OF WASTE AND GARBAGE IS THE MAIN DIRECTION OF ECOLOGY IN THE FIGHT FOR THE CLEANLINESS OF THE PLANET	Aygun Almamedova Konul Kahramanova Tarana Ibragimova	Institute of Additive Chemistry named after A. Guliyev, Baku, Azerbaijan
IDENTIFYING, CLASSIFYING, AND PRIORITIZING ITEMS AFFECTING THE CONTAGION OF BIOLOGICAL AGENTS AMONG HOSPITAL PERSONNEL	Amir Hossein Khoshakhlagh, Saeid Yazdanirad	Kashan University of Medical Sciences, Iran Shahrekord University of Medical Sciences, Iran
CNC/GO-doped TiO ₂ qUANTUM DOTS AS DYE DEGRADER	Dr. Muhammad Ikram	GC University Lahore, Pakistan.
THE GASTROANOMY DILEMMA IN CONTEMPORARY SOCIETY FROM THE PERSPECTIVE OF THE IMPLICATIONS ON CONSUMER HEALTH AND ON THE ECONOMY	Ana Cardoso Lopes Lyssandro Norton Siqueira Maraluce Maria Custodio	Escola Superior Dom Helder Câmara/Minas Gerais/Brasil
HIGH PERMITTIVITY FOR STORAGE APPLICATION	Adil Chakir, Boubker Mehdaoui, Abdeslam El Bouari	Hassan II University of Casablanca, Faculty of Sciences Ben M'Sick
DIVERSITY OF SPIDER FAUNA IN THE AREA OF JAGODINA (SERBIA)	Boban Stanković	City of Jagodina, Department of Environmental Protection, Serbia

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Session-3, Hall-5**19.03.2023****Moderator: Pr. Soraya Sedkaoui****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 15:00 – 17:00**

Title	Author(s)	Affiliation
NUMERICAL ANALYSIS OF STATISTICALLY PREDICTED RATE CONSTANTS FOR PYROLYSIS OF HIGH-DENSITY POLYETHYLENE USING MULTIPLE LINEAR REGRESSION MODEL IN R SOFTWARE	Rao Adeel Un Nabi, Muhammad Yasin Naz, Shazia Shukrullah, Abdul Ghaffar	University of Agriculture Faisalabad, 38040, Pakistan
APPLYING MACHINE LEARNING ALGORITHMS TO ADVANCE MODERN AGRICULTURE	Pr. Soraya Sedkaoui Pr. Khalida Mohammed Belkebir Dr. Rafika Benaichouba	University of Khemis Miliana, Algeria
SYNTHESIS OF NICKEL OXIDE/GRAPHENE OXIDE COMPOSITE FOR THE DEGRADATION OF CLOTHIANIDIN PESTICIDE	Atta ul Haq, Hafiz Muhammad Abubakar	Government College University Faisalabad, Pakistan
EFFECT OF DOSE OF MINERAL FERTILIZERS ON HYBRIDS SUNFLOWER PRODUCTIVITY IN NON-IRRIGATED CONDITIONS OF SOUTHERN UKRAINE	Assoc. Prof. Andrey Shepel	Kherson State Agrarian and Economic University, Department of Agriculture, Ukraine
ENVIRONMENTAL CLEAN-UP PROJECTS IN NIGERIA: A WILLINGNESS-TO-ACCEPT EXPERIMENT ON FARMING COMMUNITIES IN SOUTHERN NIGERIA	Mohammed K. Ibrahim, Inibehe George Ukpong	Kogi State College of Education, Nigeria. School of Agricultural Technology, Federal Polytechnic, Nigeria
SPATIO-TEMPORAL ANALYSIS OF LICHENS AS BIO-INDICATORS OF SO ₂ POLLUTION IN THE ANNABA REGION, ALGERIA	Naila MAIZI Thiziri IDIR Amel BERREBBAH ALIOUA	University Akli Mohand Oulhadj, Algeria University of Science and Technology (USTHB) Houari Boumediene, Algeria
THE ROLE OF DEMOGRAPHIC FACTORS ON COMMUNITY AVAILABILITY AS SERVICE PROVIDERS IN THE MANGROVE TOURISM AREA PETENGORAN, TELUK PANDAN, PESAWARAN, LAMPUNG	Dita Hydayah Hari Kaskoyo Samsul Bakri Rahmat Safe'i	Lampung University, Faculty of Agriculture, Dapartement of Forestry, Bandar Lampung
CHANGE IN THE ACTIVE SUBSTANCE CONTENT OF SHIITAKE MUSHROOM (<i>LENTINULA EDODES</i>) AS AFFECTED BY SOUS VIDE TECHNOLOGY	Peter Hajdú, Gréta Törös, Xhensila Llanaj, Dr. József Prokisch	University of Debrecen, Faculty of Agricultural and Food Sciences and Environmental Management, Institute of Animal Science, Biotechnology and Nature, Department of Animal Husbandry, Debrecen, Hungary
PROSPECTIVE AGRICULTURAL CROPS IN CLIMATE-ORIENTED AGRICULTURE OF UKRAINE	Oleksandr AVERCHEV Maria NIKITENKO	Kherson State Agrarian and Economic University
APPLE: HISTORY, CULTIVATION, HUMAN HEALTH AND FUTURE PERSPECTIVE	Asst. Prof. Gülçe İLHAN Prof. Dr. Sezai ERCİŞLİ	Ataturk University Agricultural Faculty Department of Horticulture, 25240 Erzurum-Türkiye
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Session-3, Hall-6**19.03.2023****Moderator: Moses Adeolu AGOI****Meeting ID: 842 7974 2853 / Passcode: 171819****Ankara Local Time: 15:00 – 17:00**

Title	Author(s)	Affiliation
ROLE OF ARTIFICIAL INSEMINATION IN POULTRY	Berhanu Bekele, Wondmeneh Esatu, Tadelle Dessie	Wachemo University, Ethiopia International Livestock Research Institute, Addis Ababa, Ethiopia
EVALUATION OF ARTIFICIAL INSEMINATION EFFICIENCY AND OESTRUS SYNCHRONIZATION IN DAIRY CATTLE: - A REVIEW	Berhanu Bekele, Abdilgefar Kemal, Dilgeba Aman	Wachemo University, Hossana, Ethiopia
THE SIGNIFICANCE OF INTRODUCING TASKS FROM THE FIELD OF INTERNAL AUDIT IN THE CONTEXT OF IMPROVING THE ANALYSIS OF THE FUNCTIONING OF AGRICULTURAL ENTERPRISES ON THE EXAMPLE OF THE REPUBLIC OF SERBIA	Ognjen Bakmaz Biljana Bjelica Jelena Vitomir	High School of Service Business East Sarajevo - Sokolac, Cara Lazara, 71350, Sokolac, Bosnia & Herzegovina Megatrend University, Bulevar Mihajla Pupina 117, 11070 Novi Belgrade, Republic of Serbia
REALISTIC TOP MANAGEMENT REPORTING THROUGH THE DISPLAY OF FINANCIAL REPORTING	Ognjen Bakmaz Biljana Bjelica Jelena Vitomir	High School of Service Business East Sarajevo - Sokolac, Cara Lazara, 71350, Sokolac, Bosnia & Herzegovina Megatrend University, Bulevar Mihajla Pupina 117, 11070 Novi Belgrade, Republic of Serbia
APPAREL DESIGN PERSPECTIVES FOR FARM ANIMALS	Maria Khoteeva Ptof. Varvara Getmantseva	The Kosygin State University of Russia, Moscow, Russia
STUDY ON GERMINATION AND SEEDLING GROWTH OF TWO CANOLA CULTIVARS AS AFFECTED BY CADMIUM AND COPPER SULFATE	Seyyed Hamid Reza Ramazani, Mehdi Kargar	University of Birjand, Birjand, Iran.
PHOTOCATALYTIC AND BACTERICIDAL PROPERTIES AND MOLECULAR DOCKING ANALYSIS OF TiO ₂ NANOPARTICLES CONJUGATED WITH ZR FOR ENVIRONMENTAL REMEDIATION	A. Haider	Muhammad Nawaz Shareef University of Agriculture, Multan, 66000, Punjab, Pakistan
ASSESSING THE EFFICACY OF IOT (INTERNET OF THINGS) AND ITS APPLICATION IN AGRICULTURE	Moses Adeolu AGOI Oluwadamilola Peace AGOI	Lagos State University of Education, Lagos Nigeria. Federal University of Agriculture Abeokuta, Ogun Nigeria.
DEVELOPMENT OF A STOCHASTIC WORKFLOW FOR CONTROLLING PRECISION IRRIGATION UNDER UNCERTAINTY	Angura Louis, Zsolt Zoltán Fehér, Tamás János, Nikolett Szóllósi, Dhimas Sigit Bimantara, Attila Nagy	University of Debrecen, Faculty of Agriculture food sciences and Environmental Management, Debrecen, Hungary
SPATIOTEMPORAL ANALYSIS OF THE SOIL PARAMETERS ON THE SPECTRAL REFLECTANCE OF THE MAIZE AT DIFFERENT PHENOLOGICAL PHASES USING MACHINE LEARNING	Dhimas Sigit Bimantara, Zsolt Zoltán Fehér, Angura Louis, Attila Nagy, János Tamás	University of Debrecen, Faculty of Agriculture food sciences and Environmental Management, Debrecen, Hungary
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ABSTRACT

In recent years, the spread of biogas plants has played an important role in rural areas. Indeed, intensive farming generates large quantities of ammonia, with irreversible consequences on the loss of biodiversity and the pollution of groundwater and soil. Thanks to these plants, it is possible to generate benefits not only for the individual company, but also for entire communities, and to contribute to the reduction of energy poverty and, at the same time, to the spread of economically sustainable models. This document presents a case study to investigate the potential of a biogas plant for the disposal of manure produced by cattle and buffalo farms. The paper focuses on the potential of such plants to reduce energy poverty and promote sustainable agriculture and soil fertility. Estimates were made of the energy and environmental impacts of the plant, with particular attention to environmental externalities and economic benefits. However, the study shows that both the amount of biogas and the production of compost and biofertilizers could be increased by strategically locating the plants and distributing them throughout the territory. This could have important repercussions in the agro-food sector. Furthermore, the study provides interesting suggestions for policymakers.

Keywords: Biogas, animal manure, anaerobic digestion (AD), circular economy, biofertilizer, energy transition.

**MICROWAVE PYROLYSIS OF PURE AND MIXED PLASTIC WASTES INTO
HYDROGEN AND VALUABLE CARBON USING SODIUM ZEOLITE CATALYST**

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ABSTRACT

In this study, an in-situ microwave pyrolysis of high-density polyethylene and polypropylene into hydrogen, liquid fuel and carbon nanotubes was performed in the presence of Zeolite Socony Mobil ZSM-5 catalyst. Activated carbon was used as a heat susceptor in the presented catalytic microwave pyrolysis of the plastics. The electrical energy of 1.8 MJ and microwave power of 1kW were used to degrade high-density polyethylene (HDPE) and polypropylene (PP) wastes at moderate temperatures of 400-450°C. The effect of plastic composition, catalyst loading and plastic-type on liquid, gas and solid carbon products was quantified. This in-situ CMP reaction resulted in heavy hydrocarbons, hydrogen gas and carbon nanotubes as a solid residue. A relatively better hydrogen gas yield of 129.6 mmol/g as a green fuel was possible in this process. FTIR and Gas Chromatography analyses revealed that liquid product consists of C₁₃+ fraction hydrocarbons, such as alkanes, alkanes, and aromatics. The TEM micrographs showed tubular-like structural morphology of the solid residue, which was identified as carbon nanotubes (CNTs) during X-ray diffraction analysis. The outer diameter of CNTs ranged from 30 nm to 93 nm from HDPE, 25 nm to 93 nm from PP and 30 nm to 54 nm for HDPE-PP mixture. The presented CMP process took just 2-4 min to completely pyrolyze the plastic feedstock into valuable products, leaving no amorphous residue.

Keywords: Catalytic microwave pyrolysis; Zeolite Socony Mobil-5; plastic waste; Hydrogen gas; Activated carbon; Carbon nanotubes.

NUMERICAL ANALYSIS OF STATISTICALLY PREDICTED RATE CONSTANTS FOR
PYROLYSIS OF HIGH-DENSITY POLYETHYLENE USING MULTIPLE LINEAR
REGRESSION MODEL IN R SOFTWARE

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ABSTRACT

The surge in plastic garbage production has encouraged researchers to look at various recovery possibilities. Pyrolysis is a promising and intriguing option for the recycling of plastic waste. Developing a model that simulates the pyrolysis of high-density polyethylene (HDPE) as the most common polymer is important in determining the impact of operational parameters on system behavior. The primary products of pyrolysis, like oil, liquid, gas, and waxes, can be predicted using a multiple linear regression model (MLRM) in R software. The rate constants for pyrolysis are temperature dependent, which were fixed experimentally at 420°C in this study. The MLRM was applied to these constants with a difference of 0.02, 0.03, and 0.04 in R software. The dependent variable affected the product yield, depending on the predictor variables. The added variable plots, scatter plots, and 3D plots demonstrated a good correlation among the dependent and predictor variables. The possible changes in the final products were analyzed by applying a second-order differential equation solver (SODES) in MATLAB software. The outcomes of experimentally fixed-rate constants revealed oil yield in the range 75% to 85%. During statistical analysis with a difference of 0.03 from the experimental fixed rate constant, the estimated yield of oil increased from 78% to 88% while a decreasing trend in light waxes, heavy waxes, and carbon black was observed. The improved oil and gas yield with suppressed byproducts confirms high significance of the conducted statistical analysis. The statistically predicted kinetic rate constants can be used to enhance the oil yield at an industrial scale.

Keywords: Pyrolysis of waste; high-density polyethylene; rate constant; numerical analysis; R software.

USING NANOTECHNOLOGY TO ENHANCE NUTRIENT BIOACCESSIBILITY

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ABSTRACT

Nanotechnology has become an increasingly important field in the delivery of various substances, including nutrients. The use of nanotechnology in nutrient delivery offers several advantages, including increased stability and bioavailability of the nutrient, improved targeting to specific tissues or cells, and decreased toxicity. However, there are also potential drawbacks associated with the use of nanotechnology in nutrient delivery. One major concern is the potential for toxicity associated with the use of nanoparticles. Additionally, there is limited information available on the long-term effects of nanoparticle exposure and the impact that nanoparticles may have on the body's normal physiological processes. Furthermore, there is a need for additional research to evaluate the safety and efficacy of nanoparticle-mediated nutrient delivery in different populations, including children, pregnant women, and elderly individuals. The size, zeta potential, encapsulation effectiveness, and release of nutrients nanoparticles may be related. Smaller nanoparticles typically have higher surface area-to-volume ratios, which can affect their zeta potential and encapsulation effectiveness. Higher encapsulation efficiency may be attained by increasing the stability of the nanoparticles in suspension as a result of a high zeta potential. However, a high zeta potential can also lead to a decreased release of the nutrients from the nanoparticles. On the other hand, larger nanoparticles may have lower zeta potentials and tend to have lower surface area-to-volume ratios. This may result in a decrease in encapsulation efficiency but could also increase the release of flavonoids from the nanoparticles. In this work, we reviewed the state of the art of nutrient release using nanotechnology-based delivery systems. Overall, the size and zeta potential of nanoparticles can affect their encapsulation effectiveness and release, but the precise relationship can depend on the particular composition and conditions of the nanoparticles.

Keywords: nanotechnology, nutrients, food.

BIOACTIVE PEPTIDES OF PLANT ORIGIN

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ABSTRACT

The potentiality of peptides produced from natural sources has attracted the researcher's attention in the last year for their antioxidant and antiinflammatory effects. Dietary intake of natural peptides could decrease the risk of oxidative stress-related diseases such as cancer, arthritis, cardiovascular, diabetes, and Alzheimer's disease). Natural peptides advantages are sustainability, environmental protection, low cost, emulsifying, functional, solubility, foaming properties, fewer side effects, and lower costs than synthetic drugs. Therefore, they have potential industrial applications. This presentation discusses the functional properties of peptides isolated from plants and their application in the pharmaceutical, cosmetic, and food (as functional products or food additives) industries. Furthermore, the delivery systems appropriate to avoid losing their bioactivity are also examined.

Keywords: natural peptides; antioxidant; nutricosmetic; cosmeceutical.

**EFFECT OF DOSE OF MINERAL FERTILIZERS ON HYBRIDS SUNFLOWER
PRODUCTIVITY IN NON-IRRIGATED CONDITIONS OF SOUTHERN UKRAINE**

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ABSTRACT

The main criterion that determines the effectiveness and feasibility of growing sunflowers when applying mineral fertilizers is the yield of the crop. Data on the yield of the studied hybrids, as well as its increase or decrease, indicate that during the experiments, the nutritional background of the sunflower hybrids had a different effect on the formation of crop seed yields. Thus, the productivity of the Gena hybrid under the studied nutrition backgrounds varied from 1.45 to 2.14 t/ha. When applying mineral fertilizers with a dose of N20P20 and N40P40, yield increases were, respectively, 0.25 and 0.52 t/ha compared to the control variant. This shows that when applying the studied doses of fertilizers, there is no optimal option in terms of yield.

The maximum seed yield in the experiment was formed by the Yason hybrid - 2.31 t/ha, obtained when fertilizers were applied at the rate of N40P40. At the same time, reducing fertilizer rates to N20P20 reduced the seed yield of the hybrid by 0.26 t/ha, and in the control variant, the lowest yield was obtained for the Yason hybrid – 1.83 t/ha.

Based on the results of variance analysis calculations, the relative participation of the experimental factors in the change in sunflower yield was determined.

Thus, fertilizers played the greatest role in changing the yield of the studied crop - 61.6%. The share of hybrids was 36.1%. Such results, in our opinion, are due to favorable weather conditions in the year of the research.

Analyzes of the quality of the seeds of the crop showed that the fat content in the sunflower kernel varies significantly depending, first of all, on the nutritional background. On average, the fat content in sunflower seeds decreases with the introduction of higher rates of fertilizers. Thus, for the Yason hybrid, the largest amount of fat in the kernel - 50.7% was obtained on an unfertilized background, and the smallest - 49.2% is contained in the seeds obtained in the N40P40 variant.

The maximum amount of fat in the kernel – 50.2% in the Gena hybrid was also observed on an unfertilized background. When the rates of fertilizers are increased to N20P20 and N40P40, a decrease in the fat content in the kernel of the Gena hybrid is observed.

When calculating the payback of fertilizers by the yield of the studied sunflower hybrids, it was determined: application of fertilizers at the rate of N40P40 gives the highest payback of sunflower seeds. So, against the background of N20P20 nutrition, the payback of mineral fertilizers in the Gena hybrid is 6.3 kg/kg.year, which is 0.2 kg/kg.year. less compared to the norm of N40P40. This is the result of the Yason hybrid: when applying fertilizers with the rate of N20P20, the payback is 5.5 kg/kg. d.r., which by 0.5 kg/kg d.r. less than the N40P40 variant, respectively.

When comparing hybrids, it should be noted that Gena had a higher return on fertilizer seeds by 0.8 kg/kg.year. in the version of applying N20P20 and by 0.5 kg/kg.year. in the version of the double norm, compared to the Yason hybrid.

Key words: sunflower, hybrids, mineral fertilizers, southern Ukraine

EFFECT OF CHICKPEA SEED TREATMENT WITH *TRICHODERMA ASPERELLUM* IN THE CONTROL OF *FUSARIUM EQUISETI*, THE CAUSAL AGENT OF ROOT ROT

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ABSTRACT

It is well known that the use of biopesticides in Moroccan agriculture is still low compared to that of chemical pesticides, and there are only a few biopesticides on the market that are available to farmers. Trichoderma-based biological control remains the most encouraging among the different alternative control methods.

The antagonistic and stimulating properties of preparation based on a strain of *Trichoderma asperellum*, used for the treatment of chickpea seeds, were studied in vivo. The treatment of seeds with this preparation resulted in its stimulating effect on vegetative and root growth and its ability to protect the plants against the pathogenic strain N3 of *F. equiseti*. The average length of the aerial part is 43.33 cm and those of the control plants are about 31.66. The average root length of the plants from Trichoderma treated seeds was 30.22 cm, and that of the control plants was 28 cm. This stimulation also contributed to the improvement of the aerial and root biomass which increased by 40.31% and 29%, respectively, compared to the controls. Disease severity and leaf damage index were also evaluated. Fusarium symptoms were significantly reduced compared to those in plants inoculated with *Fusarium equiseti* without prior treatment. The protective effect was very apparent in the plants from seeds treated with Trichoderma and inoculated with *F. equiseti*, with a value of the leaf damage index FDI of 0.28, noted after the third week following the appearance of the symptoms against a value of 0.44 in the plants from seeds inoculated only with the pathogen.

Key words: Chickpeas; *Trichoderma asperillum*; *Fusarium equiseti*; rot; severity

**PROTECTIVE EFFECTS OF MELATONIN AGAINST OXIDATIVE STRESS CAUSED BY
IRON CHRONIC ADMINISTRATION COMPARED TO EDTA CHELATOR**

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ABSTRACT

Iron is a dominant metal widely distributed in the brain with very strong oxidative activity. Furthermore, the pineal hormone melatonin is known to have effective protective effects against various oxidative damage of the nervous system.

The purpose of this study was to determine if melatonin could play a role against affective disorders, cognitive and oxidative stress disorders induced by chronic iron exposure by probably acting as a chelator, by comparing these effects with those of a chemical chelator Ethylenediaminetetraacetic acid (EDTA) in male Wistar rats. The treatment is carried out for 8 weeks, the rats received an intraperitoneal injection either of NaCl (control), of iron at (1 mg/kg), of melatonin at (4 mg/kg), of EDTA at (4 mg/kg) or 1 mg/kg of Iron + 4 mg/kg of melatonin or 1 mg/kg of Iron + 4 mg/kg of EDTA. Affective and cognitive disorders are assessed in the field test (OFT), elevated plus maze (EPM), forced swimming test (FST), Morris water maze (MWM), and Y-maze. The hippocampus and prefrontal cortex of each animal were taken for biochemical examination.

The results from OFT, EPM, and FST indicate that melatonin exerts anxiolytic and antidepressant effects against the effects caused by chronic iron exposure, indeed these results were better than those obtained using EDTA. In addition, data from MWM and Y-maze show that melatonin treatment increases cognitive performance. By decreasing lipid peroxidation (LPO) and nitric oxide (NO) levels and increasing catalase (CAT) activity in the hippocampus and prefrontal cortex, Mel also reduced iron-provoked OS.

In conclusion, this study demonstrates that melatonin protects against iron-induced neurobehavioral changes, which may be associated with reducing OS in the hippocampus and prefrontal cortex.

Keywords: Melatonin, EDTA, Anxiety, Depression, Memory, Behavioral tests, Male Wistar Rat

COCCIDIOSIS OF PET DOGS IN BELGRADE AREA DURING 2021

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ABSTRACT

Coccidiosis in dogs is a protozoan disease the clinical picture is mostly observed in young animals, while older individuals are carriers of parasites. The causative agents are coccidia from the genera *Isospora* (*Isospora canis*, *I. bahiensis*, *I. bigemina*, *I. burrowsi*, *I. rivolta*, *I. neorivolta* and *I. ohioensis*) and *Eimeridae* (*Eimeria canis* and *E. cati*). Parasites are found in mucosa of the small intestine. The clinical picture is manifested by enteritis accompanied by long-term mucous, and then bloody diarrhea, general weakness, loss of appetite and with depression, animals lose weight quickly. Younger dogs they can die, while in animals that recover, symptoms resolve in 7 to 10 days. In the elderly In dogs, the infection can pattern symptoms similar to those seen in epilepsy. Pathoanatomical changes are the most common in the ileum, less in the jejunum, and the weakest in the duodenum. In severe infections there is hemorrhagic enteritis with ulceration of mucous membranes, thickened intestinal mucosa and the finding of thick mucous content dark-brown color. Bleeding is most common in in the form of petechiae, and in more severe infections they are diffuse with congestion of blood vessels. During 2021 we examined feces of 137 pets dogs that had symptoms of dysentery, diarrhea, weight loss, fainting and abdominal pain. It usually occurs in young animals. A fecal sample is examined for oocysts using fecal flotation (saturated salt or sucrose solutions). Speciation should be undertaken, and in puppies this may require artificial sporulation of the oocysts with potassium dichromate. Infection with *Eimeria canis* we established in 12.33% and with *Isospora canis* in 23.17% of examined animals.

Keywords: coccidiosis, *Eimeria canis*, *Isospora canis*, pet dogs, Blgrade

**COMPARATIVE PATHOGENIC CAPACITY OF THREE FUNGAL SPECIES ONTO
DETACHED LEAVES OF SABRINA STRAWBERRY VARIETY**

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ABSTRACT

The mycological analysis conducted up on diseased plants of strawberry plants showing necrotic symptoms on strawberry leaves revealed the presence of *Botrytis cinerea*, *Colletotrichum gloeosporioides* and *Coniella fragariae*. The pathogenicity test was carried out on detached leaves of Sabrina strawberry variety cultivated under greenhouse conditions. Using two inoculation techniques, conidial suspension adjusted to 10^5 spores/mL or mycelial discs, isolates induced lesions formation which developed at 5 to 7 days after inoculation. A secondary inoculum of the three fungal isolates was produced, with varied potential according to inoculation technique and pathogen life cycle each. The disease severity was estimated to 83.01% (*B. cinerea*), 65% (*C. gloeosporioides*) and 38,34% (*C. fragariae*). Significant spore production was recorded at 10 days post-inoculation made by mycelial disc $3,11 \times 10^5$ spores/cm², $(8,23 \times 10^5)$ spores/cm² and $1,35 \times 10^5$ spores/cm² by the respective fungal isolates *Botrytis cinerea* (SC), *Colletotrichum gloeosporioides* (Cg1) and *Coniella fragariae* isolate. Thus, Koch's postulate was fulfilled, the isolates tested have demonstrated strong to weak pathogenic capacities. The re-isolation from symptomatic plants isolate were positives.

Keywords: Strawberry, leaves, symptoms, fungi, pathogenicity

MOLECULAR INVESTIGATION OF ENTEROTOXINS IN METHICILLIN RESISTANT STAPHYLOCOCCUS AUREUS ISOLATED FROM BOVINE MILK AND OCCUPATIONAL DAIRY WORKERS IN PAKISTAN

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ABSTRACT

Staphylococcus aureus (*S. aureus*), a major zoonotic pathogen of veterinary and public health significance, is responsible for dairy animal mastitis as well as food borne maladies in humans. The current study aimed to investigate the prevalence of *S. aureus* and methicillin resistant *S. aureus* (MRSA) from bovine subclinical mastitis and the occupational dairy workers. The study also highlighted the antibiotic resistance pattern as well as the increasing prevalence of major staphylococcal enterotoxins (B and C) in local MRSA isolates. Furthermore, the phylogenetic relation of prevalent enterotoxin B gene in animal and human samples was also found. In this study, a total of 384 bovines milk samples (n=192 cattle, n=192 buffalo) and 100 nasal/ skin swab samples from dairy workers (n=100) were collected and subjected to culturing and biochemical methods for confirmation of *S. aureus*. MRSA was confirmed based on Kirby-bauer disc diffusion test and presence of *mecA* gene. The positive MRSA samples were evaluated for presence of Staphylococcal protein A (*Spa*) and enterotoxin genes (*Seb*, *Sec*) by PCR. The study revealed an overall prevalence of 52.60%, 48.44%, and 47% in cattle, buffalo, and human samples. The results showed a relatively lower prevalence of MRSA in occupational dairy workers (10.64%) compared to bovine milk samples (34.02%). Among local isolates, 66.80% of staphylococcal isolates revealed presence of *Spa* gene. The overall prevalence of enterotoxigenic *S. aureus* was 16.18% with a higher prevalence of enterotoxin B (9.96%) compared to enterotoxin C (6.22%). Antibigram pattern showed that a higher resistance against amoxicillin followed by oxytetracycline and gentamicin. The phylogenetic analysis revealed significant resemblance of bovine *seb* gene with human gene sequence except of minor differences. The study concluded that increasing prevalence of enterotoxigenic MRSA in bovines as well as occupational workers depicts the spill-over of pathogen at bovines-human interface.

Keywords: *S. aureus*, bovine mastitis, MRSA, dairy workers, antibiotic resistance, phylogenetic analysis

**MORPHOBIOLOGICAL CHARACTERISTICS OF THE REDTAIL CATFISH
PHRACTOCEPHALUS HEMIOLIOPTERUS (BLOCH & SCHNEIDER, 1801)**

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ABSTRACT

Redtail catfish *Phractocephalus hemioliopterus* belongs to the order of catfishes Siluriformes, the family long-whiskered catfishes Pimelodidae, has a large broad flattened head. The eyes are small, located at the top of the head on the sides. The dorsal fin is wide and high. The adipose fin is small. The pectoral fins are long and wide. The caudal fin is very wide, with branched rays. The back is brown, the pectoral, abdominal and anal fins are black, the upper part of the dorsal (the lower part is black) and the caudal fins are orange-red. This is where the name of this species comes from. The belly has a cream color [1, 4, 8].

The fish lives in South America in the Amazon, Orinoco and Essequibo river basins. In nature, it reaches a weight of 80 kg and a body length of up to 1.8 meters, but it is also a very popular aquarium fish [3, 4, 5, 6]. Even in small aquariums, Redtail catfish grows very large. Due to its enormous size, the catfish is a coveted trophy for many professional fishermen [1, 2].

The object of this research was the Redtail catfish *Phractocephalus hemioliopterus* (Lesueur, 1819). The studied samples were seized from the cooling reservoir of the Zaporizhzhia Nuclear Power Station during remedial fishing measures in 2021. Morphometric analysis of fishes was carried out according to generally accepted ichthyological methods [7].

To carry out morphometric measurements of Redtail catfish, 41 individuals aged 1+ (two-year-olds) were selected, all the studied parameters are shown in Table 1. The average total length (TL) of Redtail catfish samples was 360 ± 4 mm and varied in the range of 322-400 mm, standard length (SL) – 320 ± 3 mm, the fork length of fish is 306 ± 3 mm. The average weight of individuals was 448 ± 18 g, the average weight without entrails of the fish was 418 ± 12 g. According to the average standard length of the fish and its weight was calculated Fulton K_F condition factor and according to the average fork length of the fish and its weight – F.Clark condition factor K_C , which were 1.6 and 1.5 respectively.

Table 1. Length-weight indicators of Redtail catfish

Total length (TL), mm	Standard length (SL), mm	Fork length (FL), mm	Weight, g	Weight without guts, g	K_F	K_C
360 ± 4 322-400	320 ± 3 295-350	306 ± 3 280-320	448 ± 18 330-578	418 ± 12 310-545	1,6	1,5

The value of catfish in industrial and technical reservoirs can be ambiguous. On the one hand, it destroys low-value fish species that are competitors in feeding industrial species, but they also eat weak and sick fish, thus fulfilling the role of biological sanitation of the reservoir. On the other hand, when it reaches large sizes (over 90–120 cm), catfish can harm fisheries by destroying valuable commercial fish species, so the number of catfish should be regulated by commercial fishing. Therefore, it is recommended to carefully monitor the number of Redtail catfish in reservoirs.

Keywords: Redtail catfish, *Phractocephalus hemioliopterus*, fishes, cooling reservoir, ichtiological research

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NATURAL DIET COMPOSITION OF THE DEEP-WATER ROSE SHRIMP *PARAPENEUS LONGIROSTRIS* (DECAPODA, DENDROBRANCHIATA, PENAEIDAE), FROM ALGERIAN WEST COAST

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ABSTRACT

The deep-water rose shrimp, *Parapenaeus longirostris* (Lucas, 1846) is one of the Decapod crustacean species that is targeted by coastal and deep-sea demersal fisheries in the western Mediterranean, in the Algerian west coast in particular. Despite its socio-economic importance and commercial interest across the country, there were only few studies focusing on its biology and ecology and no species development plan has been drawn up for now. Our study of the rose shrimp diet was based on the analysis of the faunistic composition of the ingested prey. Seasonal sampling was carried out at Béni Saf port (western Algeria) during 2018-2019, from landings from inshore trawling fisheries. A total of 641 individuals were analyzed, while taking account of males and females and size classes. 2550 introduced preys are identified, starting from the examined stomachs, of which 55 are empty. The average number of preys per stomach is 3.97 %.

Results of stomach content analyzes showed a wide range of benthic and endobenthic species. Crustacea are the preferred prey (F=77.69%), followed by Foraminifera, Annelida Polychaeta, and Mollusca with respective frequencies of (77.22%, 58.50% and 52.73%). Radiolaria, Porifera and Echinodermata represent a less important part in the diet of this species and constitute accidental prey, whose frequency is less than 10%. Benthic organisms with silt ingest the plant and various debris, which are the secondary prey with an average frequency of 14.81%. Results show that the shrimps nourish themselves intensively in spring and more in less in winter and summer, which corresponds to a significant food activity, for the constitution of concerning the reproduction.

Keywords: *Parapenaeus longirostris*, Rose shrimp, Benthic species, Algerian west coast.

BACTERIOLOGICAL QUALITY OF RAW OVINE MILK

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ABSTRACT

The primary purpose of this research was to examine the bacteriological properties of raw ovine milk produced by Merino, Tsigai, Dorper, Lacaune, and British Milk Sheep flocks on four sheep farms located in the eastern part of Hungary. In addition to individual raw milk (IRM) and bulk tank milk (BTM) samples, the udder surface (US) of ewes was also tested for bacteriological quality.

A total of 77 US, 86 IRM, and 10 BTM samples were collected in the early morning during regular milking sessions. The samples, kept cooled at temperatures below 4 °C, were delivered to the microbiological laboratory and were examined immediately.

The relatively low numbers of bacteria in both US and IRM samples reflected good housing conditions of ewes kept on the four farms studied. However, BTM samples had up to 3.5–4.0 log₁₀ CFU/mL higher mean bacterial counts than their IRM counterparts, and the mean levels of bacteria in BTM on two farms even exceeded the regulatory limit of 6.18 log₁₀ CFU/mL.

From the collected samples, a total of 45 staphylococci and 11 lactic acid bacteria isolates identified either by MALDI-TOF MS Biotyper and/or API Staph and/or 16S rRNA genome sequencing were characterized. Characterizations (catalase test, oxidase tests, coagulase test, hemolysis tests, antibiotic resistance, enterotoxin genes) were carried out for all staphylococci.

Eleven (24.4%) of staphylococci isolates were resistant to at least one of the tested antibiotics. Out of 45 staphylococci strains, 26 (57.8%) were able to produce at least one of the 13 tested enterotoxins.

Keywords: sheep; ewe; ovine; milk; microbiology; bacteriology

CNC/GO-doped TiO₂ qUANTUM DOTS AS DYE DEGRADER

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ABSTRACT

The graphene oxide/cellulose nanocrystal (CNC)-doped TiO₂ quantum dots (QDs) were successfully synthesised by employing an inexpensive co-precipitation approach for the purpose of dye degradation. X-ray diffraction, Fourier transform infrared spectroscopy, ultraviolet-visible spectroscopy, electron dispersive spectroscopy, scanning electron microscopy, and high-resolution transmission electron microscopy are some of the characterization techniques that were utilized in order to determine phase formation, functional groups, optical properties, elemental composition, and surface morphology. As a result of the insertion of GO/CNC into TiO₂, the PL intensity was found to be reduced, while the band gap (E_g) decreased from 3.22-2.96 eV. The existence of graphene oxide in composites was inferred from the detection of the D and G bands in the Raman spectrum. Doping led to an increase in the crystallinity of the TiO₂. The interlayer d-spacing of nanocomposites was estimated by using HR-TEM, and the results were quite similar to those obtained by XRD. Under the irradiation of visible light, the photocatalytic potential of the produced samples was tested against methylene blue ciprofloxacin (MBCF). (Published in Nanoscale Advances).

Keywords: Quantum dots; CNC; dye degradation

VERTEBRATE DIVERSITY AT MARGALLA HILLS NATIONAL PARK, PAKISTAN

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ABSTRACT

Margalla Hills National Park (MHNP) is in Islamabad, Pakistan and important site for the conservation of many plants and animals. The present study was aimed to determine the status of fauna diversity and richness, and environmental threats to the animals. A field study was conducted and the point count method was used to determine vertebrate diversity. The survey showed that the MHNP is home to 117 species of birds belonged to 48 families, 27 reptiles (including species such as the saw-scaled viper, Russell's viper and the Indian cobra) and 30 mammalian species, such as barking deer, wild boar, golden jackal, red fox, Asiatic leopards, monkeys, fruit bats, and pangolins. According to the Islamabad wildlife management board, one of the unique species, the grey goral (*Nemorhaedus goral*), was found extinct at the MHNP as no single specimen has been recorded since 2018. It was also observed, that the numbers of the endangered species of common leopard (*Panthera pardus*) and pangolin (*Manis crassicaudata*) have increased, possibly due to the wildlife management board's strategy for conservation. It was concluded during the visits, threats such as habitat degradation, climate change, and over hunting were possible source of decrease in biodiversity. So, implementation of approved legislation and better managerial practices can protect the unique diversity.

Keywords: Biodiversity, Margalla Hills, Habitat, Threats, National Park

**EFFECT OF THE CONTRIBUTION OF WASTE SLUDGE PRODUCED AT THE URBAN
WASTEWATER TREATMENT PLANT OF THE CITY OF BOUIRA ON THE
VEGETATIVE GROWTH AND YIELD OF CROPS**

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ABSTRACT

Agricultural reuse of sewage sludge is a long-standing practice in developed countries. The beneficial aspect of this practice has been demonstrated in numerous studies.

The beneficial aspect of this practice has been demonstrated in numerous studies. Our study has allowed us to experiment with the positive effect of spreading waste sludge from the Bouira urban wastewater treatment plant on the germination, growth, flowering, and profitability of three crops: lettuce, lentils, and potatoes with two varieties (SIFRA from Holland and NDICAT from Brittany).

To do this, we compared the outcomes of agricultural products grown under the same experimental conditions on a control soil, on the same soil that had been improved with an organic fertilizer, and on the same soil that had been improved with mud.

The above-ground portion of lettuce grown in soil improved with sludge produced fresh matter at significantly higher rates than lettuce grown in topsoil (TV), with a yield of 1200%, which is nine times greater than lettuce grown in soil improved with organic fertilizer.

However, for potato the maximum yield was found in the Dutch variety SIFRA, grown on the soil-sludge mixture with 875%.

Key words: agricultural valorisation, waste sludge, lettuce, lentil, and potato.

ENVIRONMENTAL CLEAN-UP PROJECTS IN NIGERIA: A WILLINGNESS-TO-ACCEPT EXPERIMENT ON FARMING COMMUNITIES IN SOUTHERN NIGERIA

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ABSTRACT

Nigeria is among the few nations in the world facing obvious impacts of unsustainable exploitation of crude oil and gas. With more pollution in Nigeria generated by the oil and gas industry, the Country faces increased risks of environmental pollution following increased activities of the oil and gas industry. More so, the rural population is largely dependent on natural environmental resources and agriculture for their livelihood and survival. This dependence further increases the risks and vulnerability to negative implications of environmental pollution. Specifically, traditional agriculture (or farming) depends exclusively on the prevailing natural conditions of the environment, and as being reported in many studies, agriculture is one of the most affected sources of livelihood in Nigeria, following the ravaging impact of environmental pollution. This study has been designed to focus on oil producing communities in the Niger delta region of southern Nigeria, where environmental clean-up projects have been implemented. A sample size of 1,500 respondents (500 persons per state) will be selected from three States in the region, which includes; Akwa Ibom, Bayelsa and Rivers. The research is designed to use modern impact evaluation techniques and research methodology; in particular, the study will adopt a welfare strategy; involving the willingness-to-accept (WTA) concepts, which are deemed to be one of the most efficient techniques for resource valuation and impact assessment. The study is expected to analyze the preferences of farming communities for environmental remediation projects and would provide a fact-based assessment of the response to environmental clean-up (or pollution clean-up), by the government in collaboration with multi-national organizations. The study will further validate the effectiveness of the cleanup strategies with a view to making policy suggestions towards achieving improved environmental resource management and sustainability. The study would evaluate the impact of the projects on agriculture, with a view to promote agricultural development, food security and improved livelihood of people in farming communities within the region.

Keywords: Environmental Clean-Up, Willingness-to-Accept, Farming Communities, Niger Delta, oil pollution, Nigeria.

INTRODUCTION

The worrisome increasing trend in environmental pollution has raised global concerns about the fate of the ecosystem, impact on livelihood and debates on better ways of achieving sustainable development (Bhau & Ukpog, 2018). There are various reported cases of oil spills since the advent of crude oil extraction in the 1970s. Oil spill also remains a threat to the environment in terms of natural resource loss and extinction of valuable species, with enormous wanton destruction of biodiversity, shoreline contamination and high mortality of wildlife species, as reported in the Gulf of Mexico and the Niger Delta (Lin & Mendelssohn, 2012; Ukpog *et al.*, 2019). Continuous exposure of the natural environment to crude oil makes it vulnerable to adverse health conditions of the organisms, poor growth and impact on reproduction, while also directly destroying the marine environment (Ukpog *et al.*, 2019). This makes environmental cleanup, very important to ensure the remediation of oil spills from the environment of polluted areas, such as the most debated Ogoni clean-up project.

With more pollution in Nigeria generated by the oil and gas industry, the Country faces increased risks of environmental pollution following increased activities of the oil and gas industry. More so, the rural population is largely dependent on the natural environment resources and agriculture for their livelihood and survival. This dependence further increases the risks and vulnerability to negative implications of

environmental pollution. Specifically, traditional agriculture (or farming) depends exclusively on the prevailing natural conditions of the environment, and as being reported in many studies, agriculture is one of the most affected sources of livelihood in the Niger Delta as a result of environmental pollution, mainly from oil spills and pipeline explosions (Kadafa, 2012). The devastating impacts of these incidents have raised both government and international concerns leading to the recent actions toward ensuring environmental cleanup of polluted areas across the region. The cleanup projects were aimed at improving the resilience of the environment and reclaiming polluted natural resources such as polluted soils and water resources, with a view to restore and improve the sources of livelihood. It is based on this background that this study is designed to evaluate people's perception of the cleanup projects.

The operations of the Oil & Gas industry in the Niger Delta region have brought about undeniable changes that affect the traditional means by which people make their livelihoods (mainly in the rural oil-producing communities). Oil spills in the Niger Delta have resulted in damage to farmlands and crops, resulting in loss of farmer's income and food insecurity; indicating that people's livelihood are affected by environmental pollution. The negative impact of environmental pollution, mostly as a result of oil spills have necessitated the clean-up exercise sponsored by the government and multinational. However, in planning and implementation of such clean-up projects, there is no recorded involvement of the affected communities especially farming communities who are the most affected. This has potentials to affect the successful implementation of such projects and hinder achieving the project deliverables owing to general lack of interest and acceptance amongst the communities. These facts justify the need and importance of this research.

OBJECTIVES OF THE STUDY

- i. Evaluate community perceptions on the expected impact of environmental clean-up on farm and off-farm livelihood options.
- ii. Design and implement a choice experiment for collecting choice based data that will enable estimation of choice based preferences.
- iii. Determine the socioeconomic characteristics of the farming communities that characterize their Willingness-To-Accept (WTA) the clean-up project
- iv. Carry out sample testing including laboratory testing of soil quality, water quality and air quality; to serve as a scientific basis and control for the survey.
- v. Highlight policy implications and recommendations towards addressing limitations of the cleanup projects.

RESEARCH QUESTIONS

- i. How do people perceive the impact of environmental clean-up in the Niger Delta?
- ii. What are the willingness-to-pay (WTA) attributes that describe people's perception of the clean-up projects?
- iii. What is the relationship between socioeconomic characteristics that describes people's willingness to accept the clean-up projects?
- iv. Are there any significant difference in the quality of soil, water and air in the affected areas, as would be compared to people's perception?
- v. What are the possible policy implications of the clean-up projects?

RESEARCH METHODOLOGY

This study will be carried out in oil producing communities in the Niger delta region of Nigeria, where environmental clean-up projects have been implemented. A sample size of 1,500 respondents (500 persons per state) will be selected from three States in the region; Akwa Ibom, Bayelsa and Rivers.

The research is designed to use modern impact evaluation techniques and research methodology. In particular, the study will adopt a welfare strategy; involving the willingness-to-accept (WTA) concepts,

which are deemed to be one of the most efficient techniques for resource valuation and impact assessment (Brefle *et al.*, 2015).

The technique will involve the design of choice experiments and choice cards which will enable effective data collection and near accurate responses from participants.

Data collection will involve the design of a choice experiment for collection of WTA data; which will be incorporated in the conventional survey questionnaire. Data will be analyzed using both descriptive and inferential statistics; which will include tables, graphs and charts, as well as the ordinal logistic regression analysis such as the logit/probit analysis; which will help to determine the relationship between socioeconomic variables and respondent choices. The Likert scale measurements will be used for debriefing statements which will describe rating/ranking of responses. The study will also carry out scientific experiments; which will involve laboratory testing of basic natural resource samples including soil, water and air samples. The scientific experiment will serve as an effective control sample against which the responses (or choices) of the respondents will be compared. A timeline of one year and six months is proposed for the research.

CONCLUSION

This study is expected to analyze the preferences of farming communities in environmental remediation projects and provide a fact-based assessment of the response to environmental or pollution clean-up, by the government in collaboration with multi-national organizations. The study will further validate the effectiveness of the cleanup strategies with a view to suggest policy basis for improved environmental management and resource sustainability. The study would evaluate the impact of the projects on agriculture; to promote agricultural development, food security and improved wellbeing of farming communities, and would provide a reference background from which similar projects can be evaluated.

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FUNCTIONAL FEATURES OF PLATELETS IN CALVES AT THE END OF EARLY ONTOGENESIS

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Introduction. The final stage of the early ontogenesis of the calf is the phase of plant nutrition, during which the final maturation of all its organs and systems occurs. At the same time, platelet activity remains insufficiently studied in calves at this age.

The purpose of the study: to establish the functional characteristics of platelets in healthy calves during the phase of plant nutrition.

Methodology and organization of the study. Under supervision were calves of vegetable nutrition with a total number of 17, the condition of which was taken into account on the 91st day and at 6 months, 9 months. and 12 months. life. In all animals, the biochemical properties of platelets and their hemostatic activity were evaluated, followed by statistical processing of the results.

Research results. All calves that made up the study group were under dynamic control of their condition. At each blood sampling for a planned study, the main physiological parameters were evaluated in animals and general and biochemical blood tests were performed, which gave normal values of the parameters taken into account. The content of acyl hydroperoxides in platelets of calves decreased with increasing age, as a result of increased antioxidant defense enzymes in them, primarily catalase and superoxide dismutase. Their functions increased and reached a maximum by the end of the observation. During the observation period, the content of ATP and ADP in the platelets of healthy calves gradually increased with an increase in their secretion from the composition of platelet granules. The amount of actin and myosin in intact and stimulated platelets in healthy calves gradually increased during the observation, reaching a maximum by the age of one. In the observed calves aged between 91 days and a year, a gradual reduction in the time of development of platelet aggregation with various inducers and their combinations was noted. This was accompanied by an increase in platelet activity in vivo. This was manifested in the blood of calves during the observation period by a decrease in discoid platelets and an increase in their activated varieties. In addition, during the phase of plant nutrition in the blood of calves, the number of freely moving small and large platelet aggregates gradually increased with an increase in the level of involvement in platelet aggregates, which reached the highest level by the end of the considered phase.

Conclusions. In calves, during the plant nutrition phase of early ontogenesis, the ability of platelets to aggregate gradually increases in vitro and in vivo, which is a consequence of the interaction of environmental influences on the body with its adaptive mechanisms.

Key words: calves, plant nutrition phase, platelets, aggregation, secretion.

PLATELETE FEATURES IN YAROSLAV CALVES

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ABSTRACT

The purpose of the study is to determine the state of platelet functions in young animals of the Yaroslavl breed during the phase of milk and vegetable nutrition. 42 calves of the Yaroslavl breed, born as a result of normal pregnancy from cows of optimal functional status, were examined. In calves, there was an acceleration of the onset of platelet aggregation with all used aggregation stimulators by the age of 45 days of life. She returned to the outcome by the end of the third phase of early ontogenesis. In animals, by day 45, the total number of activated platelets in varying degrees increased by 27.9% in the blood for a short time. The found short-term increase in the severity of platelet function by the age of 45 days developed due to an increase in the synthesis of thromboxane molecules by 30.3%. Also, in platelets of calves, a short-term increase in the content of adenosine phosphate in platelets and an increase in its secretory release were found. In animals, by day 45, an increase in platelet activity was also caused by a short increase in the amount of actin and myosin in them by 35.7% and 43.0%. Their content in platelets returned to the outcome at the end of the study. During the implementation of platelet aggregation in calves by the 45th day of life, an additional increase in the synthesis of actin and myosin by 35.7% and 43.0% was noted, disappearing by the end of the third phase of early ontogenesis.

Key words: Yaroslavl breed, calves, phase of milk and vegetable nutrition, physiology, platelets, hemostasis.

FUNCTIONAL ACTIVITY OF PLATELETS IN PIGS IN THE MIDDLE OF EARLY ONTOGENESIS

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Introduction. The growing demand of society for pork dictates the need to improve approaches to accelerating the cultivation and improvement of the bulk of pigs. This can be ensured by obtaining new knowledge of animal physiology. This can help improve the conditions for breeding and raising pigs. The hemostasis system is considered to be very significant for maintaining the overall viability of young pigs. Its extremely important component are platelets. Changes in their activity can affect the state of microcirculation, and hence the severity of anabolism in the growing body of animals, including piglets during the phase of milk and vegetable nutrition.

Purpose: to reveal the dynamics of platelet activity in piglets during the phase of milk and vegetable nutrition.

Materials and research methods. 37 piglets of the Large White breed were examined at the age of 21 days, 25 days, 30 days, 35 days and 40 days. Their platelets were washed and resuspended. In their membranes, the amount of cholesterol, malondialdehyde and acyl hydroperoxides, actin, myosin, ADP was estimated by traditional methods, and the severity of adenosine phosphate secretion was taken into account. Using a visual micromethod, platelet aggregation was recorded in response to standard inducers in plasma standardized by the number of platelets in it (up to 200×10^9 platelets/l). The results obtained were processed by Student's t-test.

Research results. In the platelets of piglets during the phase of milk and vegetable nutrition, the cholesterol level gradually increased, reaching 0.62 ± 0.009 $\mu\text{mol}/10^9$ platelets by the 40th day of life. Lipid peroxidation gradually decreased in their platelets. The content of actin and myosin in inactive platelets in piglets increased during the observation period. Their additional formation during platelet aggregation increased. In the platelets of animals during the observation period, the level of ADP increased by 12.5% with an increase in its secretion by 14.1%. At the first examination in piglets, collagen platelet aggregation on average occurred within 29.0 ± 0.08 s. As their age increased, this indicator accelerated, reaching the level of 24.5 ± 0.05 s by the end of the observation. A similar acceleration of platelet aggregation in animals was found in response to ADP (by 15.2%) and to ristomycin (by 13.3%). Somewhat later, platelet aggregation with thrombin (by the end of the phase 36.0 ± 0.07 s) and platelet aggregation with adrenaline (by the end of the phase 85.0 ± 0.06 s) occurred.

Conclusion. Piglets develop an increase in the hemostatic function of platelets during the lacto-vegetarian nutrition phase. This is due to their membrane-receptor changes and increased intracellular mechanisms that ensure the participation of platelets in hemostasis.

Key words: phase of milk and vegetable nutrition, piglets, platelets, hemostasis, physiology.

PLATELET ACTIVITY FOR HEIFERS AGED OVER ONE YEAR

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ABSTRACT

Introduction. Animal husbandry is a profitable branch of agriculture, strategically important for many countries of the world. Increasing demand for milk and beef requires close attention to the health status of replacement young animals. For this, it is necessary to monitor its hematological parameters, which are a marker of the state of the entire animal organism. An important component of maintaining the overall viability of the body of heifers is the hemostasis system. Platelets are a very physiologically significant component of it. The state of their activity in growing heifers with different ways of keeping remains poorly studied, which dictates the need to close this gap in scientific knowledge.

Purpose: to assess the state of platelet activity in heifers on growing at the age of 12 months.

Materials and research methods. 35 heifers aged 12 months, tethered, were examined. The body was examined once. They underwent a series of hematological tests. The platelets of the observed heifers were subjected to a standard washing and resuspension procedure. In platelets of animals, the concentration of cholesterol, the levels of malondialdehyde and acyl hydroperoxides were determined by traditional methods, the content of actin and myosin, the content of adenosine diphosphate and the intensity of its secretion were determined. In all cases, platelet aggregation in response to its main inducers was assessed using a visual micromethod. The results were processed by Student's t-test.

Research results. The platelets of heifers showed a low content of cholesterol. In heifers in blood platelets, the intensity of lipid peroxidation was low. The amount of actin and myosin in their inactive platelets was optimal. Their additional formation under conditions of platelet aggregation was small. The platelets of the examined animals showed an average level of ADP with a low level of its secretion. In rearing heifers, platelet aggregation in response to collagen, ADP, ristomycin, and thrombin occurred within the standard time, which is considered optimal for this process.

Conclusion. At the age of 12 months, the hemostatic capabilities of platelets in growing heifers were optimal. This is due to the normal functioning of their membrane receptors and intracellular hemostatic mechanisms, which ensures the optimum of their viability, growth and maturation.

Key words: heifers, rearing, platelets, hemostasis, physiology.

GENERAL BLOOD PARAMETERS IN REPEATED COWS

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ABSTRACT

Introduction. Pregnancy greatly affects the health of young cows, especially before their first calving. This greatly affects hematological parameters, which are a reflection of the oxidant-antioxidant balance, metabolic rate and overall viability.

Purpose: to find out the hematological features of first-calf heifers 2 weeks before calving.

Materials and methods. 22 first-calf heifers were examined. The animals were crossbreds - 50% blood of the Black-and-White breed and 50% blood of the Holstein breed. Inspection and blood sampling was performed from them 2 weeks before calving. The content of formed elements, levels of glucose, total protein, albumin, cholesterol, triglycerides, globulin, non-esterified fatty acids, haptoglobin, malondialdehyde, and total antioxidant capacity were determined in the blood of first-calf heifers using traditional methods. Mathematical processing of the received results is carried out.

Results. First-calf heifers two weeks before calving had all the indicators taken into account at the normal level. The content of total protein in their blood was 68.1 ± 0.92 g/l. The amount of albumin and globulin they also had was optimal. The content of haptoglobin in their blood at the time of observation was 2.3 ± 0.22 mmol/l. The glucose level in the animals was within the normal range, indicating the normal functioning of carbohydrate metabolism. The amount of non-esterified fatty acids in their blood was found to be low, with average levels of cholesterol and triglycerides. The total antioxidant capacity of blood in first-calf heifers was low - 0.66 ± 0.11 mmol/l, which provided a slightly increased content of malondialdehyde in their blood.

The amounts of erythrocytes and hemoglobin in the blood of first-calf heifers were quite high with a high content of total leukocytes, lymphocytes and neutrophils in it. This indicated a very high resistance of their organism against various infections.

Conclusion. For first-calf heifers, 2 weeks before calving, the perfection of metabolic and oxidative processes in their body is characteristic. The optimal level of their hematological parameters shows their high viability and overall resistance to any infectious agents. The found levels of malondialdehyde and antioxidant activity in first-calf heifers confirm their metabolic health and readiness of their body for calving.

Key words: cattle, blood, heifers, pregnancy, protein, lipids, lipid peroxidation.

THE EXAMINATION OF THE TOTAL PROTEIN AND FIBER CONTENT OF DIFFERENT MUSHROOM POWDERS**Gréta Törő¹**

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ABSTRACT

Agaricus bisporus and *Pleurotus ostreatus* are one of the most commonly cultivated mushrooms all over the world. These mushrooms are rich in protein and contain all the essential amino acids. Even though they contain many dietary fibers with beneficial health effects, like immune-boosting, blood sugar-lowering, and anti-cancer properties. These compounds can be found in the mushroom body and mycelium also.

This study aims to look for the answer to how low temperature (<100 °C) heat treatment can affect the protein (%) and fiber (%) content of the *P. ostreatus* (late oyster mushroom). In addition, to measure whether there was a significant difference in the processed samples from different harvests, furthermore different species and quality.

Oysters, brown and white button mushrooms (champignons) from one producer and two different harvests were collected. I. and II. quality of white champignon mushroom was obtained. The other types of the sample were classified into first quality. The washed and sliced raw materials were placed into a vacuum cooker and then heat-treated in a drying machine at 90 °C for 20 hours. The solid and liquid fractions were separated by centrifugation. The centrifuged mushroom was quickly cooled, then pre-frozen, and after that lyophilized. The full protein (%) and dietary fiber (%) of the prepared grinded lyophilisate were determined during this study.

Based on the results, it can be said that no significant differences were observed in the case of the samples from the same type and different harvest. The dietary fiber content of the mushroom powders was between 46.6±0.1 and 61.2±4.0%, and the total protein value was between 19.8±1.8 and

35.7±0.09%. The highest dietary fiber content was observed in the oyster mushroom. Furthermore, the highest protein content was observed in the brown button mushroom.

Based on the results, the tested mushroom samples proved to be a valuable source of fiber and protein. On the other hand, future research should include a more comprehensive study of the changes in the nutritional value of different mushroom species processed with different cooking methods and stored under different environmental conditions. The next step of this research to compare different drying methods and the analysis of the separated mushroom liquid.

Keywords: edible mushrooms; nutritional value; oyster mushroom; champignon mushroom; Dümah method

**THE EFFECT OF VERMICOMPOST AND P FERTILIZER ON GROWTH, YIELD AND
SOIL HEALTH OF SWEET CORN (ZEA MAYS L.)**

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ABSTRACT

This study aims to determine the effect of organic fertilizer and phosphorus fertilizer on growth, yield, quality of sweet corn (*Zea mays* L.) and soil health. The study was conducted in Bandar Lampung from December 2017 to March 2018. This study was designed using a 2 x 4 factorial randomized block design with 3 replications. The first factor is vermicompost consisting of 2 levels, 0 tons / ha and 20 tons / ha, the second factor is the dose of P fertilizer consisting of 4 levels, 0 kg / ha P, 75 kg / ha P, 150 kg / ha P, and 225 kg / ha P. The results showed that vermicompost and P fertilizer increased growth, yield, quality of sweet corn and soil health. The combination of vermicompost and P fertilizer increased levels of chlorophyll and carotenoid pigments in the leaves of sweet corn plants. The treatment of vermicompost and P fertilizer increased crop production by 14.56%, the number of fungal microbes by 58.72%, bacterial microbes by 53.99%, and soil respiration by 57.06%. The combination of vermicompost and phosphorus fertilizer is useful for increasing crop production and improving soil health in the tropics.

Key words: vermicompost, sweet corn, soil health, Phosphorous

**THE LEGAL REGULATION FOR LABORATORY ANALYZES OF FOOD DURING THE
IMPORT OF REPUBLIC OF NORTH MACEDONIA AND THEIR ECONOMIC
JUSTIFICATION**

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ABSTRACT

The research paper examines the legal regulation and economic justification of laboratory analysis of food imports into the Republic of North Macedonia. The study explores the various laws and standards governing food safety in the country, including the regulations that must be met by importers to ensure that the food they are bringing into the country is safe for consumption. Additionally, the paper analyzes the economic benefits of laboratory analysis, including the cost savings that result from preventing the import of contaminated or unsafe food products. The research concludes that the legal regulation for laboratory analysis of food imports is essential for protecting public health and ensuring the quality of food available to consumers, and that the costs associated with laboratory analysis are outweighed by the benefits that it provides.

Keywords: law, public health, food quality, economic analysis

FOOD AND VECTOR-BORNE PARASITIC INFECTIONS

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ABSTRACT

Parasitic infections cause a very heavy burden of disease in both the tropical and sub-tropical parts of the world as well as in more temperate regions, with malaria causing the most deaths globally, particularly among children in sub-Saharan Africa. Typically, they are associated with poor and often marginalized communities in under-developed and developing countries like Nigeria. This review attempts to present an insight into the food and vector-borne parasitic infections, their epidemiology, public health and control with particular emphasis to Nigeria. Various food-borne parasites of medical and veterinary importance have been discussed in more details including their transmission, life-cycle and some microscopic images. The main vectors of medical and veterinary significance, the parasites they carry, the diseases they transmit, their life-cycle and images have also been expatiated. Finally, information regarding the diagnosis, control and prevention of these infections have been provided.

Keywords: Food; Vectors; Parasites; Infections; Diseases.

IMPROVEMENT OF MEDICAL WASTE STORAGE PROCEDURES

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ABSTRACT

By medical waste, we mean all waste generated in healthcare institutions, which is related to the performance of medical-technical actions in the field of diagnostics, therapy or research activities. In almost all countries of Southeast Europe, the disposal of medical waste is not carried out in an appropriate manner, primarily because there are no necessary capacities for the removal of medical waste. The aim of the work is to review the results and experiences in the treatment of medical waste, as well as the potential risks for patients, medical and non-medical personnel. The implementation of a safe medical waste management system could significantly improve the quality of healthcare services, the health of patients and preserve the environment. The use of steam sterilization is suggested, in order to reduce the content of biological agents in the waste to an acceptable level by thermal treatment, that is, to achieve biological inactivation.

Keywords: medical waste, storage, procedures, sterilization.

USING COST-EFFECTIVE BIOADSORBENTS TO REMOVE AQUEOUS WASTE

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ABSTRACT

The objective of this study was focused on the synthesis and preparation of biomaterials of cationic and anionic type. These materials were used as adsorbents in waters polluted by different adsorbates likely to be present in the environment. The different materials will be characterized by different techniques (IRTF, DRX, MEB, BET and ATG/DTA). The studies of adsorption by these materials, will be carried out by controlling the various parameters such as: pH, mass, concentration and temperature.

Removal of effluents in aqueous media, especially the adsorption technique which seems to be well adapted to remove pollutants because of its proven efficiency and also for economic reasons, using low-cost adsorbents such as agricultural and industrial wastes.

Keywords: Characterization; Different materials; Water treatment; Bio adsorbents; adsorptio

IMPORTANCE OF FORENSIC ENTOMOLOGY DURING INVESTIGATION OF CRIMES

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ABSTRACT

The paper shows the importance of forensic entomology as a science that can help in the investigation of criminal acts, how the post-mortem interval is determined, the procedures during the investigation that are important for entomological research are pointed out, observation of the crime scene, collecting and recording micro climate and climate conditions on the crime scene, collecting samples of insects imagos, maggots, pupae and eggs. Attention is devoted to entomotoxicology, that is, determining the presence of toxic substances in the body at the moment of death when this is not possible with classical methods. proving the presence of toxic substances even after the decomposition of the corpse (in the skeletonization phase) on the basis of maggots sheaths. Also entomotoxicology can determine the presence of some other substances which were present on body in moment of death (explosives). It was pointed out that insects can contribute to the discovery of mass graves, but also to the proof of war crimes themselves.

Key words: forensic entomology, post mortal period, entomotoxicology, insects, war crimes, mass graves

USING THE GIBSON ASSEMBLY METHOD TO INSERT GRNA AND ASSEMBLE THE PLASMID

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ABSTRACT

Introduction

Assembling the plasmid and inserting gRNA into the assembled plasmid is one of the most important molecular tasks in the field of biology. To do this, there are different methods, one of which is the Gibson assembly method. This method is based on homologies that exist on different fragments so that DNA fragments can be assembled together using these homologies. In order to insert gRNA, it is also possible to synthesize a fragment that contains different gRNAs as well as promoters and scaffolds for these gRNAs, and finally, by using this method, the expected fragment is assembled with other fragments and the final and complete plasmid is achieved

materials and methods

To do this, gRNA was first designed by online websites and different primers from the plasmid. The PCR products obtained from these primers had homology and were assembled together using the Gibson assembly kit containing endonuclease, polymerase, and ligase enzymes.

Results

The results of this work were confirmed by using different primers. The primers were used to confirm the assembled plasmid sit on different fragments.

Discuss

The Gibson assembly method is one of the best methods for assembling plasmids. One of the reasons for the widespread use of this method is its cheapness and accessibility.

Keyword: Gibson assembly, plasmid, gRNA, and PCR

ACRYLAMIDE: THE DANGER IN OUR DAILY FOOD

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ABSTRACT

Contemporary society puts more and more emphasis on consumption and production. In order to meet the demand for food, agricultural producers are using increasing amounts of chemical fertilizers in order to increase and maximize agricultural production. A good part of the chemical fertilizers will undergo numerous transformations, being converted into various complex compounds that will be identified both in the structure of the soil, the plant, but especially in the products obtained (cereals, technical plants, fruits and vegetables, etc.).

With the persistence of chemicals related to fertilizers and plant protection products (PPPs) in plants, a significant amount will be fixed at the level of the obtained fruit, especially large amounts being identified in fruits containing a large amount of starch (cereals, potatoes, coffee). The raw products obtained (cereals, fruits, vegetables, etc.) will be converted into raw materials (food and food-related products) through different processes.

Through the processes of boiling, frying or baking food obtained from cereals, potatoes, coffee, a toxic compound for the body called acrylamide appears. Acrylamide is a toxic, dangerous substance for the human and animal body that appears after the processing of foods with a high starch content (especially pastry products, fried potatoes, coffee, etc.). Acrylamide is part of the amide functional group, this substance being used exclusively in the industrial field for the manufacture of synthetic materials, the treatment of waste water in sewage treatment plants. This compound consumed regularly is a danger to the body because it is carcinogenic. The compound appears at a temperature above 120 °C through the formation of bonds between carbohydrates (starch, sugar, etc.) with the asparagine protein (a non-essential amino acid with an important role in the synthesis of glycoproteins).

Through this work, it is intended to present some alternative procedures for the complete or partial elimination of the risk of acrylamide in industrial production processes (bakery, pastry, flour production, sorghum) as well as the elimination of the risk of the phenomenon of residual dangerous chemical substances from the content of chemical fertilizers and PPPs.

Keywords: acrylamide, carcinogenic substances, agriculture and sustainable food.

INVESTIGATION OF MINOCYCLINE EFFECT ON EXPRESSION CHANGES OF *BCL-2*
PROTOONCOGENE ON MCF7 BREAST CANCER CELLS

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ABSTRACT

Introduction: Breast cancer is the most often diagnosed cancer and the primary reason for cancer death in women around the world. Apoptosis is a crucial defensive mechanism against tumorigenesis. Therefore, tumor progression can be prevented by inducing apoptosis in cancer cells. The B-cell lymphoma 2 (*BCL-2*) protein family contains important pro- and anti-apoptotic regulators that, in healthy cells, are held in a delicate balance. Disturbances in this balance could cause cell death, on the other hand, could allow a cell to permanently escape apoptosis and turn into a malignant clone. Minocycline is one of the most extensively researched tetracycline antibiotics at the moment. Along with anti inflammatory, antioxidant, and neuroprotective properties, minocycline's pharmacological effects also include modulation of cell proliferation and apoptosis. The aim of this study was to evaluate the minocycline effect on expression changes of *Bcl2* gene on MCF7 breast cancer cells.

Material and method: Human MCF7 cells were cultured in DMEM-F12 in T25 flasks. 24 hour after seeding, The treatment with minocycline was started. Cells were detached with trypsin/EDTA 24 h after treatment. RNA was extracted from cells and cDNA was synthesized. At the end, the expression of *Bcl-2* gene was evaluated using real-time polymerase chain reaction.

Result: The expression of *Bcl-2* gene was reduced in the minocycline-treated group compared to the control group.

Conclusion: Proteins of the B-cell lymphoma-2 (*Bcl-2*) family regulate programmed cell death by the mitochondrial apoptosis pathway. Their malfunction enables cancer cells to evade cell death. Our research shows that minocycline induced cell apoptosis in MCF7 breast cancer cells by downregulating of *BCL2* gene.

Keywords: Apoptosis, *Bcl2*, Breast cancer, Minocycline

**SPATIO-TEMPORAL ANALYSIS OF LICHENS AS BIO-INDICATORS OF SO₂
POLLUTION IN THE ANNABA REGION, ALGERIA**

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ABSTRACT

The health and environmental consequences of air pollution have become one of the major problems of our society during the last decades.

Our work concerns the spatio-temporal analysis of a lichen, namely *Xanthoria parietina*, to detect the effects of SO₂ pollution on its metabolism.

To do so, a relevant sampling strategy, a spatio-temporal follow-up, the measurement of some physiological parameters (chlorophyll, proline, respiration) and the dosage of SO₂ were carried out.

The results obtained allowed to characterize the impact of the pollution coming from an intense road traffic on the one hand and from the proximity of a steel complex on the other hand. The spatio-temporal analysis (according to the transplantation sites and the months of experimentation) showed significant correlations between the analyzed pollutant (SO₂) and the measured physiological parameters (chlorophyll, proline, respiration). This study allowed to better characterize the air pollution and its impacts in this region.

Keywords: Air pollution, SO₂, lichen, biological indicator, bio-accumulator, Algeria.

JOKER#2 OR DERIVATION OF LACKING DATA IN BIOLOGICAL SYSTEMS

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ABSTRACT

History of the project: The SPEL (Sektorales Produktions- und Einkommensmodell der Landwirtschaft = Sectoral Production and Income Model for Agriculture, see: <https://op.europa.eu/portal2012-portlet/html/downloadHandler.jsp?identifier=84b7fd4b-7fd9-4446-98b0-500f176f891f&format=pdfa1b&language=en&productionSystem=cellar&part=1>) is a sophisticated framework for a consistence-oriented data asset management (since 1980). The Hungarian activities on this research field is an important part of the education about integrated information systems. The most relevant characteristics of the SPEL system is the strong consistence, where raw data are finetuned if biological rules can not be reflected in a direct way.

Goals/Tasks: The presentation and the full-text publication have to demonstrate, how robust biological patterns can be modelled based on a non-causal, but multi-layered consistence-oriented approach (JOKER#2). The robustness of these estimations is not only a question of numerical approximation, the experiments (as tasks) should also be capable of covering the hidden system-logic.

Solutions: JOKER#2 is the name of a new software-concept ensuring automated estimations in a context-free way (c.f. https://tr.discoveranatolia.org/files/ugd/614b1f_5d2ae9f2566d4177a40f63debab3f684.pdf#page=29). JOKER#1 was constructed by Dobó independent but parallel to the starting years of the SPEL system. The context-free characteristics of JOKER#2 (here and now in form of an MS Excel-Solver-application) can be finetuned through arbitrary constraints ensuring consistence-oriented impacts in the non-causal optimization processes.

There are further own approaches (different forms of similarity analyses – like production functions, anti-discriminative models, explorative models – COCO: <https://miau.my-x.hu/myx-free/>) for detecting data anomalies and for estimation lacking data positions. Similarity analyses can be seen as a kind of causal modelling with additive or multiplicative structures. Similarity analyses are capable of handling always one single phenomenon. JOKER#2 can be used for arbitrary phenomena in a parallel way. Similarity analyses are using staircase functions as knowledge representation. JOKER#2 has not a single visible knowledge representation characteristic (see: non-causal modelling). Similarity analyses can produce unlimited estimation for the even-observed attribute. The recent version of JOKER#2 can deliver estimations max. only 100 positions. In case of JOKER#2 the lacking positions do not have to follow a specific pattern (only one single attribute/column and one single object/row should have real data). JOKER#2 is not a kind of simple proportion-driven calculation scheme (see demo materials with the keyword of 'kazah').

Experiments: For this study, a lot of existing patterns were involved into optimization tasks in order to prove, what kind of biological rules can be approximated in a robust form and what kind of relationships can not be interpreted not even based on the potential constraints? The examined rules are less or more complex (physical and/or monetary) balances (in specific cases in form of chained annual relationships between data).

Conclusions: The similarity analyses (in the training phases) are always capable of detecting (additive) balances based on a limited amount of cases. Similarity analyses can deliver two production functions

and two anti-discriminative models in case of one single lacking data. JOKER#2 produced one single approximation. The best model in case of one single lack is COCO STD as production function for one raw attribute as Y-variable. The second-best approximation is JOKER#2, because the analysed random pattern had a very wide-ranged robustness (quasi limitless) and JOKER#2 was capable of approximating the real targeted value compared to this wide instability-range closer than the COCO Y0 (as third competitor). Parallel, it was necessary to explore the impact of the data volume concerning the competitiveness of the alternative models: more examples (data: 20 to 100 objects) did not always produce better approximations for the test cases. Explorative models, anti-discriminative models, production functions were error-free again. Y0-model based on more data is better. STD-model based on more data is not better. Explorative models delivered irrational estimations – especially based on raw data because of raw data did not have balance-oriented directions. JOKER#2 with more data ensured better estimations than with less data. Regression models are also not error-free – not even in case of pre-defined customized signs (directions) for the X-variables...

Future: More balances and more complex balances should be examined in future in order to compare causality vs. flexibility.

Demo materials: <https://miau.my-x.hu/miau2009/index.php3?x=e0&string=kazah>, <https://miau.my-x.hu/miau2009/index.php3?x=e0&string=spel>,
<https://miau.my-x.hu/miau2009/index.php3?x=e0&string=mszr>, <https://miau.my-x.hu/miau2009/index.php3?x=e0&string=aszm>, https://miau.my-x.hu/miau/296/spel_joker2.xlsx

Keywords: modelling, testing, validating, consistence, artificial intelligence

PERFORMANCE ASSESSMENT OF SUPERVISED MACHINE LEARNING TECHNIQUES
FOR CLASSIFYING THE CHRONIC DIABETES DISEASES

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ABSTRACT

Chronic diseases are one of the world's most serious health problems owing to their terrible clinical manifestations such as a long onset cycle, subtle symptoms, current environmental conditions, and various complications. Most of the time, doctors struggle to accurately identify chronic diseases by manually. As a result, machine learning has emerged as a promising technique for predicting chronic diseases. Prediction is the process of analysing current and past events in order to forecast future events. Prediction of future conditions is still an important stage in many applications to reduce risk substantially. Many analysts use healthcare data to forecast illnesses in order to help patients and physicians in a variety of ways. This research focuses on the prediction of chronic diabetes disease. Diabetes is one of the most dangerous chronic diseases for humans leading to death all over the world. Various supervised machine learning techniques are used to predict diabetes disease in order to classify chronic diabetes. With the help of supervised machine learning techniques such as Naive Bayes, Support Vector Machine, Random Forest, Decision Tree, Logistic regression, Multi-linear regression, and K-Nearest Neighbour algorithms are being investigated to classify chronicity of diabetes. The diabetes disease dataset from Kaggle is used to assist the machine learning techniques. This study compares the performance of supervised machine learning algorithms on a diabetes in terms of accuracy. The accuracy of the Naive Bayes, Support Vector Machine, Random Forest, Decision Tree, logistic regression, multi-linear regression, and K-Nearest Neighbour algorithms is 78.12%, 76.04%, 76.56%, 78.12%, 71.87%, 100%, and 68.75% respectively. With the diabetes dataset, the results show that Multi-linear regression has the highest accuracy of 100%.

Keywords: Chronic diseases, Supervised machine learning, Prediction, chronic diabetes disease

THE ROLE OF DEMOGRAPHIC FACTORS ON COMMUNITY AVAILABILITY AS SERVICE PROVIDERS IN THE MANGROVE TOURISM AREA PETENGORAN, TELUK PANDAN, PESAWARAN, LAMPUNG

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ABSTRACT

Ecotourism as behavior is the attitude of tourism providers tourism development in forest areas. Ecotourism as an industry means that governments, the private sector and communities must work together to develop tourism mechanisms that make this possible provide economic, social and cultural benefits as well as benefit the local community. Petengoran Mangrove Forest Ecotourism is a conservation-based tourism area in Gebang Village, Teluk Pandan, Pesawaran, Lampung. The existence of the ecotourism area can increase the level of community participation around the ecotourism area to become service providers in the area. The willingness of this community can be seen from the demographic factor (community characteristics) in the region itself. Therefore, it can be said that demography can be regarded as a background image that influences people's welfare. This study aims to analyze demographic factors on the willingness of the community as service providers in the Petetengoran mangrove ecotourism area. Data was collected through observation techniques, interviews and documentation. The sample size of the study was taken as many as 32 people. In this study used census techniques. The census method or technique is a sampling technique when all members of the population are used as samples. Data analysis was carried out in a descriptive manner. Demographic factors that influence the willingness of the community to become service providers in Petengoran mangrove ecotourism are dominated by men, have an average age of 40-49 years with a total of 4-7 members, the education level of service providers is mostly high school, most service providers have marital status is married and the address of the service provider is domiciled in Gebang Village. It is hoped that in the future there will be counseling related to interest in working in ecotourism areas so that more people around the ecotourism area can develop themselves to become service providers.

Keywords: Demographics, Ecotourism, service provider, Petengoran Mangrove

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REVOLUSION IN THE WORLD OF COMBUSTION

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ABSTRACT

In our time, the issue of compliance with the environmental norms of exhaust gas emissions of cars, and even the consumption norms of any consumed fuel for different types of transport. All types of existing fuels used in engine combustion chambers require their preliminary cleaning and finishing. There are many ways to solve the above problem, but all of them either do not provide sufficient quality of fuel processing, or the costly part exceeds the expected economic effect. Therefore, the problem of optimizing the energy effect when burning organic fuel is urgent and needs to be solved.

To solve the problem, we paid attention to the study of the structure of liquid hydrocarbons and its change under the influence of electromagnetic fields.

It was established that the proposed magnetic treatment of fuel reduces its consumption by approximately 15-20 percent (depending on the type of fuel and engine power) while maintaining its dynamic characteristics. We have received a patent of Ukraine for utility model No. 146615, dated 03.03.2021.

The results of research can be used in the fuel systems of land, water and air transport engines in order to improve the operation of the fuel system, improve operational characteristics and increase the time between routine maintenance of vehicles.

Thus, the use of magnetic treatment of hydrocarbon fuel allows to reduce its consumption without reducing engine power and improves its dynamic performance.

The payback period of the proposed device, which implements the proposed technology, does not exceed 3 months, depending on the engine power.

Literatureman Lectures on Physics, 1-9 vols. "SVIT

DEVELOPMENT OF A NEW VACCINE ADJUVANT BASED IN ZNO AND COTTONSEED OIL NANOEMULSION

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ABSTRACT

Emulsions have been widely used as immunological adjuvants, those could use materials derived from plants such as cottonseed oil or minerals such as zinc. Can be formulated at the nanometric scale, a field little explored up to now. The main objective of this study was to develop a nanoemulsions and evaluate their effect as immunological adjuvant. Formulated CN (Cottonseed oil) and CNZ (Cottonseed oil whit ZnO nanoparticles) nanoemulsions were characterized by AFM, DLS and FTIR. Safety, dose, antioxidant and phagocytosis were evaluated in mice macrophages. In mice, immune stimulation was determined by the cytokines and antibodies production. The CN presented a higher particle size (543.1 nm) that CNZ (320 nm). By FTIR presence of oil functional groups was confirmed both in CN and CNZ. Nanoemulsions (1.25 to 10 µL/mL) had no toxic effect (p=0.108). All doses tested for CN and CNZ induced nitric oxide and antioxidants in dose dependent. Subcutaneous tissue treated with nanoemulsions showed inflammation with higher leukocyte infiltration. Intraperitoneal inoculation with showed a high recruitment of intraperitoneal cells (CD14⁺ phenotype) (p=0.0001). CN increased macrophages phagocytosis in *C. albicans*-phagocytosis assay (p=0.004) at 3 h and increased (p=0.002) nitric oxide production at 2 h. CNZ stimulated a major INFγ secretion compared with FCA at day 7. A major IL-2 secretion of was observed at days 7 and 14. The nanoemulsions didn't affect antibody production. CN induced a significant production of IgG against OVA. In Conclusion, the two nanoemulsions with adjuvant and antioxidant capacity, are capable of generating leukocyte infiltration and increase the cytokines and antibodies production.

**DISTRIBUTION OF PARASITES OF MONOGENEA CLASS IN THE FISH OF
PRIDNEPROVSKY REGION**

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ABSTRACT

Fishing takes one of the most important places in human life, as it is an integral part of food product. In order to maintain high quality of fish as well as increase of production, continuous parasitic monitoring should be carried out, which will help to detect the timing of occurrence of both infectious and invasive fish diseases in the controlled region. Therefore, the development of this approach is the basis of timely provision of the epizootic well-being of the reservoirs of Ukraine [1].

In recent years, the results of ichthyoparasitic research have shown that the most common causes among invasive fish diseases are the appearance of flat worms of *Monogenea* class with a direct life cycle, which is the reason for a sharp increase in their numbers when caught in the open water reservoir and the beginning of an epidemic among fish [2].

Pest infestation contributes to the delay of their growth and development, violation of standard physiological state, deterioration of commodity and taste qualities, decrease of the maturity, and may even lead to death of fish.

Causes of disease appearance and appearance may be premature and insufficient preventive measures, pollution of natural water bodies with organic and toxic substances, which can cause changes in species composition and number of populations of non-vertebrates, which are intermediate hosts of many parasites, and thus cause rapid development of certain types of parasites.

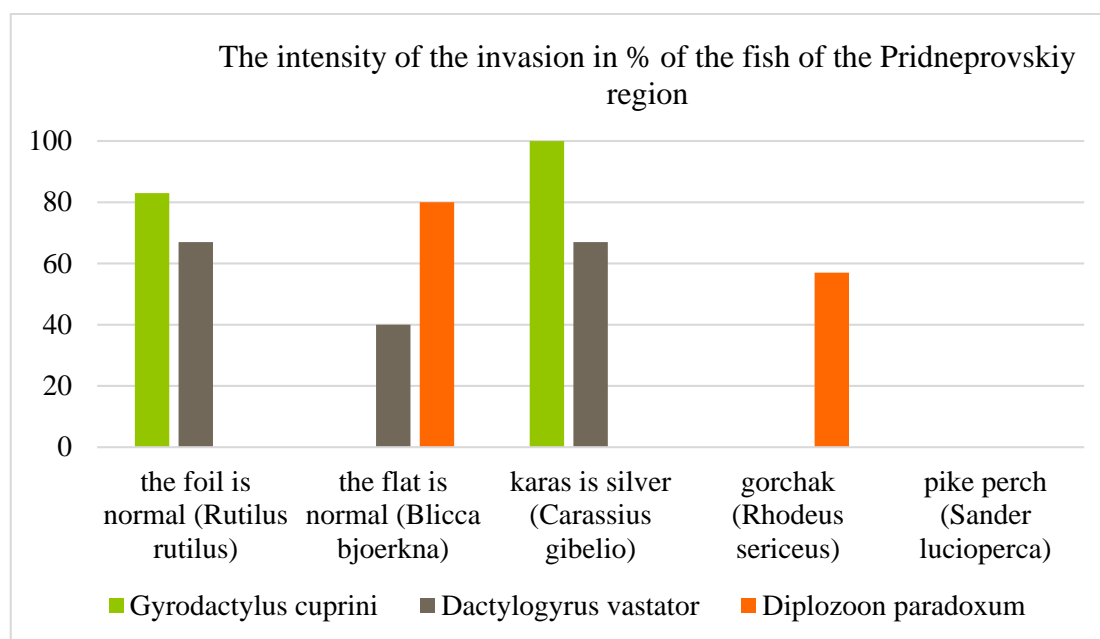
It is important that the Dnieper reservoir due to the large number of industrial enterprises is anthropogenic-loaded, including both cosmic and biological factors. Thus, the problem of fish health in fishing reservoirs remains rather urgent, and they have important scientific and practical significance for the Pridneprovsky region.

We conducted ichthyopathological researches in summer 2021 according to the classical method of complete parasitic solution of fish [3]. The fauna of monopheneya was characterized by the species composition, the intensity (EI, %) and the intensity of the invasion (II, ex./fish). Total studied from 10 to 15 copies of fish of each kind.

Fish selection was carried out in the upper and lower part of the Dnieper reservoir. The objects of the research were 5 types of fish: A plain film (*Rutilus rutilus*), the flat is normal (*Blicca bjoerkna*), karas is silver (*Carassius gibelio*), gorchak (*Rhodeus sericeus*), pike perch (*Sander lucioperca*).

In the course of parasitic analysis, 3 kinds of monogenes were found: *Gyrodactylus cuprini*, *Dactylogyrus vastator*, *Diplozoon paradoxum*, which were located mainly on the zabrovsky pellet. Monogene *Gyrodactylus cuprini* and *Dactylogyrus vastator* were found in the flat of usual and caricatsya silver; *Diplozoon paradoxum* in the mustard and flat of usual. At the same time, no KL parasite was found during the study of the pike. *Monogenea*.

The largest indices of the invasion intensity (EI) of the monogeneous *Gyrodactylus cuprini* are marked in karasya – 100%, in the usual films – 83%, respectively, in the waters of the Samara Gulf. Quite common in fish were *Dactylogyrus vastator* and *Diplozoon paradoxum*. The contamination of fish with these parasites was 67% and 80%.



The indices of intensity of invasion (II) were also the largest at infection of caratas and films *Gyrodactylus cuprini*. In the carat in the zabrovye pelyushki were found 4,5 ex./fish, in the swimmers - 3,2 ex./fish. The average number of *Dactylogyrus vastator* installed 4 copies/fish in the film. The lowest indices of the intensity of invasion (II) were set by the monogeneya *Diplozoon paradoxuma* in the amount of 1,5 exc/fish in the mustard and 1,25 exc/fish in the flat.

The Ikhtiopatological analysis showed that the studied fish leather covers are whole. The skin was not affected by the loss of the skin, ulcers, lesions. Instead, the zabrova petals had a pale color covered with a thick layer of mucus, which are swollen and whitish. There was also a "pour" of the zabrovyyh petals one to one another, their edges were eaten, which is exactly evidence of invasive disease caused by the group ectopic flat worms *Monogenea* class.

As a rule, as a result of the influence of the mentioned worms fish became restless, could breathe, gather near the surface of water and catch air. Very often fish loses appetite, it gradually is thin and the death. This can affect the quality of fish both food product and the ecological condition of contaminated water reservoir.

Taking into account the above, one can conclude that on the contamination of fish with parasites of class *Monogenea* for the Dnieper reservoir remains dangerous in the first place Samara Gulf, where stable heat of the giroactive and diploma-stomosis is observed. An important condition for effective development of fish economy is the proper protection of fish from infectious and invasive diseases, therefore, to improve the epizootic situation in the Samara region, it is necessary to carry out a complex of preventive and fish-and-meliorative measures and to continue conducting annual parasitic monitoring. Observance of proper epizootic state on diseases of industrial fish of natural reservoirs of Pridneprovsky region will allow to increase its riboproductivity.

Keywords: ichthyoparasitic, parasites, monogenean, fish.

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**CHANGE IN THE ACTIVE SUBSTANCE CONTENT OF SHIITAKE MUSHROOM
(*LENTINULA EDODES*) AS AFFECTED BY SOUS VIDE TECHNOLOGY****Peter Hajdú¹**

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ABSTRACT

Shiitake mushroom (*Lentinula edodes*) is the second most commonly cultivated edible mushroom in the world, which is native to Asia. Mushrooms are used for meals in both fresh and dried form. Its use as a medicinal plant is also widespread throughout the world. Many of its positive physiological effects have been investigated, and studies have placed more emphasis on their anti-tumor and immune-boosting effects.

Primarily, the effectiveness of the optimal dose is not determined by the amount of beta-glucan used, but its effect on the body's immune system depends on its production. The real influencing factors are the source of the beta-glucan, the process by which it is extracted from the source, and the size and shape of the beta-glucan particles that have already been digested; even what we eat or drink in addition to consuming beta-glucan. Beta-glucan of the right size tends to assemble into larger particles when it comes into contact with water during digestion, and this makes it difficult for the cells that break down beta-glucan to be effective.

The sous vide technology is a method of heat treatment at a precisely set temperature (60-90 °C), usually for a longer period of time (12-168 hours), which is carried out in a closed container. The very precise (± 0.1 °C) temperature control enables the production of products with different physical properties, different chemical compositions and diverse organoleptic properties. During the heat treatment, the liquid and solid material coming out of the food can be easily separated and treated as separate products.

The treatments were carried out at different temperatures in the temperature range of 60-90 °C, where the heat-retaining medium was air, since water poses many food safety risks. After heat treatment, the solid and liquid fractions were separated and their composition was measured. The results are used for product development, the liquid phase is potentially a dietary supplement, and the solid phase can provide a new alternative for people following a plant-based diet and leading a vegan lifestyle.

A small section of the present research will be presented, which will determine the microelement content, where special attention was paid to the determination of D-glucan, flavonoid and polyphenol content.

Overall, it can be said that the results obtained in this way can help both the innovative approach of the food industry and the production of new products, and after determining the micro- and macro-element content, we can start in a new direction, which can also be connected to crop cultivation and water management.

Keywords: Shiitake, D-glucan, food science, flavonoid, polyphenol

GROWTH AND YIELD OF RICE USING MAJA FRUIT WASTE LIQUID ORGANIC FERTILIZER*Purwaningsih¹, Sri Rahayu²**¹Faculty of Agriculture, Tanjungpura University, Pontianak, West Kalimantan**²Faculty of Agriculture. Pancabhakti University, Pontianak, West Kalimantan***ABSTRACT**

Rice is the main staple food of Indonesian people, so it must always be available. This study aims to obtain the growth response and yield of local rice plants to the application of liquid organic fertilizer from maja fruit (*Aegle marmelos*) waste. The research design used was a randomized block design (RBD), in which the concentration of liquid organic fertilizer from Maja waste was used, consisting of p0 = no liquid organic fertilizer; p1 = 20 ml/l; p2 = 30 ml/l; p3 = 40 ml/l; p4 = synthetic fertilizer (Urea 200 kg/ha, 100 kg SP-36/ha, and 100 kg KCl/ha). The number of replicates was 4, and the number of sample plants per plot was 5 plants. Rice seeds were planted in the field 10 days after sowing, the number of seeds per hole was only 1 plant, planted with a spacing of 30 cm x 30 cm. The experimental plot measures 2 m x 6 m. Liquid organic fertilizer application is carried out after the plants are 10, 20, 30, 40, 50, and 60 days after planting. The variables observed included plant height, number of tillers/clump, number of productive tillers/clump, and grain weight/clump and grain weight per plot. The results showed that the application of liquid organic fertilizer from maja fruit waste gave a good response to the growth and yield of rice plants as indicated by the average number of tillers per clump ranging from 23.6 to 28.8 plants, the number of productive tillers ranged from 20.6 up to 24.6, grain weight per hill ranged from 152 – 174.3 g, grain weight per plot 5,325 -6,263 kg. While the application of synthetic fertilizers gave an average number of tillers per clump of 20.2 plants, the number of productive tillers per clump averaged 14.8, the grain weight per clump was 136.32 g, while the grain weight per plot was 4.888 kg. Application of liquid organic fertilizer up to a concentration of 40 ml/l still increases the growth and yield of rice plants.

Keywords: Alluvial, Growth, Liquid Organic fertilizer Maja waste, Rice, Yield.

***LISTERIA MONOCYTOGENES* IN FOOD PRODUCTS IN BRAZIL (2017-2022): A
SYSTEMATIC REVIEW**

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ABSTRACT

Contamination of food products by *Listeria monocytogenes*, as a pathogen, threatens public health and is a worldwide concern. Foods derived from animal products are recognized as common carriers of this pathogen. This study aimed to estimate the prevalence of *L. monocytogenes* in a variety of Brazilian food products, using a systematic review of data from the literature. Publications related to the prevalence of *L. monocytogenes* in food products in Brazil from 2017 to 2022 were tracked through international bibliographic databases, such as Science Direct, Web of Science, Scopus, PubMed and Google Scholar. The results showed heterogeneity in the studies and estimated a combined prevalence of *L. monocytogenes* at 13%, ranging from 0 to 59% in food products in Brazil. Based on the type of product, the highest and lowest prevalence of *L. monocytogenes* was recognized for animal products and vegetables, respectively. The knowledge of the differences in prevalence of *L. monocytogenes* in different food products can guide in its efficient control by the competent authorities.

Keywords: *Listeria monocytogenes*; food products; Brazil; systematic review

**BIOLOGICAL APPLICATIONS OF PROBIOTICS IN AQUACULTURE AND FISH
FARMING INDUSTRIES**

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ABSTRACT

Fish farming and aquaculture is a fast-growing industry in Pakistan but excessive use of antibiotics leads to develop antibiotic-resistant pathogens. Therefore, fish diseases and aquaculture losses are a great concern nowadays. The application of probiotics (beneficial bacteria) and prebiotics (substrate or nutrients) that improve the microbial balance in a host digestive environment is an alternate way to overcome antibiotic-resistant pathogens. The current study confirms the prospective applications of probiotics and prebiotics in aquaculture and fish farming industries. Several microbes i.e. *Bifidobacterium spp.*, *Lactobacillus spp.*, *Pedicoccus spp.*, *Enterococcus spp.*, and *Bacillus spp.* were reported as probiotics. Glucan, insulin and numerous oligosaccharides are used as prebiotics. They play their role in growth promotion, used as antibacterial, antiviral, and antifungal agents, increase feed value, enhance immunity, restrain gut microbiota, improve nutrient digestibility, improve water quality, enhance tolerance to stress, and increase spawning and hatching rates. Recently, the antibacterial efficacy of chitosan-coated probiotics (*Lactococcus lactis* and *Lactobacillus curvatus*) was investigated and could be effective as bio-preservatives due to slowly released at the target site. In the current article, we have tried to represent the recent information concisely on the importance of prebiotics and probiotics in aquaculture but the detailed mechanisms are still unknown. For forthcoming scenarios, we need to design sustainable technologies to improve the quality of probiotics/prebiotics for aquaculture health management.

IN VITRO EFFECTS OF PHYSIOLOGICAL AND MECHANICAL STIMULATION OF D-HUSK-BASED CARDIAC BIOCONSTRUCTS

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ABSTRACT

Myocardial infarction impairs cardiac integrity affecting the survival and function of cardiomyocytes and causing disruption of extracellular matrix (ECM) architecture and composition. Cardiac tissue engineering (CTE) aims at developing novel approaches to restore the diseased heart combining scaffolds and cells. We have previously demonstrated that decellularized human skin (d-HuSk) provides a cardiac-like environment capable to support survival and differentiation of human resident cardiac progenitor cells (hCPCs) (1). With the present study we investigate the effects of a physiological mechanical stimulation at a frequency typical of adult human heart on bioconstructs of d-HuSk repopulated with hCPCs in vitro.

To this aim, we cultured hCPC on d-HuSk scaffolds for one week in static conditions. Afterwards, bioconstructs were transferred to a cyclic stretch bioreactor and cultured for one week applying a 10% strain at a frequency of 1 Hz. The effects of described conditions on hCPC engraftment, 3D organization and differentiation were then evaluated by histochemistry, SEM, immunofluorescence and gene expression analyses, using bioconstructs cultured in static conditions as reference.

Histochemical analysis showed that, although hCPCs formed a multilayered tissue on the surface of d-HuSk in both static and dynamic conditions, in constructs cultured in stretch bioreactor cells migrated through d-HuSk to reach its inner layers. From SEM observation emerged that hCPCs in cardiac bioconstructs cultured in static conditions were randomly oriented, whereas hCPC in bioconstructs cultured in stretch bioreactor arranged parallel to each other and orthogonal to the direction of stretch. Intriguingly yet, the membrane localization of connexin-43 in stimulated hCPCs revealed a more mature phenotype of differentiating myocytes. Gene expression analysis confirmed that physiological cyclic stretch induced the significant down-regulation of genes typical of undifferentiated hCPCs, like CD117, or of early stages of cardiac myocyte differentiation, like TBX-5 and TBX-3, and the significant up-regulation of late differentiating and mature cardiac cells markers, like cardiac α -sarcomeric actin, smooth muscle actin and factor VIII.

Collectively, our results support the evidence that physiological mechanical stimulation of d-HuSk-based cardiac construct boosts the differentiation of hCPCs and strengthen the suitability of d-HuSk as a scaffold for CTE.

**PROSPECTIVE AGRICULTURAL CROPS IN CLIMATE-ORIENTED AGRICULTURE OF
UKRAINE**

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ABSTRACT

The issue of climate change is becoming increasingly acute for the development of agriculture, since this sector is the largest among all industries in Ukrainian exports. Despite the fact that agricultural production makes a large contribution to the total emissions of greenhouse gases. Currently, a condition arises: the application of ecologically responsible management methods in the production sector of agriculture of Ukraine. Conducting climatically balanced agriculture is considered as a comprehensive approach to the management of agricultural systems: increasing the productivity and income of agriculture, increasing exports and competitive advantages for agricultural producers; adaptation and resilience to climate change; and reduces greenhouse gas emissions.

In particular, International Financial Corporations are launching new projects aimed at financing climate-oriented agriculture, with the aim of stimulating the transition of small agricultural producers to technologies that reduce carbon emissions.

The presented projects contribute to the wider application of climate practices in agriculture and support climate standards, which not only help to increase the competitiveness and productivity of the sector, but also become monetization tools for reducing greenhouse gas emissions.

Climate-responsive agriculture takes a farmer-centred approach to focus on the wider adoption of renewable and climate-friendly farming practices, identifying barriers to their implementation and developing solutions that bring economic, practical and environmental benefits to farmers.

The main principles that must be followed in farming in the conditions of the steppe zone of Ukraine are to use different types of technologies to improve the condition of the soil, to produce ecologically clean and biologically complete products, to implement soil protection, water-saving and energy-saving technologies. This, in turn, will ensure a high yield of cultivated plants and product quality, help preserve soil fertility and reduce the harmful effects of anthropogenic factors on the natural environment.[1]

The southern region of Ukraine is a zone of risky agriculture. Therefore, the question of providing high-quality water resources for profitable agriculture always arises. For this purpose, the Kakhov reservoir and a large network of main canals in the Steppe zone of Ukraine were built.

The main source of surface and groundwater in the Kherson, Mykolaiv, and Zaporizhia regions are the tributaries of the Dnipro and Ingulets rivers. The water of the Dnipro River belongs to the bicarbonate-sulfate class, with a mineralization of 705-800 mg/dm³, the content is dominated by the cationic composition, the majority of the calcium content. Water in the Ingulets River has a higher mineralization of 1500-2500 mg/dm³. The composition of the water is mainly chloride-sulfate-hydrocarbonate sodium-calcium. The rivers of the Azov region are dominated by sulfate-chloride waters of mixed cation composition with high mineralization, which can reach 3000-4000 mg/dm³. The mineralization of these waters significantly exceeds the MPC in terms of salt content and are unsuitable for use in irrigation.

One of the most important modern problems of the agro-complex is the low level of irrigation water quality and water supply, because of this land degradation occurs by worsening their condition due to salinization and salinization. Use of synthetic fertilizers, additives and other pesticides.

A comprehensive approach to solving the problems of land degradation will make it possible to stop soil salinization. Carrying out constant monitoring of ecological systems of ground and surface water, chemical state of soil and water makes it possible to regulate the process of salinization.

Salinization and soil degradation is one of the most important problems of southern Ukraine. In the steppe zone, the relative humidity can drop to 30% or less for at least 50 days. With severe dry spells, air humidity drops to 10-15%, and in some cases even lower. The probability of intense dry spells during the summer period is 80%. High temperature and low air humidity cause intense evaporation from the soil surface and transpiration.

Saline soils can be contained in any part of the profile, depending on the component of the content of easily soluble salts, in the vast majority of which the concentration is unfavorable for the further development of plants. A high content of soil mineralization is considered to be an excess of 0.1-0.3% salt content in the soil.

Soils are characterized by seasonal short-term overwetting and they require regulation of the water-air regime. Under irrigation conditions, there is secondary salinization of soils, in some places salinization, flooding, intensive removal of nutrients, deterioration of their physical properties. The use of heavy tillage tools, an increase in the number of technological operations during soil cultivation caused an increase in mechanical pressure on the soil, caused the creation of dense layers in the subsoil and arable horizons, which worsen the water permeability of the soil.

The use of organic technologies in the cultivation of agricultural crops leads to an increase in natural biological activity in the soil and restoration of the balance of natural nutrients. A sufficient amount of humus accumulates in the soil and increases its fertility for subsequent crops in the crop rotation. There is an improvement in the quality of the grown agricultural products and an increase in the total volume of the harvest. The immunity of millet plants is being strengthened in order to maintain resistance to adverse factors, such as droughts or diseases. To date, the use of biological preparations is the most effective measure for increasing yield and protecting seeds and crops without the risk of harming the ecosystem. Maintaining fields in a clean state, free from weeds, pests and diseases, is the most important prerequisite for high productivity of agricultural crops[2].

Increasing the productivity of plants can be achieved not only by breeding methods, applying the necessary doses of fertilizers and pesticides, but also by including biological preparations in the complex of successive technological operations of growing crops. This makes it possible to reduce the chemical load on the environment and gradually switch to organic technologies for growing millet and other crops [3].

For further profitable farming, it is necessary to prevent the formation of such negative consequences as deterioration of soil fertility, accumulation of harmful elements from the use of pesticides, water quality and water supply. there is a need to develop effective technologies for growing organic products of cereal crops. It is important to provide cultivated crops with a sufficient amount of nutrients without the use of synthetic mineral fertilizers. A leading role in this can be played by local renewable resources, siderates, crop by-products, new types of organic fertilizers [4].

In order to minimize losses to improve the overall state of natural resources, agricultural producers are encouraged to implement climate-oriented agriculture. Namely, using new types of cultivated plants, which during cultivation are less demanding on water supply, more sun-tolerant and adapted to the newly created natural conditions.

Recently, more and more farmers in the south of Ukraine are paying attention to growing millet as a promising and profitable crop. They take into account weather and newly created climatic factors that contribute to the cultivation of drought-resistant crops.

Millet is a high-yielding, valuable grain and fodder crop. In exceptionally dry years, it provides higher yields than other grain crops, and it can be an insurance crop when winter wheat dies. Millet is

successfully grown as a post-harvest and post-harvest crop. The most favorable natural conditions for growing millet are observed in the northwestern and northern regions of the Steppe. But in farms where advanced agricultural technology is used, as a rule, fairly high yields are ensured in different soil and climatic conditions [3]

Millet is a drought-resistant crop and the yield of its crops is less dependent on the lack of moisture than spring bread. The resistance of millet to lack of moisture is explained by a number of biological features. Such a culture can easily tolerate a state of temporary tissue dehydration without reducing the yield. It also tolerates long-term wilting, which occurs quite often in steppe areas due to a lack of moisture in the soil. According to scientific research, the decline in millet yield with severe wilting reached 32%.

During a drought, millet can temporarily delay and even stop growth, as well as spread the stem part on the ground, which in turn shades the soil and reduces transpiration. During this period, leaf curling is observed, which helps to reduce transpiration. Millet, unlike other grain crops, quickly recovers its growth when precipitation occurs after a temporary drought and reduces the yield less [4].

The millet plant is considered well adapted to air and soil drought and is successfully grown in a number of southern countries in the least favorable conditions for other crops. Millet belongs to crops that can withstand droughts or avoid them, accelerating the pace of their development before reaching maturity, and can grow due to atmospheric precipitation, without needing irrigation, and even form a crop with the amount of precipitation of 150 mm during vegetation, while spring wheat needs 225-250 mm. But millet's demand for moisture during seed germination is much higher than that of sorghum, corn, and sunflower [4].

Climate modeling for the territory of Ukraine indicates that the increase in air temperature in general will continue. A further change in the amount of precipitation during the year will lead to a shift in the climatic seasons, a change in the length of the growing season, a decrease in the duration of the permanent snow cover, a change in the water resources of the local runoff, etc.

Implementation of climate-optimized agricultural management, which has new technological solutions and innovative approaches to solving modern problems. Climate-oriented agriculture in Ukraine is a new way of looking at farming, which contributes to the development of the agricultural complex in Ukraine and prevents climate change and its consequences.

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**RAPID AND EFFECTIVE METHOD TO DECELLULARIZE BIOLOGICAL TISSUES
USING A HAND-MADE SAMPLE-HOLDER**

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ABSTRACT

Extracellular matrix (ECM) provides a number of biological and chemical stimuli regulating self-renewal, proliferation, survival and differentiation of cells and representing a foremost candidate for creating biological scaffolds to boost tissue regeneration. Decellularized human tissues can resemble the native ECM under structural and biochemical profile, maintaining almost completely intact the three-dimensional (3D) architecture and the content of fundamental biological molecules. The choice of the appropriate decellularization process is crucial to obtain acellular tissues preserving the characteristics of the ideal microenvironment for cells.

In this study we propose an innovative method to obtain a reproducible and effective decellularization of biological tissues, with the availment of a sample-holder for embedding cassettes stirring in a solution containing specific chemicals. In particular, skin fragments from patients undergoing plastic surgery were scaled down to fit the embedding cassettes and decellularized using a combination of SDS, Triton X-100 and antibiotics in a beaker placed on a magnetic stirrer. To avoid the random suspension of the cassettes within the beaker with irregular and uncontrolled solution transport through the samples, the cassettes were set in a plexiglass sample-holder composed by four rectangular windows. After decellularization procedure, samples were fixed and processed for histological study or snap-frozen for molecular biology analysis. The effectiveness of the decellularization procedure was confirmed by Hematoxylin and Eosin staining showing the absence of nuclei and by evaluation of DNA content that was well below accepted standards. Masson Trichrome, Sirius Red, Alcian blue, Paraldehyde Fuchsin Gomori and Weigert VanGieson stainings showed a well-preserved 3D architecture of the ECM and the retention of collagen, GAGs and elastic fibers.

Our results suggest that the sample-holder promotes a homogeneous transport of the solution through the samples, protects them and leads to a faster and more reproducible decellularization process.

**IN VITRO REMODELING OF HUMAN DECELLULARIZED DERMAL MATRIX BY
CARDIAC PROGENITOR CELLS**

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INTRODUCTION

The role played by ECM in myocardium integrity and homeostasis has been emphasized by cardiac tissue engineering (CTE) and decellularized ECM has rapidly emerged as an attractive biomaterial. We have recently provided evidence in support of the decellularized human skin (d-HuSk) as a promising biomaterial for CTE (1). Since *in vivo* ECM is in dynamic equilibrium with cells, the scope of the present study is to evaluate *in vitro* whether d-HuSk is remodeled by resident human cardiac progenitor cells (hCPCs).

METHODS

To this purpose, human skin from patients undergoing abdominoplasty was decellularized and cryosectioned to prepare three-dimensional scaffolds, while hCPCs were isolated from explanted human hearts, seeded on d-HuSk scaffolds, and cultured for two weeks. Afterwards, hCPCs on d-HuSk were induced to myogenic differentiation and cultured for two additional weeks.

RESULTS

The absence of nuclei in H&E staining and a DNA content of 9.138 ± 1.009 ng/mg of tissue confirmed the decellularization efficiency. Real-time PCR analyses revealed a significant up-regulation in transcription of differentiating and mature cardiomyocyte genes, along with retained transcription of mesenchymal, endothelial, and smooth muscle cell genes in hCPCs induced to differentiate. SEM analysis showed a better organized network of elastic fibers in hCPC-d-HuSk bioconstructs than in acellular d-HuSk, which resulted richer in collagen thicker fibers. Furthermore, quantitative analyses of scaffold composition revealed in hCPC-d-HuSk the significant increase of GAGs and decrease of collagen and elastin, along with a remarkable higher fluorescence mean intensity for fibronectin and tenascin.

DISCUSSION AND CONCLUSIONS

The results showed confirm the hypothesis that d-HuSk is actively restructured and remodeled by hCPCs, thus providing additional data supporting that d-HuSk could be an effective temporary platform for CTE.

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**A NEW PERSPECTIVE OF FOOD REGULATION: FOOD SAFETY AND THE USE OF
BLOCKCHAIN**

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ABSTRACT

This research aims to analyze the interconnection between two areas of primary interest in food law. Food safety and technology, and how the latter can be used to serve the former.

In 2002, the European Union - at that time, European Community - felt the need, in the face of several food scandals which involved, with catastrophic effects, the sensitivity and the overall health of consumers, to dictate uniform rules which would guarantee a minimum level of safety for consumer health. Such an objective to be attained could not fail to take into consideration the need to protect the free movement of foodstuffs. The meeting point was made to coincide, therefore, with the predisposition of a system that would guarantee consumers, partially restricting market operators, the free movement of only safe and healthy foodstuffs.

The European Community, with Reg. (EC) No. 178/2002, for the first time, imposed traceability obligations on products in the entire food production chain, at the same time imposing the adoption of measures (such as withdrawal and recall of unsafe products) based on the assessment of the so-called risk analysis. This is because of the urgency to adopt suitable provisions to ensure that unsafe foodstuffs are not placed on the market and to set up mechanisms to identify food safety problems and react to them, to allow the internal market to function correctly and to protect human health.

Due to the impossibility to rebuild the path taken by food and feed, the need was therefore felt to set up a general system for the traceability of products covering the feed and food sector, to be able to carry out targeted and precise withdrawals or provide information to consumers or officials responsible for controls, thus avoiding more extensive and unjustified inconveniences when the safety of food is at risk.

A synergetic activity is required. Operators in the sector must trace products to be able to identify those considered to be at risk. Public action, in its interventions, must adopt uniform measures to protect human health without distorting the system and market rules. Evident, then, is the need for constant communication between the subjects as mentioned above, and consumers, as the final recipients.

In this regard, the same regulation (Reg. (CE) 178/2002) established, in the form of a network, a rapid alert system for the notification of a direct or indirect risk to human health due to food or feed (RASFF) in which the Member States, the Commission, and EFSA participate.

When a member of the network knows the existence of a serious risk to human health from food or feed, the member must immediately transmit it to the EU Commission under the rapid alert system. The member must indicate any actions taken or any measures taken. Then EU Commission transmits the information to the members of the network.

It is on this net of obligations that blockchain technology could be incorporated as a suitable tool to accompany the above-mentioned activities, thus enhancing food safety as a result.

Suppose today the food business operator must trace products, but there is no legislation imposing a unified tool to fulfill it. In that case, it could be argued that it could represent the ideal solution.

It is well known how cryptographic technologies allow full traceability of data and security of the information entered. Objectives of decentralization, transparency, security, and immutability of data are perfectly in line with the objectives dictated for foodstuffs mentioned above.

Through blockchain technology, unified information systems could be realized for the processing of information to which operators in the sector are obliged, tracing, along blockchain chains, the food production chain would make it possible to quickly identify specific batches at any stage and trace risky products by eliminating, only those, from distribution. Furthermore, implementing decentralized public ledgers in the food sector would thus push up quality standards, making consumption safer.

Tracking via blockchain, as immutable and accessible, would thus allow for an efficient targeted response by those in charge, but going further, one could envisage the adoption of distributed ledgers directly accessible to the competent authorities in charge of control and, if desired, the members of the RASFF network themselves: alert notifications and intervention measures using the same technology for constant synergy and uniform action.

BIOACTIVE COMPOUNDS OF NUGGET HOP FOR COSMETIC USE

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ABSTRACT

Hop (*Humulus lupulus* L.) is a species of the Cannabaceae family, with climbing, perennial and dioecious characteristics with great importance due to its bioactive compounds such as polyphenols and organic acids. The female inflorescences (hops) are known worldwide as an essential raw material and flavoring agent in beer production. However, hop agricultural by-products such as leaves, stems and small-caliber cones are discarded as waste in the hop harvest process, regardless their richness in interesting bioactive compounds. Phytochemical compounds from hop, such as xanthohumol, humulone, and lupulone, have also been used in cosmetics. In addition, the plant has beneficial anti-inflammatory, antimicrobial, antioxidant properties. The area of Bragança (Trás-os-Montes) is rich in hop. In the present study, the phytochemical profile of obtained from hops and by-products of hop harvesting was investigated, along with the estimation of their total phenolic compounds and total flavonoids, the Sun Protection Factor (SPF) and antioxidant capacity.

Hop samples (Nugget cultivar and its harvest by-products) were collected in the area of Bragança (Trás-os-Montes). The volatiles extracted in a Likens-Nickerson system, were analyzed by GC and GC-MS. α - and β -acids, from which they were extracted with ICE-3 calibration standard and analyzed by HPLC. The characterization of α - and β -acids and of phenolic compounds was also performed by UHPLC-DAD-ESI-MSⁿ. Lipids were extracted by soxhlet and estimated by gravimetry. Total phenolic compounds and flavonoids were estimated by the Folin-Ciocalteu method and by the formation of a complex between Al³⁺ and flavonoids, respectively. DPPH method was used to determine the antioxidant activity while the photoprotective capacity (SPF) was performed using the method Zahnit et al. 2022.

Cultivar Nugget and its respective by-products showed similarities regarding the monoterpene component, with β -myrcene being the main compound. As for the HPLC and UHPLC-DAD-ESI-MSⁿ analyses, they showed total values around 12% of α -acids and about 4% of β -acids, corresponding to the compounds cohumulone, humulone, colupulone, lupulone and xanthohumol. For lipids, SPF and total phenols, the extract with the highest values is the obtained from Nugget cones while Nugget by-product present the highest total flavonoids values and DPPH radical scavenging capacity.

The chemical profile, antioxidant and photoprotective capacity of the extracts allows propose it as potential ingredients to developed a cosmetic formulation enriched with bioactive compounds. In addition to that, the valorisation of the surplus of hop culture, will bring economic, ecological and sustainability benefits in agriculture to the region of Trás-os-Montes.

Keywords: Hop, bioactive compounds, chemistry, α -acids and β -acids, phenolic compounds, cosmetic.

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**POWDERED POLYHERBAL ANTI-DANDRUFF SHAMPOO: FORMULATION,
CHARACTERIZATION, AND ANTIMICROBIAL ACTIVITY**

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ABSTRACT

The purpose of this study is to formulate and evaluate polyherbal shampoo for the cosmetic purpose from herbal ingredients. Herbal anti-dandruff shampoo was prepared by using various herbal ingredients like *Acacia concina*, *Ocimum sanctum*, *Trigonella foenum graecum*, *Indigofera tinctoria*, *Cinnamomum camphora*, *Melissa officinalis*, *Urtica diorca*, *Sapindus indica*, *Rosa centifolia*. The formulated shampoo was characterized by solubility, loss on drying, swelling index, flow property, bulk density, viscosity, foaming index, The anti-dandruff poly herbal shampoo was evaluated by anti-microbial activity, skin irritation, and eye irritation test. Dandruff is a common disorder affecting the scalp condition caused by yeast *pityrosporum*. Dandruff cannot be completely eliminated but can only be managed and effectively controlled in that way. In the present research work, the various anti-fungal agents are employed in hair care preparation for the treatment of dandruff.

Keywords: Dandruff, Antifungal, Various herbs, Evaluation.

Summary:

Utmost people each over the world take great care to ameliorate their beauty of face, skin, hair, take great care to improve their beauty of face, skin, hair, etc by using many herbal and synthetic cosmetic products. Some people especially women take great care to improve their hair growth, prevent dandruff, and for better-looking hair. The formulation & evaluation of antidandruff polyherbal shampoo powder is better to prevent dandruff and improve functions of hair. Formulated antidandruff herbal shampoo powder has multiple functions(i.e.) used to prevent hair falling, prematurely grey hair and dandruff, to promote hair growth, blackening of hair, conditioning of hair, nourishment of hair and to provide cleansing action, cooling effect, etc. The results of the present investigation have indicated the presence of antidandruff activity of the *Ocimum sanctum* and *Cinnamomum camphara* mainly effective against strains of a gram-negative organism such as *E. coli* and gram-positive organisms such as *staphylococcus* and fungal organism such as *candida Albicans*. The developed product has enhanced detergency, foaming action and is particularly effective against dandruff. From this investigation, it can be concluded that the formulation of antidandruff herbal shampoo powder contains all good characteristics of an ideal shampoo and it was found to be harmless, more effective, and economic.

BIOETHANOL PRODUCTION AND USE OF DISTILLERS'S WET GRAINS AS DAIRY COWS' FEED

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ABSTRACT

This paper examines the challenges of energy and food shortage, fossil fuel consumption, and the importance of using corn as a raw material. In this context, the authors discuss a number of important aspects of bioethanol as a product, as well as advantages and disadvantages of bioethanol production. A comparative analysis of distillers' wet grains was carried out, comparing the data from the research and from production, and listing the physical and chemical properties of distillers' wet grains. The authors examined the characteristics of distillers' wet grains as a feed primarily for beef cattle, in particular lactating dairy cows.

Key words: bioethanol, wet distillers' grains, feed, beef cattle

Introduction

The global population growth results in the ever-growing rate of energy consumption. The use of energy has become indispensable in every aspect of human society. In recent years, energy scarcity has become a major concern, considering that the available energy resources are limited, with some being almost exhausted. Non-renewable energy sources, such as oil and coal, are limited. Non-fossil energy (obtained from hydroelectric, wind, or biogas plants) makes up about 25% of total energy production, with the remaining 75% obtained from geothermal and nuclear power plants. Oil and oil derivatives consumption is increasing on a daily basis, largely for the purpose of transporting people and goods, as most vehicles still use fossil fuels. The vast consumption of fossil fuels has become a serious threat to the environment and all life. If the environment in which we live is polluted, what is the point of improving the quality of life?

The population growth affects not only the energy consumption, but food demand as well. With every newborn human being, food insecurity rises. Not all regions are equally threatened by food scarcity, however: Asia and Africa, especially, are faced with food scarcity and the threat of famine, due to overpopulation in Asia, and poverty and low soil fertility in Africa. Food scarcity leads to higher food prices, increasing the vulnerability of already vulnerable regions. Animals are also threatened, since food insecurity for people means even great food insecurity for animals. Food scarcity affects the livestock numbers, and this in turn leads to higher food scarcity for people. Numerous government policies and research studies have addressed this issue so far. At this very moment, Europe is experiencing an enormous increase in grain prices due to the war in Ukraine. This clearly demonstrates how food shortages lead to price increases and put pressure on the countries that have surplus food to buy that food from the rich nations.

Bioethanol

When considering how fossil fuel consumption impacts the environment, acid rain and global warming first come to mind. They are the most severe effects of fossil fuel combustion, but there are also many other negative effects, such as soil excavation during oil, natural gas, and coal extraction, or large amounts of tailings left over after oil and coal extraction. Burning fossil fuels releases various chemical compounds – pollutants, such as oxides, ash, and volatile organic compounds. The dramatic increase in

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carbon dioxide levels in the air has given rise to the predictions that global warming will disrupt weather patterns, resulting in the constant melting of glaciers and sea ice, especially in the Arctic region.

The 2015 research cited motor vehicles as the main culprit for hydrocarbon pollution, carbon monoxide, mono-nitrogen oxide, and sulfur dioxide emissions. The negative impact of vehicles on the environment can be reduced by implementing different construction and technology innovations. One technological procedure which aims to reduce the negative impact of fuel combustion in vehicles is the cleaning of the engine with hydrogen. Structural solutions are still more important. For some time now, engineers have been developing vehicles that would use environmentally friendly energy sources – primarily electric power, but also ethanol, i.e., bioethanol. Bioethanol is a product obtained through fermentation of starch-containing or lignocellulosic materials. The process of obtaining ethanol from starch-containing materials is used all over the world to meet the needs for ethanol, which is widely used in different industries today.

Corn has been used by the inhabitants of South America for many centuries. After the discovery of America, it became known to the rest of the world. Corn has been used for various purposes: as food and fodder, for non-alcoholic and alcoholic beverages, as building material, as industrial raw material, fuel material, medicinal plant, etc. With the rise of industry, every part of the corn plant was used to develop thousands of different products. In the 21st century, the use of corn to produce bioethanol as an alternative fuel has been rising steadily. The rising demand for corn for the bioethanol production led to a sharp increase in prices and became a threat to other industries that use corn. "The corn planted acreage increases every year. In 2007, corn planted acreage increased by 14%, and the production volume by 26% compared to 2000. The use of corn for animal feed increased by 16%, and for industry by 55%, compared to 2000." (Bekrić 2008). The rising corn production volume is mainly due to technology and the seed industry advancements, increasing agrotechnical efficiency, innovations in the development of a wide range of corn-based food and technical products and especially innovations in the bioethanol production and its application as an alternative biofuel. The increase in corn yields is the result of higher genetic potential of hybrids, advanced agricultural techniques, and biotechnological innovations. In recent years, these global trends can be seen in Serbia and the Balkans region: based on the data from seed producers, corn yields in Serbia in optimal conditions can reach 14 t/ha, which are very high yields.

Corn has a very wide range of uses; over 1,000 supermarket products are made from corn (Bekrić 2008). According to more recent sources, over 2,500 supermarket items are made from corn. This versatility is due to the chemical structure of corn: the flexibility of starch macromolecules is such that in reaction to different reagents (bases, acids, enzymes, and pressure) they form different products and thus open new possibilities for using corn.

Bioethanol, i.e., ethyl alcohol or ethanol (also known as "fire water") has been known to people for thousands of years. It was bioethanol which was used as motor fuel for Ford's first engine – the switch to oil derivatives (gasoline and diesel) came only later. Although ethanol can be obtained from many plants and plant fruits, sugar cane and corn have proven to be the best raw materials for the ethanol mass production.

"Alternative energy sources should be renewable, sustainable, environmentally acceptable and economically profitable" (Ivetić and Antonov 2014). From the range of alternative fuels, the EU has focused on natural gas, biogas, biodiesel, bioethanol, BTL (Biomass to liquid), GTL (Gas to liquid), CTL (Coal to liquid), whereas hydrogen is cited as a long-term solution.

At present, biomass is the most economically viable energy source, with a capacity for a profitable production of high-quality liquid and gaseous energy products. This primarily refers to bioethanol production, which has increased several dozen times on the global level in the past 30 years. Global bioethanol consumption amounts to about 60 billion liters per year. The U.S. Association of Bioethanol Producers forecasts that it will double in just 5 years.

In Serbia, bioethanol is not produced or used as a fuel or an additive to motor fuels. Rather it is used in the food, pharmaceutical and chemical industries, as a solvent, additive or raw material. Serbia imports considerable amounts of ethanol, despite having a good raw material base and modern production. There are about 10 bioethanol plants in Serbia, with molasses mostly used as raw material and production volume of about 40 million liters of ethanol. During the 2020 Covid pandemic, some out-of-operation

bioethanol plants were urgently put into use, due to the great need for ethanol as a disinfectant. This was one of the better outcomes of the pandemic, apart from the multiple negative effects for the economy. The bioethanol production was boosted by the demand for additional amounts of ethanol for the Serbian market, as imports dried up, because the exporting countries first met their own needs for ethanol. During the pandemic, the bioethanol production in Serbia increased production by up to 250%.

Bioethanol is ethyl alcohol produced from biodegradable raw materials that can be used as biofuel. The most important raw materials for bioethanol production are sugar beet, sugar cane, corn, wheat, sorghum, potatoes, etc. The type of bioethanol produced from food crops rich in sucrose is called first generation bioethanol. This production might present a problem in the context of global food scarcity because it relies on feedstocks (edible agricultural products) which could be used to feed people and animals. Consequently, bioethanol production has recently turned towards the production from non-edible ligno-cellulosic raw materials through second generation technologies. 5% of ethanol can be added to gasoline without any modifications to the engine. Higher ethanol proportions require engine modifications. Bioethanol is most often used in the EU in its modified form - ethyl tertiary butyl ether, up to 15% in mineral fuel.

Biofuel production is growing daily. There are good reasons to be optimistic about the future introduction of biofuels as an energy source. The switch from fossil fuels with biofuels is more than justified. Fossil fuel consumption and demand are constantly increasing, which has led to high crude oil prices. However, the world's major oil producers are situated in politically unstable regions (e.g., Venezuela, Libya, Iraq), and oil resources may be the cause of political instability. Another important reason for the introduction of biomass fuel is environmental protection and the projected reduction of carbon emissions.

Bioethanol can be produced from any organic substrate which, undergoing chemical or biochemical transformations, can be broken down into simple sugars, and metabolized by yeasts. There are three categories of raw materials: sugar (sugar beet, sugarcane, molasses), starch (grain and tuber crops) and lignocellulosic raw materials (wood, wastepaper, corn, straw, etc.).

Many engineering, environmental, and sociology professionals and academics are opposed to bioethanol production for the following reasons:

- Ethanol benefits farmers and large corporations, but does little for environmental protection.
- Corn production requires large quantities of herbicides and mineral fertilizers, as well as fossil fuels for agriculture technologies and harvesting – is it sensible to consume fossil fuels in order to produce alternative fuels?
- The increased demand for corn will lead to the destruction of previously unused areas, and the indigenous flora and fauna will be endangered.
- During bioethanol production, large quantities of carbon dioxide are released, which defeats the purpose of alternative fuels.
- A sudden increase in bioethanol production could threaten the food supply.

On the other hand, there are many advantages to bioethanol production, such as:

- The total balance of carbon dioxide released equals zero, because in the process of ethanol combustion, the amount of carbon dioxide equals the amount that the plants used for photosynthesis.
- The existing oil infrastructure can be used for the biofuel distribution; biofuel can be burned in gasoline engines with no or with minimal modifications.
- Bioethanol does not contain aromatic hydrocarbon compounds, and has a higher octane number than gasoline, so by burning bioethanol to carbon dioxide and water, the environment is affected as little as possible.
- Ethanol molecules contain oxygen, which enables the complete combustion of gasoline components, reducing the amount of carbon monoxide and other toxic substances such as benzene and reducing the level of non-combustible hydrocarbons.

- Bioethanol production boosts agriculture and other industries with the production and application of by-products.
- Bioethanol production reduces the import dependency of countries.

We can conclude that the most suitable and affordable raw material for the bioethanol production in Serbia is corn. Distiller's grains and syrup as milling by-products can be processed into a high-quality feed for livestock. Carbon dioxide should be used for carbonated beverages and dry ice production (Semenchenko 2010). In recent years, distiller's grains have been a topic of interest for researchers (Semenchenko 2013), i.e., how industrial by-products can be used to produce one of the basic foodstuffs, milk. The issue of whether to produce bioethanol from food is thus resolved, because corn processing can provide both ethanol and a highly valuable food of animal origin - milk. Thus plant-based food can yield both ethanol and animal-based food product.

SWOT analysis of bioethanol production

Strengths

- The product is in high market demand
- Most of the production is sold with very short payment terms
- Little competition on the Serbian market
- A wide range of customers (paint and varnish industry, chemical industry, cosmetics, pharmaceutical ...)

Weaknesses

- Part of the production is sold to insolvent customers
- Raw material is paid in advance
- Short payment terms for energy products
- The problem of selling by-products - WDG

Opportunities

- Capacity expansion – additional quantities are needed
- Expanding the range of customers
- An additional step towards the final product – e.g., production and packaging of windshield fluid for the automotive industry
- Plant for drying WDG and production and packaging of DDG
- Use of WDG as feed for dairy cows on one's own farm
- Carbon dioxide generated in the production can be sold and used for dry ice

Threats

- Emergence of additional competition and market crowding
- Customers' insolvency
- Rising prices of raw materials and energy
- Lack of raw materials

Wet distiller's grains

The ethanol production from corn grains has three main outputs:

- a) Ethanol as the main product
- b) Non-fermentable components of corn grains (proteins, fibers, oil, mineral components)
- c) Carbon dioxide

Each processed kilogram of corn is said to yield approximately 1/3 of each of these three products or by-products. The ethanol production process consists of several stages: milling, cooking, liquefaction, saccharification, fermentation, and distillation. Non-fermentable residues are removed from the production process as a whole batch, which is also fed into the cooking process. These residues are centrifuged to remove water, so WDG (wet distiller's grains) are obtained. The dried product is called DDGS (distillers dried grains with solubles). DDGS is used as animal feed, by local or remote consumers, because DDGS is a stable and non-perishable material, so it can be easily transported to remote farms. The sale of DDGS or WDG contributes to the economic efficiency of the ethanol production.

WDG is golden-brown in color, has moisture content 50-80%, is prone to rapid spoilage, and has a specific density 858-975 kg/m³. It has a low heat reception and heat transfer due to high moisture content. The color changes over time are correlated with the presence of fungi, yeasts, and moulds, which quickly colonize the moist material. The WDG color is the result of raw corn used, the environmental temperature and the production temperature. Available research has shown that the skin color and the yolk pigmentation in poultry improves with the addition of dry or raw distillers' grains to the diet. The concentration of xanthophylls in WDG and DDG is lower than in corn grits, it affects the pigmentation of poultry even at those levels and it is not necessary to add artificial pigments.

Rosentrater's study carried out in 2008 measured the physical and chemical properties of WDG.

Table 1. *WDG physical and chemical properties* (Rosentrater 2008)

Property	Unit	Minimum	Maximum	Average	Standard Deviation
Moisture Content	%	53,03	54,02	53,57	0,30
Thermal Conductivity	W/m°C	0,22	0,53	0,35	0,09
Thermal Resistance	m°C/W	1,90	4,48	2,98	0,72
Thermal Diffusivity	mm ² /s	0,09	0,13	0,10	0,01
Specific Density	kg/m ³	857,56	974,86	924,03	36,08
pH		4,36	4,39	4,37	0,01
Protein DMB	%	28,50	29,20	28,93	0,25
Fiber DMB	%	6,20	7,30	6,64	0,39
Oil DMB	%	12,10	12,80	12,44	0,25
Ash DMB	%	4,84	5,39	5,14	0,14

According to the physical properties analysis, the values listed in Table 1 are as follows:

moisture content ranges from 53.03 to 54.02% and due to the high moisture content WDG is very prone to spoilage. The products that do not contain free water have no risk of spoilage, while materials that contain surface free water on their surface are very perishable. WDG has a shelf life of four to seven days, depending on storage conditions, before spoilage due to mold begins (Rosentrater 2008). Refrigerated storage can extend the WDG shelf life by several days. The average specific density is 924 kg/m³. The pH value indicates that WDG has an acidic reaction, which is a consequence of the presence of chemicals as well as the process itself. Protein DMB content is 28.93%, total fiber DMB is 6.64%, oil DMB content is 12.44%, and ash DMB content is 5.14%. The results of the 2008 study (Rosentrater 2008) are similar to the results of other WDG-related studies.

The analysis was not done in the laboratory. It was performed by the Globoder Institute for Fodder Crops, but it was not possible to process an adequate number of samples. Therefore, a representative sample was made using the quartering method. WDG samples were taken immediately post-production on three consecutive days, from three different batches. Each time approximately the same amount of WDG was taken with a clean plastic spoon, from three places from the container - a total of 9 scoops with a spoon of approximately 500 g of WDG. WDG was mixed by hand in a plastic container to homogenize it, and the homogenized mass was placed on the table, shaped into a circle, then divided by hand into approximately equal quarters, two quarters were taken, and the process was repeated several times until the mass was reduced so that a quarter amounts to about 100 g. The samples were sent for analysis with the results given in Table 2:

Table 2. *Physical and chemical properties of plant processed WDG*

Property	Unit	Value	DS Content	%
Moisture Content	%	77,23		
Specific Density	kg/m ³	1061,5		
pH		5,43		
Protein	g/kg	105,7	464,20	46,42
ADF	g/kg	86.8	381.20	38,12
NDF	g/kg	150.6	661.39	66,14
Crude Fiber	g/kg	29.4	129.12	12,91
Oil	g/kg	20.0	87.83	8,78
Ash	g/kg	12.0	52.70	5,27
Calcium	g/kg	1.00	4.39	0,44
Phosphorus	g/kg	0.82	3,60	0,36
Sodium	g/kg	0.74	1,32	0,13
Potassium	g/kg	0.30	3,25	0,32
Iron	mg/kg	23,25	102,10	
Zinc	mg/kg	9,75	42,82	
Energy Value	KJ/kg		5280	
Alcohol Content	mg/kg		2,75	
Aflatoxin Level	mg/kg		0,0093	

The color of DWG varies from pale yellow to dark brown, depending on the natural color of the raw grain used, the levels of soluble substances, and the atmospheric conditions. DWG can be used for several days depending on the outside temperature because it is prone to spoilage and turns sour very quickly.

Comparing the results with those from Rosentrater's study, we note that the WDG moisture content is 77.23%, which is much higher. This is because the plant in which the analyzed WDG was processed does not perform the centrifugation of WDG post-processing, only the decantation of excess water. The grains are then packed in polypropylene jumbo bags of approximately 1000 kg. The knitted polypropylene bags function like a sieve, straining the excess water from the grains. Therefore, the moisture content of WDG becomes considerably lower a few hours postproduction. The WDG acidity is slightly lower, because sulfuric acid is not used in the production, but only hydrolysis at elevated temperature and enzymes. The protein content in the examined sample is significantly higher, because there is no centrifugation and separation of CCDS, so all dissolved substances remain in WDG. The fiber and oil content are approximately the same as in the 2008 study, so these values will be used as a reference for further discussions and conclusions. The energy value, alcohol content, and aflatoxin level of WDG were also measured.

Table 3. *Comparative analysis of WDG and corn kernel*

Ingredient	Unit	WDG DMB	Corn Kernels
Energy Value	MJ/kg	5280	15293
Protein	g	29,22	9,42
Oil	g	8,32	4,74
Fiber	g	7,11	7,3
Water Content	%	74,21	10,37

The data obtained at the Institute for Fodder Plants are somewhat better than the data from the 2008 study. Table 3 shows the comparative analysis of WDG and corn kernels. Starch was almost entirely removed from the corn during fermentation, resulting in the WDG having a considerably lower energy value than corn. Since starch has been consumed, protein content in the remaining mass is almost 3 times higher than in corn, the oil content is twice as high as in corn, and the fiber content is approximately the same in WDG and corn. The water content in WDG is 7.4 times higher than in corn. This is to be expected, given that WDG undergoes the fermentation process which generates additional moisture, as a product of yeast metabolism. The protein content of 30% indicates that WDG is a very

high-quality feedstuff, which can replace expensive components of animal feed, primarily soybean meal, which has 44% protein. Considering that the price of soybean meal is always high (as of May 14, 2021, the price is 102.00 RSD/kg in wholesale, i.e., 0.87 €/kg. A future drop in soybean and soybean meal prices is unlikely), it is advisable to use the full capacity of WDG.

As was previously explained, the WDGS nutrient levels are higher than in the initial raw material – corn. The reduced starch intake increases the consumption of digestible fibers, and thus helps to reduce or prevent the occurrence of rumen acidosis. According to some studies, WDGS provides higher energy value for growth than corn grits (Semenchenko 2013). Table 4 shows the amino acids content in WDG.

Table 4. *Essential amino acids content (% dry matter content) in proteins* (Semenchenko 2013)

Amino Acid	Yeast	Corn	DDGS
Arginine	2,35	0,54	1,05
Histidine	1,17	0,25	0,70
Isoleucine	2,37	0,39	1,52
Leucine	3,45	1,12	2,43
Lysine	3,32	0,24	0,77
Methionine	0,79	0,21	0,54
Phenyl alanine	1,96	0,49	1,64
Threonine	2,27	0,39	1,01
Tryptophan	0,55	0,09	0,19
Tyrosine	1,60	0,43	0,76
Valine	2,52	0,51	1,63

From the above table, we can see that DDGS has the amino acids content nearly twice that of corn, because 50% of amino acids come from yeasts. Thus, lysine levels in DDGS are three times higher than in corn. This indicates that this amino acid comes from yeasts that are rich in lysine, and other amino acids.

Semenchenko (2010) clearly showed that the protein level in DDGS samples has been doubled compared to corn grain. WDG or DDGS proteins come from two sources - from corn itself and from yeasts. During fermentation, yeasts ferment starch and produce cell mass, which is mostly made of proteins. The 2010 study showed that all corn hybrids of the Zemun Polje Institute give distillers grains that meet the standard for minimum 25% protein in dry matter. Empirical data from the ETHANOL-LAB Šabac production show that grains' dry matter content, regardless of the corn hybrid type, meet the requirements of a minimum of 25% protein, and often exceed them.

The digestibility of dry matter based (DMB) distillers' grains ranges from 74 to 82%, as was determined by the pepsin-cellulase method. It should be noted that the digestibility of DMB distillers' grains was found to be higher in waxy hybrids than in classic hybrids. Waxy hybrids have higher digestibility because they contain 100% of amylopectin component of starch, whereas the "Zuban" corn hybrids contain 28% of amylose, which impedes digestibility. Most researchers emphasize the advantages of waxy hybrids because they have positive effects in the nutrition of dairy cows and other beef cattle, primarily fattening steers. The positive nutrition effects are due to the high digestibility of amylopectin in the rumen. All digestibility parameters of dry matter distillers' grains are higher than those of dry matter corn plant, which ranges from 58 to 66% (Dinić, Marković and Terzić 2010). The dry matter corn grains digestibility is higher than distillers' grains' digestibility, ranging from 81 to 83% (Ivetić and Antonov 2014). The lower digestibility of distillers' grains compared to corn kernels can be explained by a higher percentage of fiber and ash in distillers' grains. The concentration of easily digestible carbohydrates in corn kernels is considerably higher than in distillers' grains.

The oil content in DDGS samples ranges from 10.4% to 12.0%. Similar values can be found in foreign research. The ash i.e., mineral residue values are also similar. According to Semenchenko (2010), the mineral residue range is 5.65 to 6.17%, whereas according to www.ddgs.umn.edu data, the ash content is slightly lower 4.4%, and the ash content in the sample is 5.27%. The content of ash and other elements (oil, protein, cellulose, etc.) varies from batch to batch, depending on the sample, and on the raw material.

Corn distillers' grains has higher oil content, digestible and metabolic energy, and more amino acids such as lysine, methionine, and threonine than grains from other cereals. It makes it more suitable for feeding domestic animals, primarily pigs.

As to the structural carbohydrates, i.e., ligno-cellulosic fibers content, distillers' grains have showed that the levels of NDF, ADF, ADL, hemicellulose and cellulose are higher than in the whole corn kernel. Table 5 shows the values of NDF, ADF, ADL, hemicellulose, and cellulose in certain corn hybrids.

Table 5 Structural carbohydrates and lignin-cellulose in certain ZP corn hybrids – Overview (Semenchenko, 2010)

Corn Hybrid	NDF (%)	ADF (%)	ADL (%)	Hemicellulose (%)	Cellulose (%)
ZP 434	33,81	9,27	1,05	24,54	8,22
ZP 611k	31,41	8,02	0,64	23,39	7,38
ZP 633	36,25	9,06	2,20	27,19	6,86
ZP 704	34,16	8,59	2,16	25,49	6,44
ZP 746	38,27	10,15	1,51	28,12	8,64
ZP Rumenka	31,79	8,99	1,15	22,79	7,84
Average	34,28	9,01	1,45	25,25	7,56

Table 6 Structural carbohydrates and lignin-cellulose levels in corn kernel and DDGS – Comparative analysis

Corn Kernel	NDF (%)	ADF (%)	ADL (%)	Hemicellulose (%)	Cellulose (%)
Whole grain	17,59-28,84	3,89-4,88	0,34-1,08	13,23-24,64	2,79-4,45
Average	23,21	4,37	0,71	18,94	3,62
DDGS	NDF (%)	ADF (%)	ADL (%)	Hemicellulose (%)	Cellulose (%)
Average DDGS	34,28	9,01	1,45	25,25	7,56
Average whole grain	23,21	4,37	0,71	18,94	3,62
DDGS compared to whole grain	1,48	2,06	2,04	1,33	2,09

The results in Table 6 show that the levels of NDF and ADF (ligno-cellulosic dietary fibers) in DDGS are higher than in the whole grain. For ruminants, both DDGS and WDG are excellent all-natural protein and energy sources, which improve the rumen condition. The average content of NDF and ADF in the samples is close to the prescribed values for this nutrient in the mixtures for feeding pigs. The US Grain Board, which is responsible for the quality control of animal feed, prescribes the NDF level in the range of 20.1-32.9% and the ADF content is in the range of 7.2-17.3% (<https://grains.org/buying-selling/ddgs/>). Considering the positive effects of lignocellulosic fibers on the digestibility of the ration dry matter, we can conclude that distillers' grains is a high-quality feed. It can be used to feed different species and classes of livestock – especially ruminants. Digestible energy content is about 17 MJ/kg, and metabolic energy content is about 16 MJ/kg. As all the samples tested for both digestible and metabolic energy showed approximately the same results, we can safely say that distillers' grains is both a protein and energy nutrient. The advantages are the high content of oil and usable phosphorus. The digestible and metabolic energy content values are significantly higher than those of corn bran and beer wort feed.

Using SKT in combination with other meal nutrients and as a component in mixtures (complete or supplementary) improves the taste and usability of rations for domestic animals. Distillers' grains is increasingly used in pigs' rations. The recommended amount of DDGS is around 20% in mixtures for

all classes of pigs. A higher DDGS proportion can affect the quality (firmness) of bacon, so it should not exceed 20% of the ration dry matter. The mixtures should meet the needs for digestible amino acids and absorbable phosphorus. The lysine to protein ratio should be lower than 2.80.

For steers in all stages of fattening, the proportion of DDGS can be 40% of the ration dry matter. This improves growth rate and meat quality. DDGS is used as a feed supplement to feed for fattening steers as a source of protein, in order to reduce the share of gluten and soy meal in the ration. Combined with poorer quality silage, it can serve as a source of NDF fiber, as a substitute for corn gluten meal and soy flakes, and to increase the fat content of rations.

The DDGS physical and chemical properties vary depending on the manufacturer and may have different nutritional values, but also properties important for DDGS handling and storage. These include color, smell, particle size, density, pH value, thermal characteristics, flowability, hygroscopicity and stability during drying.

These properties can vary depending on the input raw material, grinding characteristics, processing chemicals, type of dryer and drying conditions, as well as many other factors during the bioethanol production. The color varies from light yellow to dark brown. The smell varies from a sweet smell of fermented matter in light yellow color, to the smell of burning and smoke in dark brown color (Semenchenko 2013). Moisture is the most important physical property in terms of DDGS handling and storage. Moisture content of over 12% can jeopardize the DDGS quality, because it consists of small particles where air flow is impossible, so the possibility of spoilage due to microorganisms, primarily mold, increases with each percentage of moisture, especially if DDGS is stored in thick layers. Golden-colored DDGS has a sweet, fermented smell, and dark-colored DDGS has a burnt and smoky smell (Semenchenko 2013). The DDGS particle size affects the digestibility of nutrients, mixing efficiency, volume, and taste. The storage capacity and mode of transportation will depend on the DDGS specific density because it behaves like a fluid, so higher mass particles fall to the bottom, and smaller mass particles rise to the surface, which is important during handling and mixing. Larger particles have a lower volumetric mass and vice versa. Although DDGS has fluidic properties, it has low flowability, which presents a problem during loading, transportation and unloading. Some animal feed plants seek to avoid problems in DDGS handling and transportation, so they are reluctant to use it in production. Flowability problems are particularly pronounced if the material has increased moisture, i.e., if certain layers of the material have higher moisture than expected. Different layers may have different moisture levels depending on their dimensions and specific particle densities.

DDGS can be stored for a long time if the humidity is between 10 and 12%. The slightest increase in humidity above 12% can result in the risk of mold and spoilage of DDGS during storage. DDGS coagulation can occur as a consequence of handling, especially if it is not sufficiently cooled. The DDGS oil content is about 10% to 12%. This oil contains a higher percentage of unsaturated fatty acids, which can oxidize into unstable peroxides and turn the oil rancid. Moisture in fats or ingredients with a high fat content can increase rancidity. DDGS is a hygroscopic material that absorbs moisture from the air, so during storage, depending on the season, its moisture may exceed the permitted 12%.

Distillers Grains in Beef Cattle Feed

DDGS is very palatable to beef cattle, which results in a high DDGS intake and therefore energy. WDG gives better results in terms of weight gain than DDGS. If 30-40% of corn in the ration is replaced with WDG, feed conversion increases by 15-20%. This increase occurs because WDG has 120 - 150% of corn energy value. The energy in WDG and DDGS is derived from their high levels of digestible fiber which make them especially suitable for ruminants, who can digest fiber. For pigs, however, fiber is indigestible and only serves to facilitate digestion. For beef cattle, the maximum daily gain was achieved when 20 - 30% DDGS was added to the ration. If the DDGS ratio is over 30%, the maximum daily gain starts to decrease. The rations with about 30% of DDGS added reduce rumen acidosis. Subacute acidosis is a common problem in beef cattle which consume feedstuff with a high cereal content, which contain rapidly degradable starch. Both DDGS and WDG have low starch content, and are rich in fiber, protein, and fat. The rations containing too much DDGS or WDG can lead to excess protein and phosphorus. The excess protein will result in a spike in urea in urine and milk, according to Ranathunga, Kenneth and Kevin (2019). DDGS and WDG can contain high levels of sulfur, which can be a potential problem

for beef cattle. The sulfur comes from bioethanol plants using sulfuric acid to regulate the acidity of the solution. The sulfur content can vary from 0.6 - 1.8%. Microorganisms in the rumen require a certain amount of sulfur, but if the sulfur level is too high, it can lead to polio encephalomalacia – necrosis of the cerebral cortex, decrease in dry matter intake, decrease in daily gain and decrease in copper levels in the liver.

In the USA, the biggest consumers of DDGS and WDG are cattle farms, either feedlot cattle or dairy cows. DDGS and WDG has a high energy value and protein content, with easily fermentable the fiber is easily fermented, and the protein content is very high.

Distillers' grains is a feedstuff with a high oil content. Crude protein content is also very high, over 30%, more than half of which are indigestible proteins. This makes the net energy of lactation is very high, 2.25 Mcal/kg of dry matter. Crude oil content is about 10% DMB, and the NDF fiber content is about 39%.

Adding DDGS and WDG in dairy cows' rations produces similar results, but WDG still has a slight advantage. DDGS or WDG can be used as a substitute for the concentrated part of the ration. If dairy cows' rations contain up to 30% WDG, similar or better results are achieved in terms of milk yield. Distillers' grains is a good feedstuff to use as a substitute for corn and for adding extra energy to rations without causing rumen acidosis.

Conclusion

From 1982 to 2005, at least 24 studies were conducted on using DDGS in the diet of dairy cows. The share of DDGS ranged from 4.2% to 4.6% of the ration dry matter, according to Rader, Buck and Hatorri (2020). Milk yield was the same or higher if DDGS was used in the diet, except when the DDGS share exceeded 30% of the ration dry matter. The increase in milk yield is explained by slightly higher energy and slightly higher fat content in the meal. When comparing the formulations with equal amounts of protein and fat – feedstuff with soybean meal and with DDGS, better results were achieved with DDGS. Also, milk yield was higher if DDGS was golden yellow. If darker shades of DDGS were used, milk yield was lower, even compared to the control formulation with soybean meal. The assumption is that the proteins and fats from the darker DDGS were damaged by heat during drying. All the studies were done in a short period of just four to five weeks. However, the effects of the long-term use of DDGS in the diet (e.g., several years) remained unclear. In a subsequent study, lactating dairy cows were fed WDG during the entire lactation and the dry period, and then during the second lactation. 15% of WDG was added to the ration dry matter. After the first year, the differences in the amount of milk were minimal: 31.7 kg/day for the control formulation and 33.6 kg/day for the WDG formulation. However, this also showed a relative increase of 6% in favour of the WDG formulation. Milk fat increased by 3.75% for the control and 4.07% for the WDG formulation (relative increase of 8.5%), and protein by 3.29% for the control and 3.41% for the WDG formulation (relative increase of 3.6%). More importantly, with the WDG formulation, the intake of starch was reduced to about 20%, but this did not have a significant impact on milk yield. However, the digestion efficiency was improved, as well as the amino acid status. There can be little doubt that the use of WDG and DDGS in the diet of dairy cows improves both milk yield (by a few percent), and the cows' digestion efficiency and general health.

Bioethanol production offers a fuel that meets the standards for green fuels, but also a by-product that is a valuable nutrient for beef cattle or dairy cows. Thus, corn can be processed to provide both energy product and animal feed. The livestock, in turn, provide "more valuable" products, such as proteins in the form of milk and meat. Therefore, we can conclude that corn processing performs the primary task of agriculture – to produce food, and an additional task – to produce energy.

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THE RELATIONSHIP BETWEEN THE ACTION OF ERADICATE MOSQUITO NEST (PSN) WITH THE PRESENCE OF AEDES AEGYPTI LARVAE IN BAKUNG VILLAGE BIRINGKANAYA DISTRICT MAKASSAR CITY

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ABSTRACT

Background: Dengue Hemorrhagic Fever (DHF) has become an endemic disease in various countries including Indonesia. National DHF Incidence Rate (IR) in 2018 was 24.73 per 100,000 population and South Sulawesi DHF IR 24.29 per 100,000.¹ Makassar City is 6th highest in South Sulawesi Province for the number of DHF sufferers during 2016-2018.² Bakung Village has lowest larvae free value in 2018, which is 72% .³ Action of eradicate mosquito nest by the community is one of the factors of larvae presence. **Purpose:** This research aims to determine the relationship between mosquito nest eradication actions with the presence of Aedes aegypti larvae in the Bakung Village. **Method:** This type of research is observational using cross sectional study design. The study was conducted in Bakung Village, Biringkanaya District, Makassar City in February - March 2020 with a total sample of 119 houses. Data analysis using Chi-square test. **Results:** Based on the Chi-square test, p value = 0,000 in the analysis of the relationship between mosquito nest eradication action with Aedes aegypti larvae presence. This shows that there is a relationship between PSN actions and the presence of Aedes aegypti larvae in the Bakung Village. **Conclusion:** PSN activities carried out properly and correctly will reduce the risk of the presence of Aedes aegypti larvae. Therefore it is necessary to increase counseling to the community as an effort to break the chain of dengue transmission.

Keyword : DHF, PSN, Action, Aedes aegypti Larvae,

**STATUS OF WATER SUPPLY AND SANITATION IN HADEJIA LOCAL GOVERNMENT,
JIGAWA STATE, NIGERIA**

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ABSTRACT

This research dwells on status of water supply and sanitation in the study area. It employs both primary and secondary data. Primary data were collected using questionnaire as tools for data collection where multistage sampling was adopted. The study area was stratified and questionnaire administered systematically to solicit information from respondents. The research established strong relationship between economic status, level of education, water supply and environmental sanitation. The water supply is frequent and majority about 79% source it form tap water system and have toilet in their houses. The distance to the water sources is very short, majority trek less than 500 metres (78%). The overall status of water supply and sanitation in Hadejia is good.

Keywords: Water supply, Sanitation, Hadejia, Jigawa, Nigeria

**DRONE APPLICATION IN PADDY FARMING: MALAYSIA AND INDONESIA
COMPARISON**

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ABSTRACT

Drones, or unmanned aerial vehicles (UAVs), are becoming an increasingly important tool for Malaysian and Indonesian farmers, especially post Covid-19 pandemic, potentially providing a fast and efficient way to perform various tasks. Initially developed for military use, large drones have evolved to become smaller and more manoeuvrable machines to assist operations in various industries, including paddy farming. Drones can be more efficient and effective when it comes to spraying pesticides, when compared to the traditional manual method that was once prominent before the Covid-19 pandemic hit Malaysia. Pesticide spraying drones cannot be flown higher because of the spray distribution that is affected by the propeller and winds, so these agricultural drones need to be flown close to the crops and spraying area. Additionally, the down-force winds created by the propellers also contribute to more efficient and effective spraying of pesticides as the crop leaves are blown and spread to distribute pesticides to the hard to reach areas where the pests usually can be found. Also, night-time operations of drones can target the pests better as most are more active at night. This is because these drones do not need lighting and can be operated based on maps and fly automatically to cover the entire crop area without much control from the pilots who would initially setup the flying route. The potential of drone application in paddy farming has been investigated during this qualitative research (interviews and focus groups), involving three stakeholders, namely paddy farmers, agricultural government agency representatives, and drone operators, from both Malaysia (4 agencies, 3 drone operators, 15 paddy farmers) and Indonesia (2 agencies, 2 drone operators, 20 farmers), through convenience sampling method. These interviews and focus groups were recorded and transcribed. Thematic analysis was performed on the gathered data, and it was revealed that: in Malaysia, the drone operators consist of newly established companies that provide services for paddy farmers related to the spraying of pesticides, while in Indonesia, the drone operators provided services to the horticultural sector instead of rice paddy farming. Both Malaysia and Indonesia are witnessing a booming drone industry that can potentially provide more services to facilitate other industries, especially the agricultural industries. Further research is recommended to establish the growth of this potential industry by looking into the critical success factors as well as the best practices to further accelerate this potentially enabling sector.

Keywords: Drone technology, paddy rice farming, agriculture, horticulture, service industry.

NUTRITIONAL PROFILE AND BIOACTIVE CONSTITUENTS OF POMELO FRUIT

Simple Sharma^{,1}, Barinderjit Singh¹**¹Department of Food Science and Technology, I. K. Gujral Punjab Technical University, Jalandhar - Kapurthala Highway, Punjab 144603, India***ABSTRACT**

Pomelo fruit considered an exotic fruit of the citrus family known as *Citrus grandis* have a large number of wastes including peel, pomace, and seeds which are comprised of nutritional and bioactive compounds and have industrial applications. Mainly pomelo fruit is comprised of high vitamins A, B, and C, and the peel offers high protein, carbohydrates, and mineral content. The availability of these vitamins in pomelo provides a positive stimulatory effect on the immune, digestive and cardiovascular systems. Pomelo fruit is an essential source of food and energy and has a significant role in accompanying healthy diets. Pomelo fruit are exhibited due to the presence of different bioactive constituents including polyphenols, flavonoids, phenolic acids, carotenoids, triterpenoids, phytosterols, carbohydrates, coumarins, and some miscellaneous constituents. The bioactive compounds carried in waste improves health functionalities. On processing and consumption, pomelo fruit is composed of 50 % remains of peels, seeds, pulp, and peel segments that contain beneficial bioactive constituents such as polyphenols, vitamins, and carotenoids that defined antimicrobial and antioxidant activities. The main components of pomelo fruit are the flavanones, narirutin, and naringin and their aglycone (naringenin), which have always been recognized to be a distinctive component of pomelo. Other flavanones have been identified in pomelo including hesperidin, didymin, eriocitrin, neohesperidin, neoeriocitrin, and poncirin, as well as flavonols (rutin), and flavones (rhoifolin and diosmin). The pectin content present in the peel of pomelo accounts for components such as arabinose, rhamnose, glucose, mannose, and xylose. Pomelo fruit's different portions are utilized for the production of different food products. These food products have beneficial components with antioxidant and antimicrobial activities. The pomelo fruit is regarded as an edible and sustainable source for food industries. Furthermore, these products have health benefits including reducing headaches, avoiding gastrointestinal issues, cancer, removing blemishes from the skin, hypertension, and cardio attacks. Pomelo fruit is a perfect and long-lasting resource for gathering bioactive substances and other co-products for the pharmaceutical and food sectors.

Keywords: Pomelo, Fruit, Waste, Nutritional profile, Bioactive Constituents, Utilization

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Keywords: Pomelo, Fruit, Waste, Nutritional profile, Bioactive Constituents, Utilization

**EFFECT OF TOXIC SOLVENT EXTRACTION OF THE CALOTROPIS *PROCERA* PLANT
ON HEPATIC AND RENAL FUNCTION**

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ABSTRACT

The extraction of medicinal plants is a necessary step to isolate the bioactive molecules. However, this method is carried out using chemical solvents which can extract the molecules but also pollute the extract. Traditional methods of extraction are more efficient and can produce pure and unpolluted molecules. In this study, two methods of extracting a medicinal plant are tested for efficiency, known as calotropis procera. The plant was obtained from the Sahara of Algeria. The first method was to extract the plant with chemical solvents. The plant powder was put in ethanol for 72 hours. After maceration, the ethanolic extract was filtered and the extract was decanted with solvents; chloroform, butanol and ethyl acetate. After filtration, the extracts appeared in transparent green color. The extracts were kept in glass bottles and stored in the refrigerator. The second method is a cold extraction of the calotropis procera plant without chemical solvents. The extract has not been filtered. A black to dark green extract was obtained. We put the extract in a UV-resistant bottle. The extracts obtained were immediately tested on rats and they were not stored in the refrigerator. The extracts of the calotropis procera plant obtained by the two methods were tested for their protective effects vis-à-vis the toxicity of mercury. The results of the histopathology study of the kidney and liver of male Wistar rats treated with Calotropis procera extract obtained by cold extraction show that the renal glomeruli are of normal structure. The extract obtained by cold extraction completely protected the liver of the rats. However, the extract obtained by chemical and hot extraction did not protect the kidneys and liver of rats from mercury toxicity.

The results of this study demonstrate that cold extraction is a key to obtaining pure and effective molecules that can protect vital organs like the kidney and liver. The purpose of this research is to show the importance of a new method of extracting plants used in the Sahara of Algeria, including the most delicate ones like calotropis procera.

Key word: Cold extraction, chemical extraction, calotropis procera, antioxidants, kidney, liver.

**BIOGENIC SYNTHESIS OF SILVER NANOPARTICLES USING LEAF EXTRACTS OF
CHROMOLAENA ODORATA, *TITHONIA DIVERSIFOLIA*, AND *SOLENOSTEMON
MONOSTACHYUS***

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ABSTRACT

Silver nanoparticles (AgNPs) have gained the interest of different field of sciences due to their versatile application in daily activities. The use of more sustainable and eco-friendly approach is required to promote synthesis. To emphasise an alternative approach which is save, economical and eco-friendly, this research has demonstrated the use of leaf extracts of *Chromolaena odorata* (CO), *Tithonia diversifolia* (TD), and *Solenostemon monostachyus* (SM), for biogenic synthesis of silver nanoparticles. The resultant colour changes indicating the synthesis of AgNPs were brown, yellow, and brown respectively. The AgNPs were characterized through UV-Vis spectroscopy, Fourier Transform Infrared Spectroscopy (FTIR), and Transmission Electron Microscopy (TEM). The UV-Vis spectrum from this work showed a strong absorption peak at 445 nm, 437 nm, and 430 nm for AgNPs mediated synthesis using leaf extracts of CO, TD, and SM respectively. Synthesized AgNPs were predominantly spherical in morphology with triangular and rod like shape also identified in CO AgNPs, with an average size of 27.48nm, 49.64nm, and 25.76nm for synthesized AgNPs using CO, TD, and SM respectively. The FTIR spectra of the reduced silver nanoparticles has absorption bands at 1637.99 cm^{-1} , 2062.27 cm^{-1} , and a broad peak between 3230.61 cm^{-1} to 3601.06 cm^{-1} for CO; 1641.16 cm^{-1} , 2062.27 cm^{-1} , and a broad peak of 3230.61 cm^{-1} – 3629.55 cm^{-1} for TD; 1637.99 cm^{-1} , 2059.10 cm^{-1} , and 3487.07 cm^{-1} for SM, indicating that carbonyl stretch of amides and stretching vibration of O–H functional group are important in the bio-reduction of AgNO_3 to AgNPs and subsequent capping and stabilization.

Keywords: Silver Nitrate, Silver Nanoparticles, Eco-friendly, UV-Vis, FTIR, TEM

GENETIC APPROACHES TO AMELIORATE HEAT STRESS CHALLENGES IN
LIVESTOCK

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ABSTRACT

Heat stress is one of the major negatively influencing factors for livestock production in the changing climate scenario. Heat stress could cause severe economic burden for the poor and marginal farmers especially in the tropical countries wherein livestock was considered a principal livelihood option. Thus it is of paramount importance in livestock sector to reverse the adverse impacts of heat stress. Such approach could help the farming community to ensure livelihood security for the poor and marginal farmers. There are several approaches to ameliorate heat stress impacts on livestock. This includes shelter management, nutritional interventions, genetic approaches as well as health management. Among these approaches, genetic approach offers the best possible permanent solution for heat stress associated economic loss in livestock sector. Intensive genetic selection could help to identify the elite animals for breeding program, which could help to develop more climate resilient breeds. The recent advances in molecular biotechnological OMICS tools such as metagenomics, transcriptomics and epigenetic changes studies offers greater scope to understand the molecular mechanisms governing livestock adaptation. The genome wide association studies (GWAS) and selection signature also offers scope for identifying genetically superior animals. These above listed molecular tools could help to revolutionize future breeding policies through identification of advanced biomarkers for heat stress. Such identified biomarkers could be used in Marker Assisted Selection (MAS) for developing more climate resilient breeds with potential to not only adapt to any adverse environment but also with the ability to produce optimally. Therefore, genetic approaches offer permanent solution to climate change associated livestock production by producing more heat resilient animals. The improved performance of such breeds in the changing climate scenario could help to optimize the economic return for the poor and marginal farmers of tropical regions.

Keywords: Adaptation; Climate resilience; Heat stress; GWAS; Thermo-tolerance

**TRANSPORTATION STRESS IN FARM ANIMALS: IMPACT ASSESSMENT AND
STRATEGIES TO AMELIORATE**

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ABSTRACT

Transportation is considered as important animal husbandry practice and paramount stressor having deleterious effects on health, growth, performance and productivity of livestock. Therefore the aim of this paper is to synthesise information on different types of transportation stress and its impact on production and health in livestock. Transport by sea involves lateral movements, noise, ammonia accumulation, weather extremes, poor ventilation and limited space. Stressors in road transportation includes; loading, confinement, vibration, noise, stakeholder attitudes, driving skills, road conditions, temperature extremes, food and water deprivation, mixing of unfamiliar animals and stocking density. Rail transport involves stressors like; repeated loading, high density confinement, lengthy waiting times, extended periods of feed and water deprivation, altered microclimatic conditions, mixing of animals, exposure to noxious gases, motion and loud noises. Animal's response to transportation stress creates complex interaction between neurons and hormones. Behavioural responses like vocalisation, aversion, freezing, frequent urination and defecation, aggressive and sexual behaviours; physiological responses like increased heart rate, panting score, respiratory rate, osmolality, free fatty acids, β -hydroxy butyrate, muscle tremors and urea; blood-biochemical and endocrine responses like increased total protein, albumin, PCV, cortisol, creatine kinase, lactate dehydrogenase, AST, ALT, vasopressin, epinephrine, norepinephrine, β -endorphins, ACTH, serum LPS, lactic acid, TNF- α , IL-1 β , IL-6, IL-10, IL-4, WBC, Monocyte, granulocyte %, MCHC, Platelets, etc. Different biomarkers of transport stress includes HSP90, HSP70, β -hydroxybutyrate, Haptoglobin, Fibrinogen, Cortisol, Dehydroepiandrosterone (DHEA), Cortisol : DHEA ratio, Testosterone, Progesterone, Total leukocyte count, Serum amyloid A, C-reactive protein, Apolipoprotein, Insulin-like Growth Factor-I and IGF-II and Insulin-like Growth Factor Binding Protein, Total antioxidant capacity, etc. The strategies to mitigate transport stress in farm animals include; nutritional manipulation, genetic selection, environment enrichment, habituation to human handling and biomarker-associated welfare indicators. These strategies when actively implemented might help a lot to reverse the economic loss incurred through different transportation stressors in farm animals.

Keywords: Animal welfare; Biomarkers; Genetics; HSPs; Transport stress

GENERATING ELECTRICITY FROM ALGAE & SEVERAL DIFFERENT PLANTS

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ABSTRACT

Algae have attracted much interest for production of bioactive compounds, biofuel and foods recently. In this paper, The principle idea is that plants excrete rhizodeposits from roots, mostly in the form of carbohydrates, and the bacteria convert these rhizodeposits into electrical energy via the fuel cells. Some fundamental investigations are established to demonstrate the potential of harvesting electrical energy from algae and living plants. The basis of work to convert solar energy into electricity is based on cooperation and interaction between plants and bacteria using microbial-plant fuel cells. These cells are able to absorb the energy from interactions in the area close to the root of the plant (rhizosphere) produced as a result of the activity of existing microorganisms and convert to electrical energy after transferring to the cells. The energy is harvested by embedding electrodes into the plant to allow flow of ions and hence generate electricity. By conducting experiments in which we used the combination of zinc and copper, we can create the highest voltage in the future and generate electricity from living plants.

Keywords: Algae, energy harvesting system: living plants, organic energy, green electricity

DEVELOPMENT OF AN ELECTRICAL HEATER FOR PROTECTING TREE IN WINTER

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ABSTRACT

When woody plants are subjected to a sudden large drop in temperature, injury or even death of plants can occur. An electrical heater unit designed for cold protection tree in winter. It made up from three layers. Material of middle layers was from glass wool and two outer layers were from waterproof rubber covering. Thermal wires were placed inside the layers. Electrical heater of tree could be used for trees with trunk diameter between 15 cm to 45 cm. The electrical heater around the trunk was wrapped, and then in a cooler chamber was placed. Tests carried out in five different temperatures (-8, -12, -15, -18 and -20 °C) with five replications. Essential power and voltage for this electrical heater was 54.6 W and 24 V. Tests results indicated that the tree heater kept trunk in temperature 20, 19, 18, 15 and 14°C while cooler chamber temperature was -8, -12, -15, -18 and -20°C, respectively.

Keywords: Tree heater, Tree injury, Electrical heater, Cold climate, Low temperature.

SOIL ADHESION REDUCTION BY THE ELECTRO-OSMOTIC METHOD

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ABSTRACT

Today, the development of high-efficiency tillage implements which can meet the requirements of modern agriculture in energy consumption is a matter of great importance. Therefore, using bionic electro-osmosis technology inspired from the body surface of soil burrowing animals in design and construction of soil-engaging tillage implements for soil adhesion reduction has gathered the attention of researchers in the last two decades. In this study, a soil-engaging plate with optimized operational parameters is introduced. Experimental results showed that reduction of soil adhesion was the most for the plate with 1/4 positive/negative electrode area ratio, and applying 24 V for 30 s to the electrodes. Results also revealed that by using bionic electro-osmosis technology, plates' soil adhesion reduced by 29.8% to 90% compared with conventional plates. Results of this study can be used for the design and development of high-efficiency soil-engaging implements for power-consuming agricultural field operations.

Keywords: bionic tillage implements; soil adhesion; electro-osmotic plates; soil.

HEAVY METALS IN HEN EGG, AMOUNT AND HAZARDS

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ABSTRACT

Eggs are rich in protein and essential minerals, they are economically affordable and widely used in different societies, and since they are consumed by almost all age groups, they are an indispensable part of the breakfast basket. (1)

Egg is known as the largest biological cell that is formed by single cell division, contained momentous macronutrients suchlike protein and lipids with high digestibility and also micronutrients suchlike vitamins and minerals that satisfy all the necessities to patronage fetal growth until hatching(2). As it collects essential lipids, proteins and vitamins and also minerals, and rare ingredients, an egg has a balanced calorie source (About 140 kcal per 100 grams) and has excellent culinary potential as well as nether economic expense. Eggs are known as the undermost-cost animal source of protein, vitamin B12, iron, vitamin A, choline, riboflavin, and the second minimum costly origin of calcium and zinc (3) In addition to preparing nutrients appropriate for almost any age, eggs consist countless of biologically active ingredients (2, 4, 5) Eggs proteins are high quality proteins and are used as a golden standard for measuring the quality of other food proteins (6, 7) Although a small level of egg proteins are not assimilated Especially if it is consumed raw, egg components are stated to be highly digestible (8, 9) In edible parts of egg ,the antimicrobial compounds are mainly concentrated in egg white and the vitelline membrane.(1)

According to the report of the World Health Organization, eggs are a necessary part of the diet, but due to economic issues, its consumption is more than other sources of animal protein(10, 11), and also according to the WHO statement, the consumption of 60 grams of eggs is an average of 2 or 4 times a week. It is recommended for the need of 2100 kcal(12) The normal annual per capita utilization of hen eggs within the world is 250 Kg. In any case, per capita, egg utilization among family units in Tehran is much lower than the prescribed guidelines (11) Iranians expend around 198 kg of eggs annually, in spite of being the eleventh-largest egg maker within the world(10)Average egg consumption per year/capita in the world ranges from 62 (India) to over 358 (Mexico) (13) and in African countries it is even lower (36 eggs per year/capita) (14)

The issue of a relationship between egg consumption and an increase in plasma cholesterol dose and therefore an increase in the risk of CVD has existed for 50 years, while now, as most clinical, experimental and epidemiological studies have not provided any evidence for this connection, this limitation of Most national dietary recommendations have been removed(3).

It has been suggested by several authors that egg cholesterol is not well absorbed, so egg consumption does not have a significant effect on the concentration of blood cholesterol (15, 16).

Although it is now well established that egg consumption helps overall health among life span(17) by correcting nutrient deficiencies(18), it should be noted that adults should not ignore the global cardiovascular risks, genetic desire to heart attacks, and altogether dietary habits while consuming egg yolk indiscriminately(19) . and in addition, people who is suffering from metabolic disturbances such as high blood pressure, diabetes, and hypercholesterolemia should be careful in consuming dietary cholesterol (15, 16).The antioxidant properties of eggs can be found in many egg lipids such as phospholipids and many egg proteins such as ovalbumin, ovotransferrin and phosphotin, and also in certain micronutrients suchlike carotenoids, vitamin E, vitamin A and selenium. On the other hand, eggs can be enriched with antioxidants such as iodine, carotenoids, vitamin E and selenium through manipulation of poultry feed.(6) In parallel with the concern about the risk of egg cholesterol, egg allergy was raised. It usually brings up in the first five years of life, in 50% of children egg allergy grows sooner

by three years (20, 21). Fortunately, in many cases, the outbreak of egg allergy reduces with age (22) and usually resolves by school age. (1) According to the mentioned cases, the health and safety of eggs is very important. Eggs can be contaminated with heavy metals during production or consumption.

A collection of eight heavy metals containing Cd, Pb, As and Hg according to the EPA (Environmental Protection Agency) are most prevalent in the environment (23). Heavy metals are known as the most hazardous contaminants category in the Globe and are playing an important role between diverse contaminants due to their indestructible nature, ecological dangers, toxicity and The nature of biogeochemical recycling. (24, 25) As they are non-degradable, they spread progressively in water and underground soil and have a long persistence quiddity and can accumulate and magnify along the food chain (24) They can have carcinogenic and non-carcinogenic results and afford various harmful health results with relentless after effects. (26) Their relentless complications are caused by skin contact, aspiration and Swallowing routes, from water and soils (23).

All people are threatened in different ways due to their prevalence in environment, as mentioned earlier, in food, water and air. According to the study of Sylwia Borowska et al., heavy metals such as Al are present and are highly concentrated in cosmetics produced in different countries, including countries with strict legal restrictions (27). However, Diet intake and food chain routes are the main sources of toxic heavy metal reposition in humans (28) such as cadmium that is mainly exposed by diet while smoking cigarettes is a related source (29-31). When metals enter the food chain of human, after ingestion, Heavy metals are converted to their stable oxidation condition in the acidic environment of the stomach, which then incorporates with proteins and enzymes (32) to the human body accumulates.

According to Das et al.'s study on the main Indian carp, heavy metals can cause oxidative stress in organisms (33).

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**COVID-19 AWARENESS, ATTITUDES AND PRACTICES AMONG RESIDENTS OF THE
ASIR IN SAUDI ARABIA**

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ABSTRACT

The coronavirus disease 2019 (COVID-19) pandemic has spread to over 213 countries worldwide, causing serious respiratory disease. This study aimed to evaluate the level of awareness, attitudes, and knowledge of COVID-19 among the population of the Asir region in order to propose concrete recommendations for managing pandemic.

A cross-sectional survey was conducted online using Google Forms.

A total of 563 participants from the Asir region were recruited. Information regarding their COVID-19 knowledge, attitudes, and practices was collected and analyzed.

Most participants demonstrated a moderate knowledge of COVID-19. Age, education, and employment were significantly associated with knowledge level. The respondents exhibited positive COVID-19 attitudes and practices. Approximately 89% of respondents believed that regular handwashing with soap and water helps prevent infection, and 96.8% believed that social distancing is essential for stopping the outbreak. We noticed that most participants, especially females, had good practices such as mask wearing and handwashing.

These findings reflect the participants' high levels of knowledge of COVID-19, which indicates that Asir's residents are very careful in their daily habits and practices. Nonetheless, there is a need to ensure that awareness, healthy attitudes, and practices are strongly inculcated among all communities.

EATING PATTERNS AND HEALTH BENEFIT SCORE ZONE OF UNIVERSITY
STUDENTS IN SAUDI ARABIA

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ABSTRACT

Introduction: Food plays a vital role in the maintenance of good health and both in prevention and cure of diseases. Food is considered a natural body defender against different diseases, and it keeps the body healthy. The lifestyles always have a great influence on the both health and food consumption. University students represent a major segment of the young adult population. Young adults, in consideration of important lifestyle changes, are arranged to negatively modify their way of eating. Hence, this study aims to assess the eating Pattern and Health benefit zone of nursing students at the college of applied medical science.

Materials and Methods: A descriptive study with a total of 140 students who were undergoing a 4 years of BSc nursing program at the College of Applied Medical Sciences, King Khalid University (KKU), Saudi Arabia was carried out during the 2022 academic year. The subjects recruited using convenience sampling and data were collected using a Healthy Eating Assessment questionnaire -10 items via online survey. The responses obtained were subjected to statistical analysis using SPSS.16.0 version.

Results: 43% of students were eating the 3 times a day fast/fried food/or packaged snacks high in fat/salt/or sugar. regular soda, sweet tea, juice, energy/sports drinks, sweetened-coffee or other sugar sweetened beverages 36% of students drinks 2-3 times a day. 60% eats (not low-fat) snack chips or crackers 2-3 times/day, sweet foods (not the low-fat kind) or desserts, like chocolate or ice cream, and other sweets 47% of them eats one time /day. The mean health benefit score is 30.41 and the overall 60% of students in good health benefit score zone also 3.5% in the excellent category whereas 3.5% in needs improvement category zone.

Conclusion: The students belong to needs improvement category health benefit score must take necessary action plan for eating healthy that fits your lifestyle to prevent chronic diseases.

Keywords: Eating pattern, Health benefit score zone, nursing students

**PLASMA AS A PROMISING TECHNOLOGY IN THE FOOD SYSTEMS: STATE OF THE
ART AND NEW TRENDS**

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ABSTRACT

The growing demand for nutritious, fresh, safe, and "minimally-processed" foods has prompted research in burgeoning non-thermal food processing techniques. A number of possible uses for cold plasma in the food industry make it a really cutting-edge and exciting technology. It employs highly reactive, energetic, and charged gas species and molecules to cleanse food surfaces and packaging while preserving foods without compromising their nutritional value or quality. The inactivation of microorganisms in the food industry with cold plasma technology has shown encouraging results without degrading food quality. Despite the need for the substantial study, it is quite successful in cleaning fruits and vegetables' surfaces. Recent patents have mostly centered on using cold plasma to treat and preserve food. However, more research is imperative to scale up this technology for commercialization in the future and to comprehend plasma physics for improved outcomes, expanded applications, and benefits. The current uses of cold plasma in the food sector to improve food quality and increase shelf life are reviewed in this paper. Additionally, it provides an outline of the ideas and mechanisms behind plasma formation.

Keywords: Cold plasma; Emerging technology; Food preservation; Food processing

IN-VITRO CATALYTIC AND ANTIBACTERIAL POTENTIAL OF GREEN SYNTHESIZED
CUO NANOPARTICLES AGAINST PREVALENT MULTIPLE DRUG RESISTANT
BOVINE MASTITIS STAPHYLOCOCCUS AUREUS

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ABSTRACT

Nanoparticles prepared from bio-reduction agents are of keen interest to researchers around the globe due to their ability to mitigate the harmful effects of chemicals. In this regard, the present study aims to synthesize copper oxide nanoparticles (CuO NPs) by utilizing root extracts of ginger and garlic as reducing agents, followed by the characterization and evaluation of their antimicrobial properties against multiple drug resistant (MDR) *S. aureus*. In this study, UV-vis spectroscopy revealed a reduced degree of absorption with an increase in the extract amount present in CuO. The maximum absorbance for doped NPs was recorded around 250 nm accompanying redshift. X-ray diffraction analysis revealed the monoclinic crystal phase of the particles. The fabricated NPs exhibited spherical shapes with dense agglomeration when examined with FE-SEM and TEM. The crystallite size measured by using XRD was found to be within a range of 23.38–46.64 nm for ginger doped CuO and 26–56 nm for garlic-doped CuO. Green synthesized NPs of ginger demonstrated higher bactericidal tendencies against MDR *S. aureus*. At minimum and maximum concentrations of ginger-doped CuO NPs, substantial inhibition areas for MDR

S. aureus were (2.05–3.80 mm) and (3.15–5.65 mm), and they were measured as (1.1–3.55 mm) and (1.25–4.45 mm) for garlic-doped NPs. Conventionally available CuO and crude aqueous extract (CAE) of ginger and garlic roots reduced MB in 12, 21, and 38 min, respectively, in comparison with an efficient (100%) reduction of dye in 1 min and 15 s for ginger and garlic doped CuO NPs.

Keywords: bactericidal potential; CuO; nanoparticles; dye degradation; MDR

DEVELOPMENT OF EDIBLE FOOD PACKAGING FILMS FROM FINGER MILLET STARCH

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ABSTRACT

The physicochemical and structural features of three different types of finger millets grown in Uttarakhand, India, were examined using the alkali soaking method. Each variety contain 78 %, 79%, and 87 % starch, with amylose concentrations of 39.03 %, 37.2 %, and 33.5 %, respectively. The XRD study revealed that extracted starch possessed a typical A-type crystalline network with 17.7–19.3% crystallinity, which significantly affected the starch's retro gradation tendencies. The SEM images disclosed that isolated starch granules have a polyhedral form and a smooth exterior. Finger millet starch offers significant promise for the creation of edible films and coatings made from starch. In the present study, extracted finger millet starch was investigated in an effort to create a thin and flexible food packaging film. Thereafter sorbitol was added in the film and the results of thermal gravimetric analysis and differential scanning calorimetry reveal that sorbitol increases the thermal stability of the FMS film. Based on the findings, it was determined that the manufactured films possessed excellent functional properties, such as swelling index, solubility, and water vapour permeability, which could replace petroleum-based non-biodegradable packaging materials, extend the shelf life of food materials, and improve food quality overall.

Keywords: Thin film, Finger millet starch, Food packaging film

**DISTRIBUTION ROUTES OF THE INVASIVE ALIEN SPECIES *I. GLANDULIFERA*
ROYLE IN THE ISKAR RIVER GORGE BETWEEN PLANA AND LOZENSKA
MOUNTAINS (SOUTHWESTERN BULGARIA)**

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ABSTRACT

The object of study is the spread of the invasive alien species *Impatiens glandulifera* Royle in a section of the Iskar River and its tributaries near the capital Sofia. The study area is 400 km², of which about 0.2% is occupied by the *Impatiens glandulifera* populations. The investigation was conducted in the period 2019-2022. The beginning of the *I. glandulifera*'s spread in the studied territory is not through the main stream of the Iskar River, but through one of its tributaries - the Vedena River. At the current stage, this IAS is not distributed in Bulgaria through the commercial network, its populations are distributed naturally. A clearer legislative framework is needed regarding the prohibitions and measures related to the trade in IAS on the territory of the country.

Key words: Invasive plants, spread, populations, river vegetation

Introduction

Invasive alien plant species (IAS) invade many ecosystems worldwide, often having substantial negative effects on ecosystem structure and functioning (Higgins, Richardson, 1996). Research on the distribution of IAS and their pathways of introduction is essential for understanding and tackling the invasion process (Sîrbu et al., 2022). Our ability to predict the spread of IAS is largely based on knowledge of previous invasion dynamics of individual species (Capinha et al., 2022).

Himalayan balsam (*Impatiens glandulifera* Royle) is a highly invasive plant and considering the extend of its spread since its introduction to Europe from the Himalayas in 1839, there is an abundance of lessons which can be learned from studying the invasion of this IAS (Coakley, Petti, 2021). The species is in the list of Regulation (EU) No 1143/2014 of the European Parliament and of the Council of 22 October 2014 on the prevention and management of the introduction and spread of IAS

In Bulgaria *I. glandulifera* was first recorded in 1978, and its distribution was subsequently established in the Forebalkan, Balkan Range (Central), Sofia Region, Vitosha Region, Znepole Region, Valley of River Struma, Valley of River Mesta, Rila Mts, Mt Sredna Gora, Rhodopi Mts, Thracian Lowland, up to about 1500 m a.s.l. (Petrova et al., 2013).

The purpose of the present publication is to investigate the main distribution routes of the *I. glandulifera* populations in one of the biggest localities of this IAS in Bulgaria- the area of Iskar river gorge between Plana and Lozenska mountains.

Materials and methods

The investigation was conducted in the period 2019-2022. The object of study includes the section of the Iskar River and its tributaries between the villages of Pancharevo and Dolni Pasarel close to the capital Sofia (Southwestern Bulgaria) (Fig. 1). The study area is approximately 400 km², of which about 0.2% is occupied by the *I. glandulifera* populations (Glogov, 2021). The altitude is between 650-1100 m a.s.l. Средната годишна сума на валежите е 590.7 mm. Максималната средна месечна температура е през юли (21.5°C), а минималната през м. януари – 1.5°C. Soils are Fluvisols according to World Referent Base of Soil Resources (WRB, 2014).

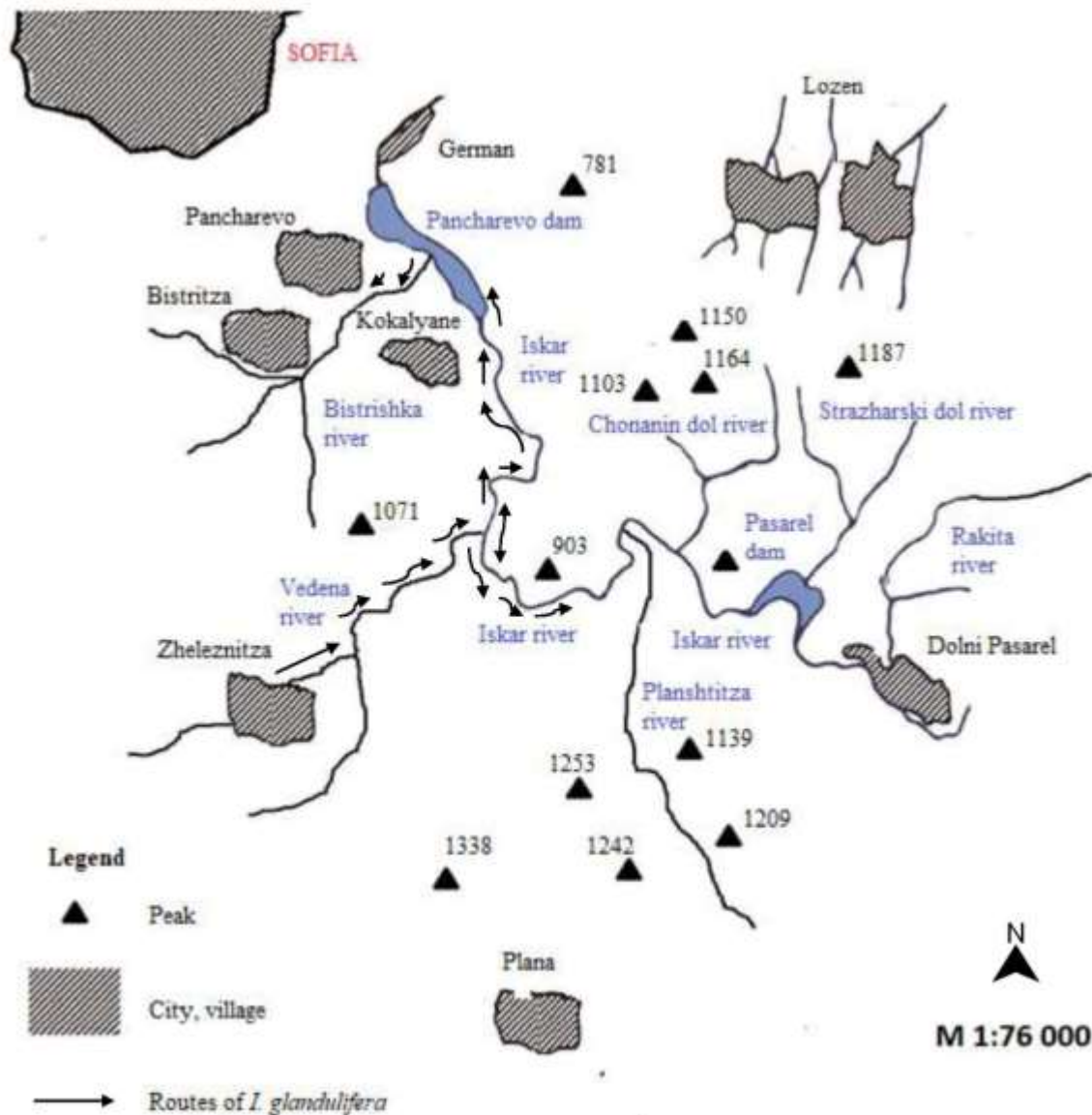


Fig. 1. Map of the study area

The Research methods include:

1. Reference based on literary sources, including scientific publications and citizen science data.
2. Field monitoring of the distribution of *Impatiens glandulifera* populations
3. Conversations with residents of the villages in the study area.
4. Filling out a questionnaire during the meetings with plant business representatives (flower exchanges, garden centers and flower shops) in the study area and the capital located in the immediate vicinity. In addition, the most frequently sold IAS were identified from the catalogs and stands of the companies

Results and discussion

The results of the present study, which tracked the distribution of *I. glandulifera* populations along the Iskar River and its tributaries (fig. 1), show the following: Localities of the species were found in Zheleznitsa village and along the entire length of the Iskar tributary - the Vedena River. The plant has not been found in the Bistriza village, but its localities are observed in the lower part of other Iskar tributary- the Bistriska River near its mouth in the area of Pancharevo village.



Fig. 2. Locality of *I. glandulifera* in the study area (photo: P. Glogov)

The distribution of *I. glandulifera* along the Iskar River is limited in the section Pancharevo-Devil's bridge (the mouth of the Vedena River). After the Dolni Pasarel village on the road to Samokov, along the Iskar river, no localities of this IAS are observed at the current stage. However, they are found on the banks of another of the tributaries of the Iskar river - the Okolska River, where they were most likely spread unintentionally by the cars of fishermen or tourists.

In the end, it could be assumed with great probability that the spread of *Impatiens glandulifera* along the Iskar river in the study area started from its tributary- the Vedena river. Another evidence in favor of this statement is the fact that the first information about the presence of a population of *I. glandulifera* comes from a study by Assyov, Vassilev (2004), who established the species in the Vitosha floristic region, on the banks of the Vedena River in the Zheleznitsa village.

The present survey on the distribution of *I. glandulifera* in the study area found that this species is rarely cultivated intentionally in the gardens of local villages and cottage areas. According to the local people, Himalayan balsam has established itself using the river flow and has displaced valuable economic and ornamental plants. And every year most of them take measures individually to eliminate it. Tourists are encountered who in July and August (the months in which the plant bears fruit) pick the inflorescences for bouquets without knowing about the invasive influence of Himalayan balsam and without realizing that in this way they are inadvertently helping its spread.

Meetings with questionnaire were conducted with 3 flower exchanges, 31 flower shops and 12 garden centers. The responses to the survey questions were as follows (Table 1):

Table 1. Summary of questionnaire responses from local representatives of business with plants

Question	Yes	No
Do you currently sell <i>I. glandulifera</i> ?	0%	100%
Have you ever sold this particular species of genus <i>Impatiens</i> before ? (incl. Was it ordered by a customer?)	0%	100%
Do you sell other <i>Impatiens</i> species?	100%	0
Have you heard of invasive alien plants?	67.4%	32.6%
Do you have any idea which of the plant species you sell are IAS?	23.9%	76.1%

Other result from questionnaire show that 81.1% of all companies included in the survey use internet for the purchase and sale of plants, which confirms the data of Lecheva (2021) that internet trade is the most preferred option for the import of seeds and the entry of IAS. In the assortment of companies engaged in the supply of decorative plants, there are other exotic species from the genus *Impatiens* (and their varieties), which at the present stage are not categorized as invasive, including *I. balsamina* L., *I. walleriana* Hook.f., *I. parviflora* DC and *I. hawkeri* W.Bull. Some of the garden centers offer for sale other IAS that occur near the study area such as *Buddleja davidii* Franch., *Opuntia humifusa* (Raf.) Raf., *Lupinus poliphyllus* Lindl. and *Helianthus tuberosus* L.

It is striking the high percentage of surveyed traders who do not know (or do not accept the fact) that some of the plants they sell are invasive and threaten biological diversity. Another part of them emphasize the beneficial properties of IAS - for example, some agro-exchanges sell invasive foreign species such as *Amorpha fruticosa* L., because of their honey-bearing qualities.

I. glandulifera and other IAS included in the list of Regulation (EU) No 1143/2014 cannot be intentionally bred, transported, reproduced or released into nature. The regulation was transposed into the Bulgarian Biodiversity Act (created 2002 and last amended in 2022), but in its provisions, the issue of trade in IAS within the country is not specified in sufficient detail at this stage, which does not lead to specific sanctions for traders.

Conclusions

The beginning of the *I. glandulifera*'s spread in the studied territory is not through the main stream of the Iskar River, but through one of its tributaries - the Vedená River.

At the current stage, this IAS is not distributed in Bulgaria through the commercial network, its populations are distributed naturally.

A clearer legislative framework is needed regarding the prohibitions and measures related to the trade in IAS on the territory of the country.

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ECONOMICS OF SELECTED VEGETABLES IN KHYBER PAKHTUNKHWA-PAKISTAN

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ABSTRACT

This study was carried out with the aim to compare the profitability of selected vegetables in district Peshawar, Pakistan. In the present study a total of 180 producers were randomly selected and interviewed for the collection of primary data. In the study area, the analysis of the collected data showed that maximum (36.7%) of the respondents fall in the age category of 50-59 years which was followed by (36.1%) by the age category of 40-49 years. In terms of education, the analysis revealed that the maximum (45.0%) of the respondents had primary education, followed by (31.7%) of the respondents which had education till middle. While in terms of tenurial status, the analysis of the collected data revealed that maximum (60.6%) of the respondents were tenants while only (39.4%) of the respondents were found owners. The results revealed that profit comparison in the study area turnip was the maximum profit generating vegetable in the selected vegetables which was recorded as Rs. 36,185.0/- while potato generated a total profit of Rs. 17,574.7/-. Similarly, tomato was found as the minimum profit generating vegetable in the selected vegetables generating a total profit of Rs. 14,396.6/- respectively. It is recommended that Government must focus on establishing markets at village level, so by minimizing the role of intermediaries will help farmers to generate more profit. The wholesale market may be monitored regularly by the Government officials, which will protect the farmer from exploitation and fraudulent practices. Proper metalled road and related necessary facilities are the dire need of time in the research area and ultimately it will reduce the marketing cost, hence facilitating the ultimate consumer.

Key words: Market, Efficiency Profitability, vegetables, Khyber Pakhtunkhwa

ASSESSING BIO-DIVERSE FOODS IN DIETARY INTAKE SURVEYS-A CASE STUDY
CONSIDERING RANDOM SELECTED SAMPLES

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ABSTRACT

This survey is based on expressing diet diversity indicators such as the diet diversity score (DDS) or food variety score as a reflection for dietary quality and measure the diversity of unique food groups and food items consumed, respectively. During our approach the questionnaires conducted in the period of 2022 and 2023 the DDS for women was a count of the total number of food groups consumed from a list of 10: (i) grains, white roots and tubers, and plantains; (ii) pulses; (iii) nuts and seeds; (iv) dairy; (v) meat, poultry, and fish; (vi) eggs; (vii) dark-green leafy vegetables; (viii) other vitamin A-rich vegetables and fruits; (ix) other vegetables; and (x) other fruits. For children, a seven food-group classification was used, including the following: (i) grains, white roots and tubers, and plantains; (ii) legumes, nuts, and seeds; (iii) dairy; (iv) meat, poultry, and fish; (v) eggs; (vi) vitamin A-rich fruits and vegetables; and (vii) other fruits and vegetables. Following references a 15-g minimum quantity consumed was considered as a cutoff for species inclusion in the DDS for women but not for children. The questionnaire considered 271 adult woman and 233 children. The Minimum Dietary Diversity (MDD) was used as a cutoff for higher nutrient adequacy and refers to a minimum of five and four food groups for women and children, respectively. The results shows that >50% of adult woman's have value of dietary species richness lower than 0.5, while in case of children's the average value was slightly higher (0.52).

Keywords: food diets, food diversity, consumption, children, woman, poverty

MONITORING THE OCCURANCE OF OCHRATOXIN A IN GREEN AND ROASTED
COFFEE IN IRAN-SHIRAZ MARKET BY USING HPLC-FLD

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Introduction: Ochratoxin A (OTA) is a type of mycotoxin that is a secondary metabolite of *Aspergillus* and *Penicillium*, with nephrotoxic and nephrocarcinogenic potential. In the national standard of Iran, the MRL of OTA in roasted beans and coffee powder is 5 ppb, instant coffee and instant coffee blend powder is 10 ppb and green coffee beans are 15 ppb.

Methods: In this study, the extraction of OTA in 27 samples of green coffee beans and roasted coffee were performed using an immunoaffinity column and analyzed with HPLC-FLD. The validation parameters of specificity, selectivity, linearity, limits of detection (LOD) and quantification (LOQ), precision (variability within and between days), were checked.

Results: The results of linearity were calculated based on the standard curve and correlation coefficient of 0.9999. Accuracy was 98 ± 2.3 and the recovery rate was in the range of 10.3 to 104.3% for 3 concentration levels in the tested samples. The LOD was 0.046 ppb and the LOQ was 0.138 ppb. Based on the results of this study, the average value of OTA in 27 samples of green coffee and roasted coffee is 1.65 ± 1.25 ppb. All coffee samples had permissible values and only the amount of contamination in one sample of roasted coffee exceeded the permissible level and was equal to 5.46 ± 1.23 ppb.

Conclusion: The possibility of more intake of OTA can be a serious threat for who drink a lot of coffee. Although Iran is not one of the coffee producing countries, but due to the increase in its consumption this study has been conducted to determine the amount of OTA in coffee in Iran. These results show that imported coffee products in Iran are well controlled by the Health and the Food and Drug Organization before distribution at the supply level.

Key word: Ochratoxin A, Coffee, HPLC, Mycotoxin, Validation.

PROBIOTIC EDIBLE FILM WITH AQUEOUS CLOVE EXTRACT

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ABSTRACT

Incorporation of milk powder containing aqueous clove extract (ACE) with probiotics in edible film can offer health advantages. In addition, the antimicrobial functional properties of probiotics and ACE can bring many benefits. Probiotic edible films' functional and nutritive properties have not been sufficiently studied. An innovative method for incorporating probiotics into food matrices is to add them to edible film, which can help to improve their stability and functional properties. This study aimed to develop a probiotic edible film with antibacterial effects against *Klebsiella pneumoniae* and *Pseudomonas aeruginosa* using probiotic strains (*Streptococcus thermophilus* ATCC 19258, *Lactobacillus bulgaricus* ATCC 11842 and *Lactococcus cremoris* L105, respectively). Milk powders containing 7.5% (w/w) ACE with different probiotic strains were added with 2% (w/v) pectin biopolymer and 60% (w/w) glycerol plasticizer to prepare a probiotic edible film with ACE. The disc diffusion and pour plate methods were used to investigate the antibacterial effect and viability of probiotic edible film, respectively. It is found that the edible film with *L. cremoris* and *S. thermophilus* had a higher viability of 8.13 ± 0.08 log cfu/mL and 8.09 ± 0.06 log cfu/mL respectively, than *L. bulgaricus* incorporated edible film. The edible film containing *L. cremoris* and *S. thermophilus* shows antibacterial activity of 13.33 ± 1.15 mm and 11.33 ± 1.15 mm against *P. aeruginosa*, and 11.67 ± 0.58 mm and 11.00 ± 0.00 mm against *K. pneumoniae*, respectively. ACE incorporated edible film with *L. cremoris* and *S. thermophilus* have higher antibacterial effect against *K. pneumoniae* and *P. Aeruginosa* than *L. bulgaricus* edible film. Further research is needed to optimize the method and conditions to produce synbiotic edible films on an industrial scale and evaluate their use in different food items.

Keywords: Probiotic edible film, *S. thermophilus*, *L. bulgaricus*, *L. cremoris*, viability, antibacterial

**HEALING EFFECTS OF A TEUCRIUM *POLIUM* CREAM ON EXPERIMENTAL
WOUNDS IN THE RABBIT**

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ABSTRACT

Being a natural barrier for protecting the human body, the skin should be treated with more natural products. Due to its protective role, it is exposed to various risks such as injuries, burns, radiation, cuts, tears, scratches and abrasions. The skin has repair mechanisms and healing of damaged tissue. In some cases, the healing can take time; for example, those patients with unhealed wounds are exposed to infections delaying more the healing. Current wound treatments are numerous such as laser, cosmetic surgery and the healing medicines. These treatments are expensive and can leave long-term sequelae. The solution is the use of natural methods such as the medicinal plants which can be an attractive alternative for the treatment of wounds and skin injuries. Many plants have healing properties on wounds. The medicinal plant “teucrium polium” is widely used by the Algerians healed the injured skin. For efficiency, this plant carries the Arabic name “el kayatta” which means the seamstress. The testimonies of users of this plant reported its outstanding efficiency to the rapid healing of the skin and without the undesirable effects. This plant has interested us for conducting a study whose objective is formulation of healing cream for superficial and deep wounds as well as burns. The TEUCRIUM polium plant is a plant widely used in Algerian herbal medicine for many uses such as healing. The TEUCRIUM polium plant grows in eastern Algeria and the picking period is from May to June. we prepared a hydrosol of the teucrium polium plant. The extracts were well preserved against bacterial growth. For this, the pH of each hydrosol has been adjusted with citric acid. Sodium benzoate (preservative) and potassium sorbate (preservative) were added. The Ph of the first plant was adjusted to 5.28 and the Ph of the second plant was adjusted to 4.91. The practical part started with the preparation of Fat phase; for this 6 g GELO 64 (emulsifier) and 2 g Cytalic alcohol (viscosifier). This preparation was heated on the hot plate. We put in a beaker 83 of water and 3g of glycerin (moisturizer). 0.25 g of sodium benzoate (preservative) was added. The 0.4 g xanthan gum (gelling agent) was also added and the whole was mixed. We then heated it on the hot plate up to 70°. The preparation was cooled to 45C°. We mixed a second time and added the extract of the TEUCRIUM polium plant 10%. We mixed well and adjusted the pH to 4.2 with citric acid. The preparation was covered with aluminum foil and the emulsion was then observed under a microscope. After the observation and analysis, it was confirmed that the preparation of the cream was successful. We tested the cream on young and big rabbits. We found that it healed the wounds completely.

**CHEMICAL, PHYSICAL, ELECTRICAL, OPTICAL AND MAGNETIC PROPERTIES OF
CANCER CELLS AND MODULATION IN THESE PROPERTIES FOR CANCER THERAPY**

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ABSTRACT

There are numerous obstacles to overcoming in the field of cancer therapy nowadays. But now that it has these properties, it may be used as a potent tool in the fight against cancer. The biomedical industry might greatly benefit from these characteristics. The medical community of the 16th century believed that magnets might be utilized to cure or prevent illness. Cancers vary greatly from patient to patient, from tissue to tissue, from cell to cell, and even down to the molecular level. Because of this multi-scale heterogeneity, it is very difficult to develop effective treatments that can not only tell cancerous from healthy tissue but also efficiently target the wide variety of tumor sub-clones. Most treatments either take advantage of a specific biological characteristic shared by cancer cells (such as a propensity for rapid division) or aimlessly eradicate every single cell in the area of interest. In this article, we will review the physical, chemical, electrical, optical, and magnetic properties of cancer cells, as well as the modulation of these properties for cancer therapy, and we will discuss how these characteristics are currently targeted or may one day be targeted to improve cancer therapies. It can be concluded from the literature survey.

Keywords: Cancer Cells, electrical stimulation, Magnetic Field, Cancer Treatment, Electrochemotherapy

SILVER NANOPARTICLES FORMULATION ENCAPSULATED BY MUCILAGE
HYDROGEL FOR SUSTAINED RELEASE OF DRUG

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ABSTRACT

The peels of avocados are commonly discarded, not knowing their potential use. In the current, Ultrasound assisted extraction of bio actives was performed from avocado peel and used as green matrix for silver nanoparticles formulation encapsulated by *Phoenix dactylifera* mucilage thus, loaded on dressings for sustained release to heal wounds. Peaks between 300-330 nm and 218.5 nm divulged by UV/VIS spectra and HPLC chromatogram revealed the presence of number of bio actives e.g. phenolics, flavonoids and polyphenolic compounds having nutraceutical attributes not only in avocado peel but also in mucilage which were used as both reducing and stabilizing agent for silver nanoparticle formulations. Another intense peak due to surface plasmon resonance was disclosed at 420 nm confirming the uniform and mono dispersed silver nano particles formulation with an average size of 208.5 nm as detected by zeta sizer. Extract and mucilage exhibited number of peaks in the region of 4000 cm⁻¹ to 650 cm⁻¹ whereas nano formulation displayed somewhat different behavior towards IR radiation absorption. Silver nano particles formulation exhibited optimal efficacy of quenching free radicals (65.27 ± 0.82). The efficacy of the developed nanoparticles loaded on dressings was evaluated against pus cell bacteria. Bactericidal effects were detected against *E. coli* and *P. vulgaris* with inhibited zones calculated up to 18.66 & 14.01 mm respectively. *E. faecalis* was inhibited maximum by extract upto 19.66 mm whereas mucilage and AgNPs revealed maximum resistance in the range of 10.66-13.0 mm. *K. pneumoniae* and *E. coli* were more sensitive to nanoparticles dressings. All experimental samples disclosed safer act towards human blood cells and showed somewhat non-significant toxicity in the range of 2.11-7.59 % in comparison to positive control Triton X (100) (82.13%).

Keywords: Avocado peel, mucilage, silver nano particles, pus cell isolates

MEASURING FARM ANIMAL EMOTIONS—SENSOR-BASED APPROACHES

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ABSTRACT

Understanding animal emotions is a key role to unlocking methods for improving animal welfare. Currently there are no ‘benchmarks’ or any scientific assessments available for measuring and quantifying the emotional responses of farm animals. Using sensors to collect biometric data as a means of measuring animal emotions is a topic of growing interest in agricultural technology. Here we reviewed several aspects of the use of sensor-based approaches in monitoring animal emotions, beginning with an introduction on animal emotions. Then we reviewed some of the available technological systems for analyzing animal emotions. These systems include a variety of sensors, the algorithms used to process biometric data taken from these sensors, facial expression, and sound analysis. We conclude that a single emotional expression measurement based on either the facial feature of animals or the physiological functions cannot show accurately the farm animal’s emotional changes, and hence compound expression recognition measurement is required. We propose some novel ways to combine sensor technologies through sensor fusion into efficient systems for monitoring and measuring the animals’ compound expression of emotions. Finally, we explore future perspectives in the field, including challenges and opportunities.

Keywords: animal emotions; animal welfare; behavior; sensors; precision livestock farming; farm animals; animal-based measures

INVESTIGATION OF THE ANTI-INFLAMMATORY ACTIVITY AND NUTRITIONAL
VALUE OF THE LEAVES OF *CALOPOGONIUM MUCUNOIDES*

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ABSTRACT

Calopogonium mucunoides is frequently used in south-eastern Nigeria to treat various conditions, including aches and pains. The clinical symptoms of many diseases like headache, fever, and other aches and pains related to various conditions are indirectly or directly because of an inflammatory process. The necessity for the quest for less expensive and safer anti-inflammatory medications stems from the fact that most existing anti-inflammatory drugs are linked to adverse side effects. In this work, *in-vitro* and *in-vivo* models were used to evaluate the nutritional value and anti-inflammatory properties of the ethanol extract of *Calopogonium mucunoides* leaves (EECML). Studies on EECML's *in-vitro* anti-inflammatory effects were carried out in this work using the Inhibition of platelet aggregation method, phospholipase-A₂ enzyme activity, egg albumin denaturation inhibition assay, and hypotonicity-induced membrane stabilization method. The plant extract's *in-vitro* antioxidant capacity and nutritional content were assessed using conventional biochemical methods. Twenty-five (25) adult male albino rats (weighing 120-160g) were split into five (5) groups of five (5) rats each for the *in-vivo* anti-inflammatory investigation. Groups 3, 4, and 5 received doses of EECML 100, 200, and 400 mg/kg body weight each, whereas Group 1 was left untreated and underwent induction. Group 2 received an indomethacin dose of 10 mg/kg body weight. The secondary metabolites of the plant contained flavonoids, saponins, glycosides, alkaloids, tannins, phenols, steroids, and terpenoids in various concentrations, according to qualitative and quantitative analyses of the plant. According to an acute toxicity test, the extract was safe up to 5000 mg/kg body weight. According to the findings, significant levels of antioxidant vitamins and minerals were found. Proximate analysis of EECML showed the presence of protein, carbohydrate, fat, crude fiber, ash, and moisture concentrations in respectable proportions. In the systemic rat paw oedema model, Egg albumin-induced paw oedema was considerably ($p < 0.05$) slowed down by higher dosages of the extract. The well-known anti-inflammatory medicine indomethacin (10 mg/kg b.w.) had comparable outcomes in preventing rat paw oedema brought on by egg albumin at 5 hours (84.25%). In addition, the extract substantially ($p < 0.05$) showed concentration-dependent DPPH (1-1diphenyl-2-picrylhydrazyl) radical scavenging action, similar to the widely used antioxidant ascorbic acid, at various doses (10-640µg/ml). Also, varying doses of the extract significantly ($P < 0.05$) inhibited platelet aggregation, phospholipase-A₂ activity, albumin denaturation as well as hypotonicity-induced hemolysis of red blood cells in a concentration-related manner, provoking inhibition comparable with the standard anti-inflammatory drug used. According to these results, the extract possesses significant anti-inflammatory and antioxidant activities and nutritional potential. Furthermore, the findings suggest that the plant extract may include anti-inflammatory compounds and be an inexpensive dietary ingredient source.

Keywords: Anti-inflammatory, *Calopogonium mucunoides*, nutritional composition, antioxidant.

**DURABILITY OF SUSTAINABLE CONCRETE SUBJECTED TO ELEVATED
TEMPERATURE**

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ABSTRACT

Fire poses serious threat to the life of structure and occupants, as it induces detrimental effects at structural level both short and long term. Keeping in view the importance of fire performance of concrete, various studies have carried out to evaluate the behavioral characteristics of concrete; various studies have carried out to evaluate the behavioral characteristics of concrete under such conditions. The safety and serviceable life of concrete structures after exposures to fire depend on two important factors i.e. residual strength and durability. Hence a review on the durability of concrete containing various mineral admixtures after being exposed to rising temperature is presented. Durability of concrete after fire exposure is measured through tests such as chloride ion permeability, water permeability, absorption and sorptivity. Thus the test methods and available literature has been summarized. However to properly understand the durability performance of fire exposed concrete structures constructed with sustainable concretes, a great deal of work is required in this particular domain.

Keywords: Groundwater, WQI, Fire, Concrete, Structures, Safety, Temperature and Sustainability.

FOOD SECURITY AND RELIGIOUS CONFLICT IN NIGERIA: CHALLENGING THE CHALLENGES

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ABSTRACT

This article examines how religious conflict threatens food security in Nigeria. Nigeria's rural areas are made up of mostly farmers, both commercial and subsistence. Most commercial farmers have little or no incentives from the state and federal governments. Most of these farmers make their living by farming, and this is what they used to train their children in former education. Unfortunately, the current religious conflicts caused by the activities of Fulani herdsmen have led to the deaths of many farmers and the destruction of farmlands. Most Fulani herdsmen go into people's farmland with their cattle, destroying people's crops. When the people try to resist or complain, they are killed. Although, literature has been written on religious conflicts in Nigeria, there is a paucity of literature on its relationship to food security and insecurity in Nigeria. Findings reveal that most women, men, and children have been made to flee their farmlands, which has led to the increasing cost of food crops in Nigeria. In fact, famine is ongoing in Nigeria due to food insecurity necessitated by the activities of Fulani herdsmen and farmer conflict. They seem not to be interested in issues of this nature. This study adopted a documentary analysis. Recommendations are discussed.

Keywords: food security, religious conflict, Nigeria, Farmers, Fulani herdsmen

**BaHPO₄ DEPOSITED ON DIFFERENT SUBSTRATES FOR THE ELECTRO-
DEGRADATION OF RHODAMINE B**

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ABSTRACT

A wide range of organic compounds are detected in industrial and municipal wastewater, which pose serious problems in the environment due to their resistance to biodegradation and traditional filtration processes. Advanced oxidation processes (AOPs) are favourable technologies that can generate radicals such as hydroxyl and sulphate radicals for the degradation of toxic substances in water due to their high degradation efficiencies, complete mineralisation capacity and environmentally friendly nature. Compared to other hydroxyl-based AOPs such as Fenton reactions and ozonation, electro-degradation and photo-electro-degradation have proven to be more cost-effective and environmentally friendly. The objective of this work is focused on the development of various phosphate-based catalysts and their use in the degradation of organic pollutants.

In this work, a facile method was performed to synthesise a new BaHPO₄ anode by a one-step electrodeposition technique. The anode is characterised by a variety of methods: structural (XRD), morphological (scanning electron microscopy coupled to energy dispersive X-ray spectroscopy SEM-EDX) and electrochemical. The electrocatalytic activity (EC) of the samples is determined by studying the degradation of Rhodamine B (RhB) as a model organic dye. The EC performance varied depending on the type of substrate.

Key words: Electrodeposition, BaHPO₄, Thin films, Dyes removal, Electrocatalysis.

GENETIC APPROACHES TO AMELIORATE HEAT STRESS CHALLENGES IN LIVESTOCK

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ABSTRACT

Heat stress is one of the major negatively influencing factors for livestock production in the changing climate scenario. Heat stress could cause severe economic burden for the poor and marginal farmers especially in the tropical countries wherein livestock was considered a principal livelihood option. Thus, it is of paramount importance in livestock sector to reverse the adverse impacts of heat stress. Such approach could help the farming community to ensure livelihood security for the poor and marginal farmers. There are several approaches to ameliorate heat stress impacts on livestock. This includes shelter management, nutritional interventions, genetic approaches as well as health management. Among these approaches, genetic approach offers the best possible permanent solution for heat stress associated economic loss in livestock sector. Intensive genetic selection could help to identify the elite animals for breeding program, which could help to develop more climate resilient breeds. The recent advances in molecular biotechnological OMICS tools such as metagenomics, transcriptomics and epigenetic changes studies offers greater scope to understand the molecular mechanisms governing livestock adaptation. The genome wide association studies (GWAS) and selection signature also offers scope for identifying genetically superior animals. These above listed molecular tools could help to revolutionize future breeding policies through identification of advanced biomarkers for heat stress. Such identified biomarkers could be used in Marker Assisted Selection (MAS) for developing more climate resilient breeds with potential to not only adapt to any adverse environment but also with the ability to produce optimally. Therefore, genetic approaches offer permanent solution to climate change associated livestock production by producing more heat resilient animals. The improved performance of such breeds in the changing climate scenario could help to optimize the economic return for the poor and marginal farmers of tropical regions

Keywords: Adaptation; Climate resilience; Heat stress; GWAS; Thermo-tolerance

DETERMINATION OF SOME PHYSICOCHEMICAL PARAMETERS AND SOME HEAVY METALS IN WATER SAMPLES FROM RUMA RIVER, MALLAMAWA RIVER AND JIBIA DAM IN KATSINA STATE, NIGERIA

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ABSTRACT

This research is focused on the heavy metal levels Analysis of water and in fish samples from Jibia dam, which were determined during the wet and dry seasons Using standard procedures. The results obtained showed that the heavy metals determined were generally higher in dry season than the wet season. The difference between them was found to be statistically significant, The concentration ranges of heavy metals determined in the water samples in mg/l were as follows; The mean concentration mg/l) for chromium , copper, iron, lead and zinc ranged between 0.020 ± 0.001 and 0.36 ± 0.023 , and 0.07 ± 0.00092 , 0.086 ± 0.002 and 0.027 ± 0.0007 in the wet season for Jibia dam and values ranged between 0.74 ± 0 and 1.359 ± 0.0081 , 0.111 ± 0 and 0.087 ± 0.001 , 0.054 ± 0.001 in the dry season for Jibia dam. And the concentrations ranges in the fish samples in mg/kg where as follows; 0.73-0.908 for Fe, 0.66-0.81 for Cu, 0.44-0.71 for Cr, 0.34-0.65 for Zn and 0.20-0.66 for Pb, Fe>Cu>Cr>Zn>Pb in Jibia dam with concentrations being higher in the gill tissue when compared with the muscle tissues in both the tilapia and Bagrus during the Wet season. This falls below (WHO/SON) permissible limits for drinking water. The values obtained in this study, are comparable with those available in the literatures and some values were found to be above the permissible limits of WHO/FAO, 2010 while some where values were found to be within.

Keywords: Heavy metals, AAS, Jibia, Katsina, Nigeria.

LCMS STUDY OF THE INDIGENOUS FRUITS AND VEGETABLES OF INDIAN
HIMALAYAN REGION

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ABSTRACT

Phenolics of *Prunus avium*, *Cydonia oblonga* & *Malva neglecta* and carotenoids of *Taraxacum officinale* of the selected indigenous fruits & vegetables of Indian Himalayan region (IHR) have been characterized and analysed for the first time. Phenolics & carotenoids were determined by LCMS using a reverse phase C18 column. In *Prunus avium*, the phenolics like cyanidins, rutin, epicatechin & catechin were found. In *Cydonia oblonga*, the caffeoyl quinic acids were abundant. A total of 24 carotenoids were identified in *Taraxacum officinale*. The most important identified were (all-Z)- β -cryptoxanthin, antheraxanthin, (all-E & Z)-lutein, (all-E)-zeaxanthin and (all-Z)-violaxanthin. Hydrocarbon carotenoids found were (all-E)- β -carotene, (9Z)- β -carotene & (13Z)- β -carotene. In *Malva neglecta*, the major phenolics were quinic acid, chlorogenic acid, rutin, & gallic acid. This work will contribute to the development of scientific research about the bioaccessibility and bioavailability of phenolics & carotenoids for better understanding of the phenolics and carotenoids impact on human health.

Key words: Indigenous; Gradient; LCMS; Minor; Phenolics; Carotenoids.

**HIGHLY EFFICIENT SUN-LIGHT-ACTIVE CN/ BiC/SW NANOCOMPOSITES FOR
PHOTOCATALYTIC DEGRADATIONS OF DYES**

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ABSTRACT

In this paper, we synthesize by coprecipitation a recoverable photocatalyst CN/BiC/ SW nanocomposites, as a greatly effective visible-light-active photocatalyst, and they were characterized by XRD, EDX, SEM, UV – vis, and FT- IR analysis. Sun-light-convinced photocatalytic performances were studied by the degradation of dye as a pollutant. It was verified that the nanocomposites are effective in the reduction of e^-/ h^+ recombination via the matched relations between energy bands of CN, BiC, and SW semiconductors. The loftiest photocatalytic declination effectiveness was observed for the CN/ BiC/ SW nanocomposite after 1h of radiation by more than 90% degradation of MG, more than every semiconductor independently.

In addition, a mechanism for photocatalytic performances was proposed using reactive species scavenging trials and characterization results.

Keywords: nanocomposite photocatalyst; coprecipitation; degradation

MYCOFLORA CONTAMINATION OF DRIED SMOKED FISH FROM MARKETS IN
KADUNA, KADUNA STATE, NIGERIA

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ABSTRACT

Food preservation is a key component in ensuring food availability throughout the year. This is because some foods are seasonal, and others are perishable despite being available all year. Moulds are multicellular fungus that develop thin thread-like structures known as hyphae. They are widely spread and can be found wherever there is dampness. Fungi are a major source of food and feed spoilage. The study aims to investigate the mycoflora contamination of dried smoked fish from Kaduna, Kaduna State markets. A total of 20 dried smoked fish samples were obtained from marketplaces in Kaduna State's four local governments. Using normal microbiological protocols, the fish samples were tested for moisture content and fungal infestation. The samples' moisture level ranged from 5% to 10%. The fungal contaminated all 20 dried smoked fish. The fungal loads were found to be highest in the market in Igabi local government, at 1.65×10^4 to 18.16×10^4 cfu/g, and lowest in the market in Kaduna South, at 3.48×10^4 to 8.34×10^4 cfu/g. *Aspergillus niger*, *Aspergillus flavus*, yeast, and *Rhizopus* sp. were among the fungi found. The dried smoked fish tested from the markets in the four local governments were all contaminated with fungi that could be responsible for the degradation and subsequent development of toxins. As a result, it is strongly advised that fish preservation and packing be done carefully, particularly at the point of sale. This will decrease mould infestation and help to avoid food poisoning.

Keyword: *Aspergillus flavus*, dried smoked fish, mycoflora, *Rhizopus* sp.

**EFFECTS OF SACCHAROMYCES CEREVISIAE LIVE CELLS AND CULTURE ON
GROWTH AND PRODUCTIVE PERFORMANCE IN LACTATING NILI RAVI
BUFFALOES**

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ABSTRACT

An experimental work was conducted to evaluate the effects of *Saccharomyces cerevisiae* live cells and its culture on dry matter intake (DMI), milk yield, milk composition, body condition score, selected blood metabolites, feed conversion efficiency (FCE), nutrient digestibility, weight gain and economics of milk production in lactating multiparous Nili-Ravi buffaloes. In total, 20 buffaloes of age 5 years \pm 6 months and weighing 550 \pm 20 kg were selected and assigned to four dietary treatments (n=5 buffalo/treatment) under completely randomized design. The dietary treatments include treatment 1 (T1) control, treatment 2 (T2) 5g/head live yeast, treatment 3 (T3) 5g/head yeast culture, treatment 4 (T4) 10 g /head yeast culture per day for 60 days excluding 14 days as an adjustment period. The results indicated that T4 showed significant ($p<0.05$) improvement in DMI, milk yield and components, blood glucose, digestibility of nutrients and weight gain, while significant decrease in blood urea nitrogen as compared to other treatment groups. Body condition score was not affected among treatments. In conclusion, dietary supplementation of 10gram yeast culture significantly improved DMI, milk yield, milk composition, and digestibility.

Keywords: *Saccharomyces cerevisiae*; Yeast live cells; Yeast culture; Growth performance; Productive performance; Nili Ravi Buffalo; Digestibility

**EFFECT OF SPECIFIC SURFACE FOR REMOVAL OF METHYLENE BLUE DYE USING
TWO TYPE OF NATURAL SAND BEFORE AND AFTER GRINDING**

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ABSTRACT

The Sand is one of most abundant mineralogical material; it is the matrix of building materials. The sand used in this study is taken from the Assa region south of Morocco (fine sand) and second one in Zagora region (wide sand), both of them are using before and after grinding for removal the methylene blue dye. The analysis of fine sand and wide sand by X-ray diffraction, the fine sand is made of Quartz (SiO_2), Muscovite ($\text{K Al}_2\text{Si}_3\text{AlO}_{10}(\text{OH})_2$) and Albite, calcian ($(\text{Na}, \text{Ca})\text{Al}(\text{Si}, \text{Al})_3\text{O}_8$). The wide sand is composed of quartz, calcite ($\text{Ca Mg}(\text{CO}_3)_2$), albite ($\text{NaAlSi}_3\text{O}_8$) and dolomite ($\text{Ca Mg}(\text{CO}_3)_2$). The grinding is carried out using a ring mill, installed at the Laboratory of hydrogeology at the Faculty of Sciences of Agadir. The size of the particles obtained after grinding and less than $10\text{ }\mu\text{m}$. The grinding of the sand increases the specific surface the adsorbed quantities of methylene blue. For wide sand and fine sand, the quantities of methylene blue adsorbed are respectively 2.13 mg/g and 4.27 mg/g , after the grinding of these sands the quantities adsorbed increase. For wide sand powder, the value is equal to 4.267 mg/g and for fine sand powder, the value is 6.4 mg/g . We notice that the quantity adsorbed after the grinding of wide sand powder is twice as large and for fine sand powder, the quantity adsorbed is 1.5 times greater.

Keywords: Sand, X-ray diffraction, Specific surface, Methylene Blue.

WATER TREATMENT PROCESSES AND USED TECHNOLOGIES

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ABSTRACT

Water is very important resource required for the existence of human race. For drinking, fresh and clean water is required. Freshwater resources are severely reducing as a result of the growing population as well as using it for secondary activities like, cleaning, washing clothes and irrigation etc. One of the ways to cater drinkable water to human population is to reduce its use for secondary applications. Treatment of wastewater for removing hazardous contaminants from it is one of the techniques suggested by researchers so as to make it suitable for secondary applications. This paper reviews the stages of waste water treatment processes and various technologies used in waste water. Also, a monitoring system for waste water treatment plant has been proposed in this work. Sensing unit of the monitoring system consists of four sensors, namely, turbidity sensor, pH sensor, conductivity sensor and Oxidation-reduction potential sensor (ORP). For data processing an arduino mega 2560 has been considered and liquid crystal display (LCD) has been proposed as the display unit. In future the proposed monitoring system for waste water treatment will be implemented.

Key words: STP, water treatment plant (WTP), storage tanks, Aerobic, WTP sensors, and technologies.

I. INTRODUCTION

Variety of human activities directly or indirectly depend on sufficient supply of water. Water is directly required for drinking. By supporting aquatic life and irrigating crops, water resources contribute to the production of vital food. But the majority of the world's water supplies are contaminated by liquid and solid pollutants created by human settlements and industrial activity. A significant contributor for the water shortage is untreated waste water. Although there are several sewage treatment facilities, the majority of them are either not operating properly or are unable to handle the amount of water that is pouring in. In areas of dense population, this issue tends to get worse. The world's second-largest populous country, India, is a massive country with a high-water consumption rate. But the amount of water suitable for drinking in water bodies like lakes, rivers, ponds, etc. is rapidly diminishing. Thus, instead of using drinkable water for secondary applications like, irrigation, washing and etc. using treated sewage water may be a solution for overcoming the shortage of drinkable water.

Sewage water treatment plant has minimum of three tanks, namely, collection tank, aeration tank, and decan tank. Depending on the sewage inflow, there might be two in each category to increase the processing cycle. The sewage is physically filtered at the sewage treatment facility before being collected in a collection tank. To obtain adequate water for treatment, the collected sewage is then allowed to sit for a predetermined period of time. This water is then moved to the aeration tank, where it is combined with air that has been pumped in under pressure and swirled vigorously for 6 to 8 hours. This expedites the decomposition process and gets the water ready for the decan tank transfer. Prior to entering the final tank, the water is passed through sand and carbon filters, where the carbon filters out all organic contaminants and raises the oxygen content of the water to a usable level. This water is then moved to the decan tank, where it is kept to finish settling. There may be an additional settling tank between the decan and aeration tanks in many household plants to improve the filter [13]. This water should be left alone so that the contaminants can disperse and the water can be used.

Sewage that is being discharged from houses and businesses sometimes comprises a combination of food waste and human waste that is fed into the sewage system. This sewage needs to go through some kind of treatment to get the toxins out of the water before being immediately drained into large watersheds. The primary purpose of a sewage treatment plant is to treat home effluents, though it may also treat some industrial effluents. Production of solid waste that may be reused or disposed of is the

primary goal of sewage treatment, fluid waste stream that is environment-friendly, disposal of effluent that won't affect the environment. The main advantages of a sewage treatment facility include better public health, reduced environmental deterioration, and certainty of water availability for secondary applications.

II. LITERATURE REVIEW

Numerous studies have focused on wastewater treatment to raise the standard of water that can be used for secondary purposes. They talked about several controller types that can be applied to the control of the activated sludge process, oxygen control, the provision of good, high-quality effluent, etc. In this section, a brief overview of related works is presented.

Yi yang Wang [1] developed a controller for an activated sludge process. The primary goal of the work was to develop an adaptive fuzzy controller for the stabilization of complex nonlinear dynamic systems. For the same author had employed two strategies. Activated sludge model number 1 proved a better option than 4*4 model. This uses the fuzzy system as a nonlinear approximator, and an adaptive control was created to modify the parameters from the fuzzy sets to assure stability. In a 4*4 model, the plant has 4 state variables, 2 control inputs, and is paired with a mathematical model to determine the changes from the incoming wastewater, but a more complex model with more variables and actual inputs is used in the other model. The above two models cannot be used to generate a precise model of an activated sludge. Authors created the controller to address the issues present with the two models. The system's nonlinear portion has been roughly represented by fuzzy control, and adaptive control has been used to offer resilience against unidentified modelling mistakes and unidentified unbound disturbances.

To manage the level of Dissolved Oxygen (DO) in the sludge process of wastewater treatment, Xian Jun Du, et al. [2] designed a solution for it. Using a Proportional-Integral-Derivative (PID) controller, the amount of dissolved oxygen in an aeration tank is maintained at the ideal level. Due to the issue that the PID adjustment is made adaptive to unknown disturbances that are occurring in the system, it is challenging to regulate DO concentration to a specific level. "A radial basis function neural network based adaptive PID (RBFNNPID)" algorithm has been presented for managing the dissolved oxygen concentration in the activated sludge process in order to circumvent this issue. Decreased aeration energy while increasing the efficacy of wastewater treatment was achieved by using this approach. By modifying the parameters of PID controller, an ideal control effect on DO concentration control was attained by authors attained. This method has superior tracking, robustness, and anti-disturbance characteristics when compared to PID controllers for controlling DO concentration.

[3] was used to remediate effluent from seafood processing that had a high organism count. They checked the effectiveness of organic removal on two large- and small-scale activated sludge plants. For the purpose of calculating the volume of organic elimination, they also observed the various ranges of BOD, or biological oxygen demand, per day. By doing this, we may draw the conclusion that the small-scale system in Ha Long Factory has a higher BOD removal efficiency than the factory's standard activated sludge system. We must use a moving bed biofilter prior to the aerobic tank due to the issue of the low BOD removal efficacy in typical activated sludge systems.

Bo Ying-Chun and Zhang Xin [4] employed dynamic online programming, which adjusts to changes and relies on parallel network state, to address the problem of the concentration of oxygen dissolved in wastewater treatment. In this study, a single-input-single-output issue is used to examine the dissolved oxygen content. Recursive least square (RLS) controller is the foundation of the ESN-ADP method, and this algorithm's convergence is examined. This ESN-ADP Controller is made to work with data that's coming online and being tracked by the control system. Using a benchmark simulation model for wastewater treatment plants, this controller's performance is also examined and assessed. The results of these analyses demonstrate that the suggested controller can achieve high control accuracy and strong inference capability on regulation of oxygen dissolved concentration in sewage treatment plant. for sewage treatment plants to work more efficiently in terms of both economics and the environment.

Gaudioso, Elena, et al.

[5] used a reinforcement learning strategy. An automatic and speedy adaptation to environmental changes is made possible by RL agents with the least amount of operator input. According to the results,

when there is a disruption in the plant, this proposed system performs better than the manual plant operator. This process lowers costs while also assisting the plant management.

To address the problem of dissolved oxygen concentration, Mei-Jin Lin and Fei Luo [6] developed a method known as neural adaptive control that makes use of a disturbance observer. The study describes how the sludge activated process for wastewater treatment controls the DO concentration. To approximate the dynamics that are uncertain throughout the wastewater treatment process and to increase system robustness, an RBFNN is used into the adaptive controller architecture. In order to characterize the biological events associated with DO concentration in an aerobic reactor, a model based on ASM1 is first created. Now, the adaptive NN controller was developed, which depends on the disturbance observer, to keep the concentration of dissolved oxygen at the setpoint in the aerobic reactor. Nonlinear disturbance observer was designed to approximate externally present disturbance and approximation error. Realistic data must be known in order to determine the benefits of the designed controller, and noise- and noise-free circumstances in the bioprocess must also be taken into account. The outcomes demonstrate that an adaptive neural network controller will perform better than other DO controllers.

Nanotechnology breakthroughs are having a positive impact on several industries, including water treatment. ZnO nanoparticles may be produced inexpensively and easily, and they have good antibacterial properties.

The communication strategies employed draw on [7], [8], [9], and [10] as inspiration. Chemical, physical, and biological factors can be used to gauge the quality of water. The assessment of pH, DO, Boron, SAR, BOD, and Free Ammonia are also necessary for determining the precise quality.

[11] Professor Pisal R. S., Bhosale Kiran Uttam, Galande Abhijeet Baspusaheb, and Jadhav Pappu Shivaji. In this study, a gadget that uses the IoT to autonomously monitor an industrial application is being developed. Safety is taken into consideration in this proposal in addition to automation, and they are employing a temperature sensor (LM35) for that.

III. PROCESS OF WASTE WATER TREATMENT PLANT

Various stages of waste water treatment plant have been presented using diagram Fig 1.

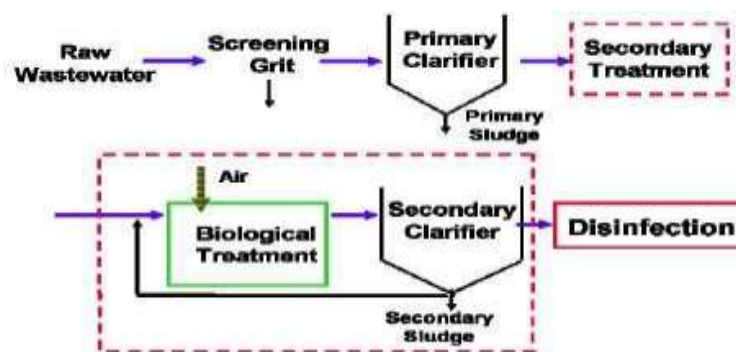


Fig. 1: Stages in sewage treatment plant [13]

Stage wise brief description of various stages is presented below.

1) **Screening:** Screening is the process of removing grit, such as sticks, rags, and boards, from waste water. Screening equipment shields, mechanical machinery like pumps and also stops valves and pipes from clogging and leaking. Coarse screens with 1 cm vertically spaced bars between them are one type of screening apparatus. They offer rectangular channels that are angled away from waste water flow entering them. In small plants, solid particles retained by these screens are removed by hand raking, whereas in large plants, mechanical cleaning equipment is used. Prior to further processing, screened solids are coated with environmentally friendly organic ingredients and dumped into a sanitary landfill, ground and returned to the flow of waste water, or incinerated.

2) **Grinding or Comminuting:** A comminutor is used to do grinding and shredding. Comminutor is situated across the flow route to shred coarse materials up to size of 8mm. The waste water still contains crumbled materials.

3) **Removal of grit:** Grit is a mixture of big organic and inorganic particles. It accelerates the wear on the pumps and other sludge handling machinery every time it comes into touch with them. Large channel areas in grit removal facilities allow grit to settle out by slowing the flow rate. Aerated grit chambers are utilized in large factories. Due to the injection of compressed air into the water, turbulence is created in aerated grit chambers, which causes heavier grit to settle at the bottom and promotes suspension of lighter organic material.

4) **Primary sedimentation/settling:** This process clears the waste water of suspended organic materials. Long rectangular or circular tanks are used for the action. Scum is cleaned from rectangular tanks when sludge scrapers are inserted through the surface. The sludge scraper is then brought back to the tank's effluent end. The floating material is carried to a collection site at a distance, where a transverse scum scraper removes it. Skimmer arms are fixed to sludge scraping mechanisms in circular tanks. Scum is removed by wiping it up an inclined apron and into a trough. Between two scum removal facilities is a scum baffle.

Small waste water treatment plants often utilize circular sedimentation tanks, whereas bigger waste water treatment plants typically use rectangular sedimentation tanks.

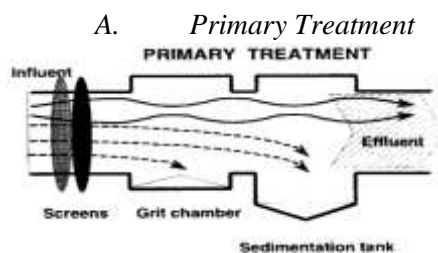


Fig. 2: Primary stage [15]

A sequence of physical, chemical, and biological interactions are used in secondary treatment to remove organics from waste water. In these reactors, which are scientifically constructed and under observation, microorganisms feed on various organics found in water and turn them into biomass. The following three methods can be used to accomplish this:

1) **Activated sludge system:** After primary treatment, wastewater is transported into an aeration tank where it is combined with microorganisms that feed on the organics in the water and turn them into biomass when oxygen is available.

To speed up the process of producing biomass, active microorganisms found in settled sludge are added back to the reactor. This procedure is aerobic. In this mechanism, the oxygen consumption rate by the microorganisms will always be greater than the natural replenishment rate of oxygen. Artificial aeration is therefore offered to get around this. [17].

2) **Trickling Filters:** The media in trickling filters is made of slag or broken stone. On these stones, which offer a sturdy, hard, and chemically resistant surface ideal for the growth of microorganisms, microorganisms are cultivated. These microorganisms feed on the organic material in the waste water that contains organics when it comes into touch with this medium, creating biomass. Uniform distribution of waste water is provided by rotating systems that pump water onto the trickling filter. Both the treated water and the produced biomass are collected using an effective under drain system. The media can also be made of wooden slats or plastic sheets in place of crushed stones.

3) **Ponds and lagoon systems:** These systems consist of waste water ponds where the waste water is permitted to remain for long enough for the natural processes that aid in waste water treatment to take place. Due to the air above it diffusing into the upper layers of the water, oxygen is present there. The process of photosynthesis carried out by algae is mostly responsible for oxygen in the deeper levels. Maximum oxygen levels in the pond are a result of this. Ponds with both aerobic and anaerobic zones are employed for comprehensive treatment of municipal waste water. These ponds are referred to as

facultative ponds. In ponds, oxygen is produced naturally, whereas it is added artificially to lagoons. According to the degree of mechanical oxygen mixing, lagoons are also divided into several categories. Lagoons operate in much the same way that ponds do.

Sludge is the solidified name for the waste produced by water. For the purpose of increasing the soil's fertility, this sludge is either burned or dumped in a sanitary landfill. In order to increase the production of numerous crops, this sludge can also be utilized as a natural fertilizer.

B. Secondary Treatment

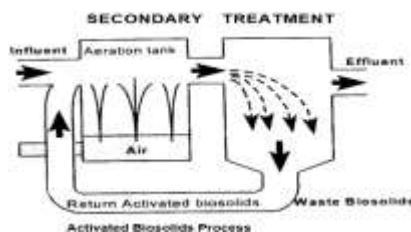


Fig. 3: Secondary stage [15]

C. Tertiary Treatment

After secondary treatment, waste water still contains dangerous bacteria and nitrogen and phosphorus compounds that cause unpleasant odors. As a result, this water undergoes tertiary treatment, an enhanced kind of treatment. Two procedures, air stripping and nitrification-denitrification, are primarily used to remove nitrogen compounds. Primary and secondary phases only remove a little quantity of phosphorus—far less than is necessary. So, extra treatment is administered. By use of chemical precipitation, phosphorus compounds are eliminated.

By adding chlorine to waste water, pathogenic microorganisms are eliminated. 99 percent of bacteria are destroyed when a sufficient amount of chlorine is supplied. On the other hand, too much chlorine in the water is dangerous. Some locations practice dichlorination to get rid of extra chlorine [18].

IV. VARIOUS SENSORS USED IN WASTE WATER TREATMENT PLANT.

1) pH Sensor. A simple test to determine how acidic or alkaline a sample of water is is the pH of the water. Receiving readings in the 0 to 14 range is feasible when taking this measurement. Any measurement that is below 7.0 is regarded as acidic, while any value that is over 7.0 is regarded as alkaline. A pH of 6.5 to 7.5 is common for filtered water. If there are a lot of impurities in the water, it's probably acidic, which suggests that treatment would be required.

Water treatment facilities can quickly determine the pH of the water with the use of a pH sensor, and then proceed to treat the water as needed. Once the treatment has been administered, this sensor will probably be utilized once more. These measurements are frequently utilized in cooling tower management, water pre-treatment, odour scrubbers, and environmental monitoring. [18]

2) Oxidation Reduction Potential(ORP) A molecule's ability to oxidize or reduce another molecule is measured by a property called oxidation reduction potential. A gain in electrons is referred to as reduction, whereas an overall loss of electrons is referred to as oxidation. This specific measurement is shown in millivolts when an ORP sensor is used. Negative ORP values characterize reducers. A positive ORP value, on the other hand, indicates an oxidizer. [18]

3) Conductivity. The ability of water to carry an electric current is referred to as conductivity. The unit of measurement is micro-Siemens per centimeter. Total dissolved solids (TDS), a measurement of a solution's contamination levels, are now being used by many industrial facilities. TDS can be computed using a conductivity sensor and is displayed as PPM. When the TDS levels are elevated, the water is likely polluted, which makes it very conductive. A poor conductor of electricity, however, is pure water. [18]

For monitoring chlorine or ozone disinfection, ORP measurements have shown to be a practical and affordable method. An ORP sensor can offer the solution that a wastewater treatment plant is looking for when trying to figure out whether its treatment processes are efficient.

4) Alkalinity. As was previously discussed, alkalinity is a pH reading that indicates whether or not the water can withstand acidification. While alkaline water is often preferable than acidic water for drinking, extreme alkalinity can be harmful. Alkalinity levels of 8–9 can be found in toothpaste. Comparatively, household bleach has alkalinity readings of 12–13. While pH measurements in water treatment facilities are normally more acidic, very alkaline water must also be treated to prevent environmental harm. [18]

5) Turbidity. The degree of water clarity is determined by turbidity. It is light scattering that causes the water to look cloudy or hazy when there are significant concentrations of dissolved particles in a sample of water. It is necessary to cleanse the water before reusing it if the turbidity values are high. If the results for turbidity are low, the water ought to be almost clear. With a turbidity tube or an electronic turbidity meter, turbidity can be measured. [18]

6) Dissolved oxygen .The quantity of oxygen that has been completely dissolved in a sample of water is known as the dissolved oxygen content. By way of photosynthesis, aeration, or diffusion with the surrounding air, plants produce waste that can leach oxygen into water. Aquaculture-related concerns make the water's DO levels crucial. A lack of dissolved oxygen may cause a large number of fish to perish because if the DO levels go too low, the aquatic life won't have access to the oxygen it needs to survive.

Any solids in the water are broken down by microorganisms at water treatment facilities. When the DO levels are low, the helpful bacteria are likely to disappear, which means that the decomposition process will halt. Energy is being lost when DO levels are high. The water treatment plant can decide whether extra oxygen needs to be introduced to the water in order to permit more successful treatments by monitoring DO level with a dissolved oxygen sensor. [18]

7) Biological oxygen demand. The biological oxygen demand measurement is another one that correlates with dissolved oxygen (BOD). You may determine from this type of measurement how much oxygen bacteria and other microbes use throughout the breakdown process. Biological oxygen demand data should be utilized in conjunction with your measured dissolved oxygen levels to determine whether your water treatment solutions are performing as intended. [18]

By observing the variations in DO levels over a five-day period, biological oxygen demand is determined. Insufficient dissolved oxygen in the water is indicated by higher results, which suggests that the water is still contaminated. In the event that your BOD measurements are low, you may be certain that your water treatment was successful. Due to the low number of impurities that need to be broken down, the bacteria in the water no longer need dissolved oxygen to survive.[18].

V. PROPOSED SYSTEM

On the basis of the literature survey, a solution has been provided in this research has been proposed for online monitoring of the quality of wastewater after it has been treated in the treatment plant. The proposed system has been depicted in Figure 4. It consists of three modules, viz, sensing unit, processing unit and display unit. Sensing unit has four sensors, namely, turbidity sensor, pH sensor, conductivity sensor and Oxidation-reduction potential sensor (ORP). For data processing an arduino mega 2560 has been considered and liquid crystal display (LCD) has been proposed as the display unit.

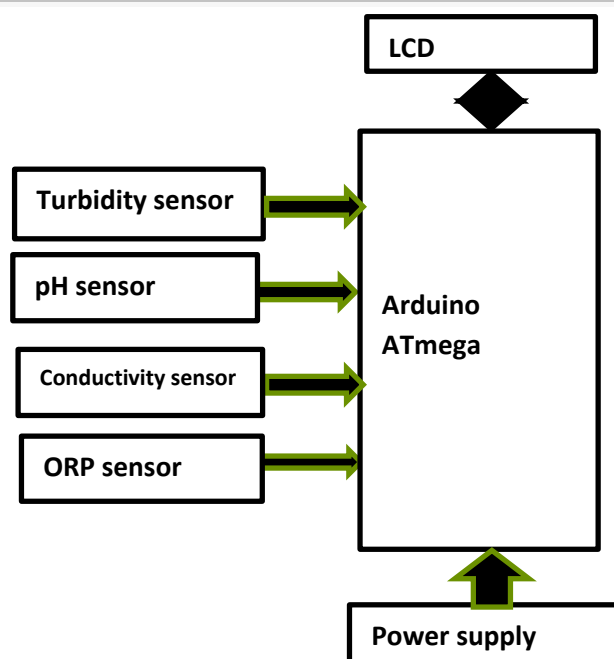


Figure 4: Proposed waste water treatment system

VI. CONCLUSION

This report examines a number of options for the treatment, recovery, and reuse of wastewater. It is clear that many solutions are practical for usage in the poor world, and it is even clearer that several low-tech options can be combined to produce extremely high efficiency. Environmental managers are showing a great amount of interest in natural treatment technologies. Natural treatment methods are thought to be practical due to their low initial costs, ease of upkeep, potential longer lifespans, and capacity to recover a range of resources, such as treated effluent for irrigation, organic humus for soil improvement.

This paper reviews the stages of waste water treatment processes and various technologies used in waste water treatment including biological, physical and chemical systems.

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**UTILIZATION OF PLANT PROTEIN SOURCES AND SUPPLEMENTS IN AQUA-FEEDS:
A NEW APPROACH FOR SUSTAINABLE AQUACULTURE**

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ABSTRACT

The current talk will evaluate the use of conventional and non-conventional plant products in aqua-feeds to promote the sustainable production of multiple fish species in aquaculture. The development of sustainable protein sources to substitute fish meal in aqua-feeds is critical to the continued growth and intensification of aquaculture productivity. Fish feed plays an important role in the growth of the aquaculture industry. Fishmeal (FM) has been employed as the principal protein element in aquaculture because of its beneficial essential amino acids, high digestibility, and palatability. Fishmeal prices are expected to rise by 20% between now and 2030 because of rising demand and increased output. This requires the search for better FM alternatives for long term aqua-feed production. In this light, much efforts have been conducted to seek the sustainable supplies of protein sources to substitute FM. Good nutrition in production systems is essential to economically produce a healthy, high product the first consideration for formulation of feed is the quality of the feed ingredients. Use of plant protein source in the feed industry has been in practice for various advantages such as sustainability, availability, cost effectiveness etc. Because of their high protein content, excellent amino acid profile, low cost, and year-round availability, they are commonly utilized as a cost-effective alternative to high-quality fish meal in diets for many aquaculture fish species. *Moringa oleifera* leaf meal, *Moringa oleifera* seed meal, Canola meal, Sunflower meal, and Cottonseed meal have all been studied extensively. Different supplements, such as enzymes, probiotics, organic acids, and Nano-particles, are also given to fish meals in addition to plant by-products. All of these factors help fish species enhance their growth, nutrient digestibility, and body composition.

Keywords: plant by-products, replacement, feed formulation, cost effective, environment friendly

EFFECT OF EXTRA-CAPORAL SHOCK WAVE THERAPY IN MYOFASCIAL TRIGGER POINTS (MFTP) USING DOPPLER ULTRASONOGRAPHY

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ABSTRACT

Myofascial trigger points commonly written as (MTrPs) are firm, palpable nodes in tense band muscles, which are unexpectedly painful (active) or painful on pressure (silent). It is in either acute or chronic stages, sometimes it is so acute and painful that patients need urgent and emergency attention. Most of time these nodes are in chronic and repetitive nature. This problem is increasing and becoming chronic illness leading to functional disability in public health. It can be found in any age, sex, or race subjects. Despite high numbers of patients seen in orthopedic and physical therapy clinics, its underlying pathophysiology and mechanism is not clear. Most of the studies outcomes are VAS, PPT and cervical ROM, but none of the studies used DUS (Doppler Ultra-sound) as an outcome for MFTTr to our knowledge, in this study we are using this outcome to see is there any changes in pre-post ultrasound using ESWT. This will be a unique study to see the changes in blood flow in muscle muscles. We assumed that ESWT could reduce pain by changing pain signals and increasing blood flow into the trigger points.

Therefore, the main purpose of our study will be to see the clinical effects of ESWT on DUS, VAS and PPT in myofascial trigger points of trapezius lower fiber.

Methodology: Recruited subjects will examine VAS, PPT and Doppler ultrasonography under per-and post Shock Wave Therapy treatment for 4 weeks. The palpation physical examination of trapezius muscles lower fiber will be done by physical therapist, which has 15 years' clinical experience in musculoskeletal disorders. Painful palpable nodule will be marked for PPT, pre-post color Doppler ultrasonography and treatment procedure.

We will be excluding the subjects those who have cervical spondylitis, shoulder arthritis, subjects received ESWT before for same problem. The purpose of our study will be explained to the subjects.

This will be a unique study to see the changes in blood flow in muscle muscles. We assumed that ESWT could reduce pain by changing pain signals and increasing blood flow into the trigger points.

Keywords: Myofascial Trigger points, shock-wave therapy, doppler-ultrasound

IMPACT OF HEAT STRESS ON THE GROWTH PERFORMANCE IN GOATS

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ABSTRACT

Livestock production is one of the widely adopted agricultural practice among marginal and subsistence farmers, particularly in the developing parts of the world. However, sustaining livestock production amidst the erratically changing climate scenario has become a challenging task. Beyond its direct consequences, climate change negatively influence animal agriculture by reducing both feed and water availability in addition to increasing the frequency of sudden disease outbreaks. Goats are stated as the ideal climate model for the tropics, for their superior traits. Though these species possess relatively better thermo-tolerance, drought tolerance and disease resistance potential, climate change, more specifically heat stress, has a deleterious impact on goat production. Studies have revealed significant reduction in body weight due to heat stress in goats that can range between 2.65 to 3.4 kg for different indigenous goat breeds. Heat stress also has a significant impact on other vital growth traits like daily weight gain and Kleiber ratio. Heat stress was also reported to alter the plasma growth hormone concentrations in goats. The reduction in heat-stress-associated growth traits could be an outcome of activated hypothalamus-pituitary-adrenal axis (HPA) response during heat stress. The activation of the HPA axis during heat stress directly influences the release of GH that negatively influences growth. However, breed variations have been observed for these mechanisms in goat that needs to be assessed to identify thermos-tolerant goat breed best suited for each region.

Keywords: Goat; Growth; Heat stress; Hypothalamus-pituitary-adrenal axis; Thermo-tolerance

STUDY ON GERMINATION AND SEEDLING GROWTH OF TWO CANOLA CULTIVARS AS AFFECTED BY CADMIUM AND COPPER SULFATE

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1. Introduction

Rapeseed is one of the oily plants that has been cultivated in our country and it is supplied oil requirement in high amount. Some heavy metals such as Zn Cd and Cu, which are required at optimum concentrations for plant growth, can be inhibit growth and metabolism at high concentrations. The toxicity of heavy metals causes damage to the plant and its death. Various sources include industries, municipal sewage and fuel, increase the concentration of these pollutants. Also, the use of chemical fertilizers, especially phosphate fertilizers, increase the amount of these elements in the soil. High concentrations of Cu can induce many changes in the cell and cause changes in membrane permeability, chromatin structure, enzymatic activity of respiratory processes and photosynthesis. Cadmium is one of the most dangerous pollutants in the soil, whose adverse effects include the prevention of root and shoot growth, the severity decrease in crop yield and the effect on nutrient uptake and biological balance. In addition, this metal poses a very serious problem for the health of humans and animals with the accumulation in important crops and subsequent entry into the food chain,

Saberi et al. (2010) investigated the effect of concentrations of 10, 20 and 30 mg/l of Cd and Cu on germination and growth of atriplex, Cd had a significant effect on percent and speed of germination and Cu had no significant effect on germination percentage but decreased seedling growth. Jelisenkova et al. (2003) showed that Cu, Mg, Pb and Cd had a greater effect on early growth of root than germination in fennel, cumin and anis. Mahmood et al. (2005) also stated that different levels of Cu had no significant effect on corn germination but decreased the early growth of corn.

Considering the importance of the effects of heavy elements on plant growth, the aim of this study was to investigate various germination and seedling growth indices of two canola cultivars affected by cadmium and copper sulfate.

2. Materials and Methods

This research was conducted in Seed Technology Laboratory of Agricultural Faculty of Sarayan, University of Birjand in autumn 2017.

First, the seeds were disinfected with 5% sodium hypochlorite solution. Then, it was washed three times with distilled water and disinfected in a 1: 1000 Benomil fungicide solution for 20 minutes. All of the used materials, including petridishes and filter papers, were sterol in autoclave. This experiment was a factorial based on completely randomized design with three replications. The treatments included cadmium and copper sulfate at concentrations of 0, 10, 20 and 30 ml and two new rapeseed cultivars (Hayola 50 and Homolious). In each petri dish was placed 25 seeds and different treatments were applied. Distilled water was used for control treatment. Petri dishes were placed in a growth chamber at 23°C. Germination percentage, Daily germination rate (DGS), Mean daily germination (MDG), Vigor index (VI) Plant length (PL), Root length (RL) and Seedling length (SL) were measured after seeding time (12 days).

Data analysis was performed using SAS software and mean comparison with Duncan's test at 1% probability level. Drawing diagrams were also done using Excel.

3. Results and discussion

The effect of different levels of cadmium on any of the germination indices and seedling growth was not significant. Different levels of copper sulfate had a significant effect on shoot, root, seedling length

and seed vigor index at 1 % level. The effect of two canola cultivars on all germination indices and seedling growth was significant at 1% level. Interaction effects between all treatments did not have a significant on any of the traits.

With increasing concentration of copper sulfate, shoot length decreased, so that the maximum length was belong to 0 ml with 6.03 mm and the lowest belong to 30 ml with 4.59 mm.

Along with increasing concentrations of copper sulfate, root length decreased. The highest root length was observed at 0 and 10 ml, with 7.62 and 7.30 mm, respectively, and the lowest belong to 30 ml with 5.07 mm.

Seedling length decreased with increasing Cu concentration. was The highest seedling length were observed at zero and 10 ml with 13.66 and 13.64 mm and the lowest at 30 ml with 10.4 mm.

The index of seed vigor decreased with increasing copper sulfate concentration. At 0 and 10 ml concentration, with 10.13 and 9.95, had the highest and in 30 ml with 7.51 had the lowest.

Copper sulfate had no significant effect on germination percentage, MDG and DGS. On all measured germination indices, two canola cultivars was significant at 1% level, so that the Hayola 50 was better and had higher than Homolious for all traits except germination rate.

Seedling length decreased with increasing copper sulfate concentration. As you can see, at concentrations of 0 and 10 milliliters, with a mean of 13.66 and 13.64 mm, the seedling length at its highest concentration and in the concentration

4. Conclusion

The results of this study showed that although different concentrations of Cu were not significant on germination percentage of rapeseed cultivars, they had a negative effect on seedling growth and consequently on seedling vigor index of rapeseed cultivars.

Due to the fact that different concentrations of cadmium did not have a significant effect on germination percentage and seedling growth, these rapeseed cultivars can be used in plant refinement, but it should be noted that according to the results, hayola 50 are more resistant cultivars than other. It is suggested that in higher researches, higher concentrations of cadmium and copper should be tested.

Key words: Heavy elements; Seed vigor; Tension; Oily seeds

THE ENVIRONMENTAL AND ECONOMIC IMPACTS OF THE USE OF RECYCLED ASPHALT DURING THE PREVENTIVE MAINTENANCE OF ROADWAYS IN THE UAE

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ABSTRACT

Roadways are one of the significant important elements in infrastructure because they are characterized simply as the point of interaction between societies and people. Any country in the world needs to create roadways so that citizens and visitors can travel easily and smoothly. Mainly roadways have been the main source by which whole economies and societies have emerged and developed over the years. They also made a positive contribution to the distribution of ideas, cultures, languages, discoveries, goods, and services of having better and safer roadways.

This study seeks to assess the application of recycled asphalt in roadways maintenance by comparing it to the current roadway maintenance procedures in terms of technical parameters in construction procedures, timelines ...etc. Furthermore, the environmental and economical requirements are highlighted and explored. This will enable the study to identify the possible benefits of using recycled asphalt pavement in roadway maintenance.

One of the benefits of using this construction material includes the economic benefits of saving on cost in material consumption, energy conservation in the processes, and environmental protection, which are imperative attributes in the development of sustainable human activities. However, other studies have indicated that asphalt has numerous disadvantages that should be considered before it can be fully adopted. Some of the challenges regard the technical aspects, mechanical considerations, and other quality concerns. . This implies that while recycled asphalt can be used as a sustainable material, there is a need to conduct an in-depth analysis to verify and quantify the effectiveness of the material, where the information is limited in the current literature. This study addresses the importance of using recycled asphalt with the integration of road maintenance procedures in the road network. This element is considered the main element of any national infrastructure development plan. The research aims to study and highlight the using recycled asphalt as a suggested sustainable method for road maintenance procedures. Therefore, the study elaborates on the historical use of recycled asphalt, its advantages, and disadvantages. Besides that, the maintenances process categories to ensure the suitable type that ensures the best quality of the network. Since roadway pavement assessment is based on quality as well as different characteristics parameters such as rutting, cracking, pavement quality Index, and roughness

The realization of addressing the factors is an important matter to prevent any threats and challenges during the life cycle of the road network. This can be done by establishing a new implementing process such as using recycled asphalt in pavement rather than the traditional pavement. The new process may provide unique outcomes from environmental, social, and economic perspectives and dedicate policy and strategy to enhancing the quality of roadways.

In addition to other parameters. The selected case study for this research is the Dibba-Masafi E89 roadway in UAE where the research methodology is conducted by elaborating the current situation of the roadway performance and the conduct recycled asphalt as solution to ensure better performance.

Keywords: Recycled asphalt, Roadway maintenance, Pavement Parameter, Condition Index

HEAT STRESS IMPACT ON IMMUNE RESPONSE IN GOATS

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ABSTRACT

The detrimental impacts of climate change on livestock will pose a major threat to global food security resulting in devastating economic consequences. Among the various productive functions of goats, immune function plays a significant role which imparts them the potential to survive in extreme climatic conditions. The goat is considered an ideal climate-resilient animal due to its increased disease resistance, ability to feed on limited pastures, proficient grazing behavior, high feed conversion efficiency, and high thermal tolerance thereby best suited to thrive in tropical climates. When the goats are exposed to multiple stressors they might lead to impairment in production and reproduction, changes in gene expression, metabolic functions, and inflammatory status, and also results in compromise of the immune system which responds to stress by enhancement or suppression of immune functions thereby prompting the animal susceptible to a broad range of diseases. The stress response is primarily stimulated through the hypothalamic-pituitary-adrenal axis which exerts an influence on immune functions. Glucocorticoids and catecholamines released under the influence of chronic heat stress concomitantly instigate cellular immunity suppression and are transposed to humoral immunity leading to the reduced immune response in animals. Toll like receptors also plays a vital role through innate immune response during heat stress where some of the genes may serve as immunological markers to identify breeds with thermo tolerance ability in connection with immune response during heat stress. Further, it is important to reduce environmental stresses through a multi-disciplinary approach focusing on nutritional interventions, housing, and genetics ultimately improving the welfare and health of the animal.

Keywords: Cytokines; Climate change; Glucocorticoids; Livestock; Heat stress; HPA axis

CLIMATE RESILIENT GOAT PRODUCTION IN THE TROPICAL REGIONS

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ABSTRACT

Sustaining livestock production under a challenging climate has necessitated the need for identifying an ideal species to cater the needs of the growing human population. Comparatively, small ruminants are better adapted to hot environments than large ruminants and have a better ability to survive, produce and reproduce in harsh climatic regions. Several studies have identified goats as the go-to species to sustain animal agriculture under changing environmental conditions. Goats arguably are considered the best-suited animals to survive in tropical climates and are said to be climate resilient. Thus, it is the need of hour to identify more climate resilient goat breeds which apart from adapting can also produce optimally in any environment. Although considered extremely adapted to tropical climates, their production can be compromised to cope with heat stress. The comparatively small body size of these species, their unique feeding pattern as a browser, their behavioral plasticity, morphological features, associated low water and feed requirements, good feed conversion ratio, and the capacity to convert low-quality feed into quality products are important characteristics which helps goats to survive in harsh climatic condition. However, breed differences were established in exhibiting these adaptive traits. Hence research efforts are needed to identify quantifiable biological markers for environmental stressors in goats. These markers could be utilized in marker assisted Breeding selection to develop more climate resilient goat breeds. Such an approach can help the farming community to sustain livestock production in the changing climate scenario.

Keywords: Adaptation; Climate Change; Heat Stress; Goat; Resilience; Thermotolerance.

HEAT STRESS IMPACT ON THE REPRODUCTIVE PERFORMANCE IN GOATS

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ABSTRACT

Production and sustainability in the livestock sector are largely determined by the effects of climate change. Among the climatic factors, heat stress is the foremost in hampering animal production which results in economic loss. Small ruminants, goats in particular can resist short periods of heat stress if cooler temperatures succeed and it is normally acknowledged that they are better adapted to hot conditions. The heat stress negatively impacts growth, reproduction, immune response, and meat production in goats, although they are highly adapted. The heat stress associated reproductive inefficiency in Does was mediated through hypothalamo-pituitary gonadal axis (HPG) resulting in lower levels of gonadotrophin releasing hormone (GnRH) from hypothalamus and associated lower levels of follicle stimulating hormone (FSH) and luteinizing hormone (LH) from anterior pituitary. This leads to lower estradiol secretion from ovary resulting in decreased estrus expression, low follicular dominance, decreased oocyte quality, reduced conception and fertilization, which ultimately leads to higher embryo loss. In addition, the lower progesterone levels adversely affect the maintenance of pregnancy. Thus heat stress seems to be the major intriguing factor negatively influencing goat reproduction. Although goats are extremely adapted, still such baseline information in several indigenous breeds are largely unknown. Therefore, it is very vital to generate these information in an effort to identify more climate resilient goat breeds which not only can adapt but also produce optimally when exposed to adverse environmental condition.

Keywords: Climate change; Goat; Heat stress; Hypothalamo-pituitary gonadal axis; Reproduction

AGRITECH INDIA: MODERNIZATION OF THE AGRICULTURE FIELD USING NEW TECHNOLOGIES

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ABSTRACT

Agriculture is the backbone of our country. India is one of the largest producers of food grains globally. A Farmer's economy also depends on agricultural profit. Approximately 58% of India's population is dependent on agriculture as a primary source of livelihood. Now a day the bigger issue is, even in the 21st century, Indian farmers are dependent on Monsoon rain and effort to fetch the right price for their produce, both issues can be solved by using of technology. With a growing population to feed and a need to improve their own earnings, it is only necessary that farmers in India leverage technology more. These needs to change with the agritech bring new changes and innovation to existing agricultural practices with the help of digitalization and modern techniques. In the upcoming years, agriculture will use advanced technologies like robots, temperature and humidity sensors, aerial photography, and GPS system. Modernization of the sector of agriculture will continue by infusing new technologies so, that farmers can increase their income, statement justified, according to Agriculture Minister Narendra Singh Tomar. New technology in agriculture possibly will help farmers forecast climate more accurately, reduce the usages of water, increase yields and increase their net profits. Technological innovations have greatly shaped agriculture throughout time. The adoption of modern technology depends on different factors such as socioeconomic conditions, geographical conditions, irrigation facilities, crop grown, etc. Technology in agriculture has the potential to truly go ahead India to be "Atmanirbhar Bharat" in all respects, and be less dependent on extraneous factors.

Keywords: Agriculture economy, Challenges in Agriculture, Technology in agriculture, Agritech

**IMPORTANCE OF CULINARY CULTURE IN VIETNAMESE BELIEFS CASE STUDY:
SOUTHWEST VIETNAM**

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ABSTRACT

More than being a part of a culture, food also takes advantage of the natural environment. So, the meal structure of Vietnamese people reveals very clearly the footprint of wet-rice cultivation - a long-lived tradition that existed in Southeast Asia for more than 10 000 years. It is because of passing this historical period that the features of Vietnamese agriculture have taken a part in the population's beliefs. They consider wet-rice cultivation as the main factor of their daily life organization and bring this into the national development of the economic structure. That proves the high ingenuity of Vietnamese people while combining traditional values with future improvement.

For a long time, the main indispensable ingredients used in Vietnamese dishes were rice and rice-based products. The rice stalk is revered in many Vietnamese sanctuaries. It is thought to have evolved from the earliest religion in Vietnam, Mother Goddess worship. Rice is more than just pleasure; it molds and shapes Vietnamese culture.

In short, the main point that this paper aims to emphasize is that Vietnamese cuisine embodies cultural immersion and the uncomplicated harmony of tradition and modernity. As a result, our research mentions the significance of Vietnamese agrarian culture is exemplified by rice, the most famous food and the embodiment of a wet-rice society.

Keyword: culinary culture, gastronomy, vietnamese people, Southwest Vietnam

**IMPLEMENTATION OF PRECISION FARMING MEASURES BASED ON TAKING INTO
ACCOUNT THE SPATIAL DISTRIBUTION OF NITROGEN COMPOUNDS IN ARABLE
SOILS**

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ABSTRACT

The presence of the required amount of nitrogen, as one of the most important mineral elements of the soil, is an important prerequisite for the proper growth and development of agricultural crops, which helps to increase the yield and improve its quality. In this regard, it is extremely important to study the spatial-temporal heterogeneity of the concentration of nitrogen compounds in arable soils.

In the course of research according to a regular grid of elementary sections (based on 1 plot per 1 hectare), soil samples were taken from the 0-30 cm layer and the content of nitrogen compounds was determined on arable soils of two fields located within individual agrocenoses of the Left Bank Forest-Steppe zone of Ukraine.

The use of geostatistics methods made it possible to interpolate the results of soil analyzes regarding the nitrogen compounds content from individual sampling points to the total area of the fields, to reveal the regularities of its spatial distribution in the soils, and to build electronic cartograms displaying information layers of the same level of data in the space of the studied fields.

The presence of heterogeneous distribution of nitrogen forms in the spatio-temporal continuum was confirmed, where the factors of influence were not only the genetic features of the soil, but also the granulometric composition of the soil and the presence of heterogeneous relief forms.

On the basis of the obtained information, a network of homogeneous areas of three levels, spatially distributed within the studied fields with different levels of provision of nitrogen compounds were identified.

The introduction of precision farming measures, in particular, the spatially differentiated application of nitrogen fertilizers, into the modern agricultural production of Ukraine provides an opportunity to obtain the maximum profit under the conditions of economy of economic and natural resources, which is extremely relevant in the conditions of conducting military operations.

Keywords: spatial distribution, nitrogen compounds, differentiated agricultural measures.

DEFORMATIONS TREATMENT IN LIQUID HYDROCARBON RESERVOIRS

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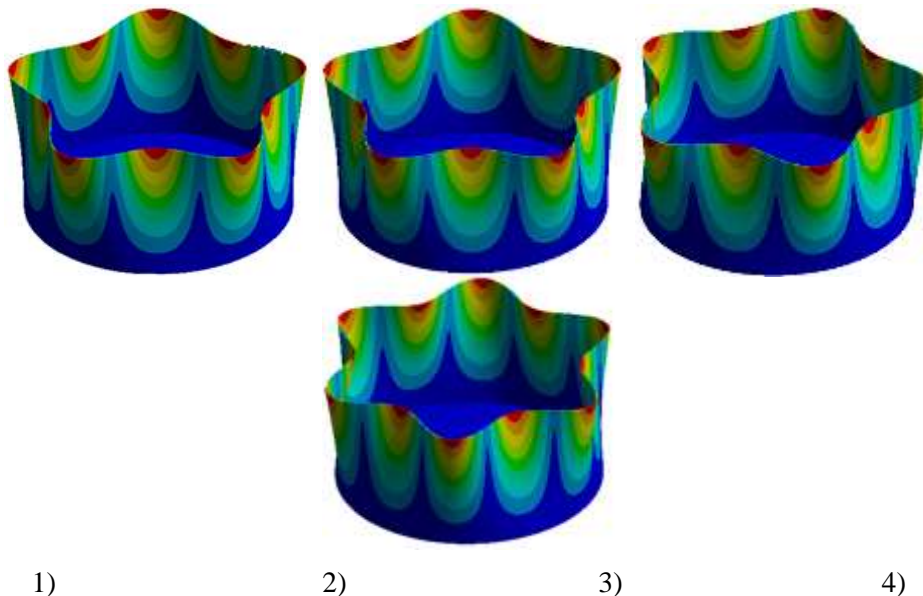
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ABSTRACT

In the paper, the problems of determining the frequencies and oscillations forms of structural elements have been investigated, taking into account the hydroelastic interaction. It has been noted that the basic correlations of the mechanics of a solid medium have been used to describe the motion of both an elastic structure and a fluid.

To calculate the vibration characteristics, we perform the following calculations [1-3]. First, we calculate the frequencies and oscillation forms of the elastic unfilled shell. A steel shell with fastening along the entire bottom has been considered [4-7].

Fig. 1 shows the oscillation forms of such an unfilled elastic shell.



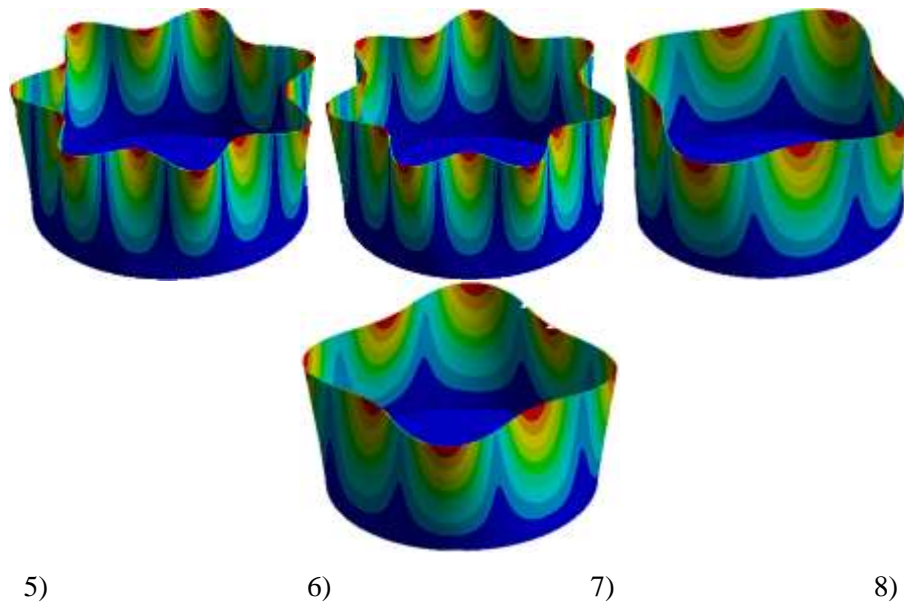


Figure 1. Oscillation forms of an unfilled elastic shell

Table 1 shows the corresponding oscillation frequencies.

Table 1. Oscillation frequencies of the unfilled shell.

Form N	1	2	3	4	5	6	7	8
Oscillation frequency, Hz	109.07	109.07	110.63	110.63	129.95	129.95	132.15	132.15

Note that all oscillation frequencies are multiples, and different oscillation forms correspond to them. These forms make up the first system of basic functions for dynamic analysis. Next, oil sloshing in the above-mentioned tank has been considered. The oil density is 960 kg/m³, the sound speed is 1250 m/s, and the level of filling the shell with oil is 1 m. Table 2 shows the frequencies of oil sloshes in the casing. At the same time, the shell has been considered rigid.

Table 2. Sloshing frequencies, Hz

Form N	1	2	3	4	5	6	7	8
Oscillation frequency, Hz	0.6596	0.6596	0.8693	0.8693	0.9754	1.021	1.021	1.149

Fig. 3 shows the forms of free surface sloshes.

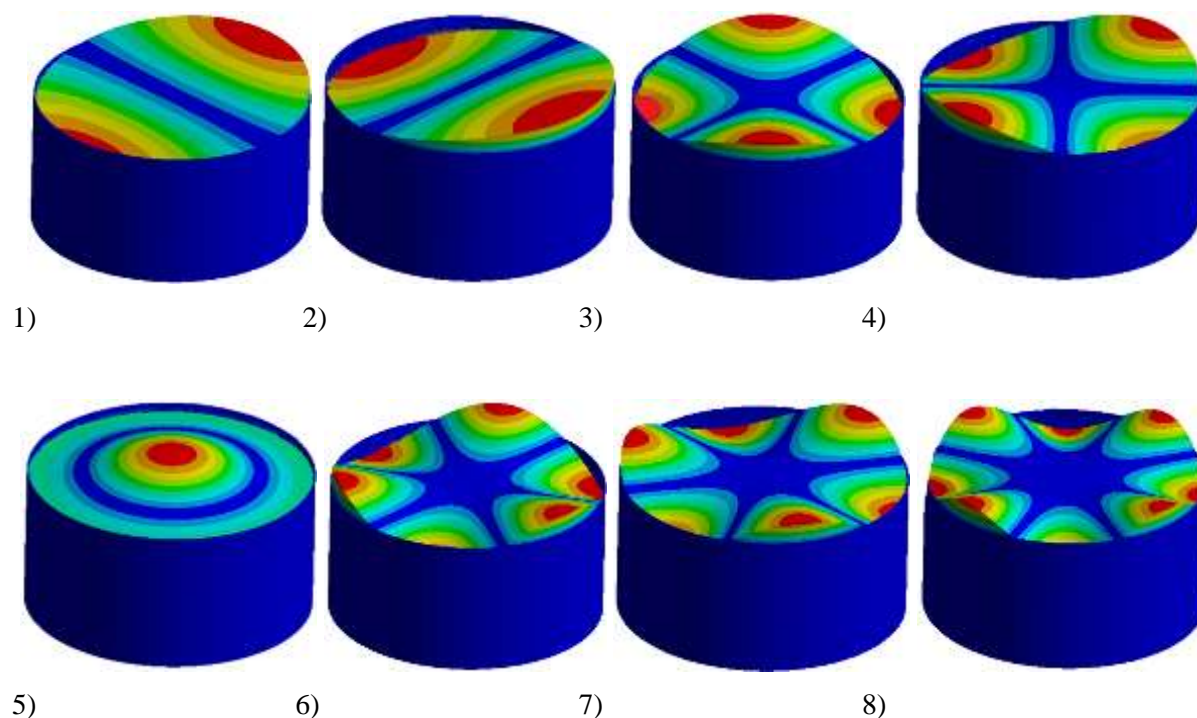


Figure 3 Sloshes forms of the free surface

We can see that the lowest frequencies correspond to neoseimetric forms, namely the first harmonic. The axisymmetric shape corresponds to the fifth frequency.

Keywords: oscillation frequency, hazardous liquid, seismic loads, storage tanks, petroleum products, sloshing, liquid hydrocarbon reservoirs.

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LIQUID VIBRATIONS IN CYLINDRICAL AND CONICAL SHELLS WITH AND WITHOUT BAFFLES

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During operation the shell and shell structures containing various liquid fillers can be exposed to intense dynamic effects. In order to analyze the strength of structures in these conditions, it is necessary to take into account nonlinear phenomena in fluid motion, since the application of linear equations does not provide an adequate assessment for estimating the pressure and sloshing amplitude. In this research a study of fluid vibrations in rigid cylindrical and conical reservoirs with and without baffles under lateral and longitudinal excitations has been carried out. The systems of differential equations that correspond to the linear and nonlinear formulation of the problem are obtained as in [1,2]. It is assumed that a fluid is an ideal and incompressible one, and its motion caused by external influences, is non-vortex. In these suppositions, there exists a velocity potential that satisfies the Laplace equation. For slosh reducing, a lot of devices, such as baffles [3] and cover membranes [4] were proposed as well as new constructive materials for tank manufacture [5].

The problem is formulated as following. At boundaries of the liquid domain, no-penetration conditions on the wetted reservoir surfaces are chosen. On the free surface, the kinematic and static conditions are specified. The static condition consists in the equality of pressure on the liquid free surface to atmospheric one. The pressure is received from the Cauchy-Lagrange integral. In this case, the linearization of the Cauchy-Lagrange integral leads to the linear formulation of the problem, whereas in the nonlinear formulation, quadratic terms are taken into account. To formulate the kinematic condition, an additional unknown function is introduced, that describes the free surface motion. The kinematic condition is in equality of the liquid velocity described by the velocity potential, and the velocity of the free surface itself. The problem of the fluid-structure interaction is solved using single-domain and multi-domain reduced boundary element methods. If longitudinal excitations agitation is considered, then it leads to an additional acceleration. In this case, in the linear formulation we obtain the system of uncoupled differential equations, each of them represents the Mathieu equation. This allows us to investigate the phenomena of parametric resonance. In analyzing differential equations, arises in a nonlinear problem, it was found that the solutions of such equations depend drastically on the initial data. The phase portraits of the considered dynamic systems with indication of resonances are obtained. The numerical analysis of the differential equation corresponding to nonlinear formulation has been carried out. The proposed approach allows us to carry out the numerical simulation of frequencies and the level of the free surface elevation for baffled liquid storage tanks with baffles of different sizes and with different position in the tank considering liquid sloshing and elasticity effects. This gives the possibility of governing the baffle' sizes and their positions within the tank at design stage. That will be useful in designs of seismic protection of reservoirs [6].

Keywords: liquid vibrations, hazardous liquid, seismic loads, storage tanks, petroleum products, sloshing.

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APPAREL DESIGN PERSPECTIVES FOR FARM ANIMALS

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ABSTRACT

Every year there is a growing need for the use of smart clothing for animals in agricultural animal husbandry, in particular in pig breeding. The main goal of introducing smart clothing into pig breeding is the ability to track the vital processes of the entire livestock throughout the growth and development of pigs. The development and implementation of new innovative monitoring systems and technologies will improve the productivity of animals, which in turn directly affects the production of high-quality and competitive products.

Clothing design is a labor-intensive process based on systematically obtained data on the external shape and structural features of the human body. Basically, clothing design includes two stages: the development of a basic design (BD) and its further constructive modeling to obtain a model design (MD).

When designing clothes for animals, changes in individual dimensional characteristics and measurements in dynamics are taken into account. For the design of products made of inextensible materials, minimum allowances are laid down, which will ensure freedom of breathing, freedom of movement, and the presence of an air gap for ventilation of the underwear space. When designing products from elastic materials, these allowances can be zero or negative, depending on the coefficient of extensibility of the material. The thicknesses of all materials from which the product will be made are also taken into account to determine the structural allowance for the package of materials.

Keywords: innovative technologies, light industry, farm animals.

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OVERCOMPACTION OF THE ARABLE LAYER OF THE SOIL AND ADAPTATION OF
AGRICULTURAL CROPS TO ITS MANIFESTATION

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ABSTRACT

In Ukraine the area of overcompacted soils is about 17 million hectares, but due to the war, which is accompanied by the use of heavy equipment, these areas are intensively increasing. Soil compaction can temporarily reduce the yield of crops by 10 to 60 %, and natural loosening can last up to 4 years, depending on the humidity and granulometric composition of the soil.

The aim of the research was to investigate the ways of adaptation of agricultural crops to overcompaction of the arable soil layer. A series of laboratory and model experiments were performed in a light cabinet in vegetation vessels with a volume of 1.5 dm³ in triplicate. An overcompacted subseed layer with a density of > 1.3 g/cm³ was simulated artificially by pounding. The methods of adaptation were the application of growth stimulants (inoculation of corn seeds with growth stimulator "Vympel" at doses of 400, 500 and 600 g/t), selection of adaptive varieties (intensive and semi-intensive variety of spring barley), soil moisture levels (60, 80 % and 100 % of LMC (the lowest moisture content)).

As a result of research it was found that inoculation of seeds before sowing helps to increase plant germination. In the variant with overcompacted soil with the use of growth stimulant even in the minimum dose there is an increase of 17 % germination energy and complete germination of corn seeds compared to the variant without growth stimulant. Correlations between corn yield and growth stimulant doses were found ($r = 0.96$); biological yield of barley varieties and moisture ($r = 0.93$ for intensive and $r = 0.89$ for semi-intensive varieties) under conditions of soil overcompaction. The increase in biological yield of corn due to inoculation, compared with the non-inoculated variant ranged from 14 % to 47 % depending on the dose.

With a sufficient level of soil moisture (80 % LMC) the productivity of the roots of semi-intensive varieties is characterized by 18-23 % higher compared to plants of intensive varieties, which helps to increase almost 40 % biological yield and indicates a better adaptation of the roots of this variety to soil overcompaction.

Thus, the selected methods of adaptation of cultivated crops contribute to the reduction of the negative impact of over-compaction on germination, growth and development, the formation of their root system, and contribute to sustainable yields.

Keywords: over-compaction, arable layer, adaptation, inoculation, variety.

PERFORMANCE ASSESSMENT OF SUPERVISED MACHINE LEARNING TECHNIQUES FOR CLASSIFYING THE CHRONIC DIABETES DISEASES

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ABSTRACT

Chronic diseases are one of the world's most serious health problems owing to their terrible clinical manifestations such as a long onset cycle, subtle symptoms, current environmental conditions, and various complications. Most of the time, doctors struggle to accurately identify chronic diseases by manually. As a result, machine learning has emerged as a promising technique for predicting chronic diseases. Prediction is the process of analysing current and past events in order to forecast future events. Prediction of future conditions is still an important stage in many applications to reduce risk substantially. Many analysts use healthcare data to forecast illnesses in order to help patients and physicians in a variety of ways. This research focuses on the prediction of chronic diabetes disease. Diabetes is one of the most dangerous chronic diseases for humans leading to death all over the world. To classify chronic diabetes, a variety of supervised machine learning methods are utilised to forecast diabetic illness. With the help of supervised machine learning methods such as LogisticRegression, K-NearestNeighbours, NaiveBayes, Multi-LinearRegression, RandomForest, DecisionTree, and SupportVectorMachine are being investigated to classify chronicity of diabetes. The diabetes disease dataset from Kaggle is used to assist the machine learning techniques. This study compares the performance of supervised machine learning algorithms on a diabetes in terms of accuracy. The accuracy of the LogisticRegression, K-NearestNeighbours, NaiveBayes, Multi-LinearRegression, RandomForest, DecisionTree, and SupportVectorMachine is 79%, 62%, 79%, 100%, 76%, 69% and 74% respectively. With the diabetes dataset, the results show that Multi-linear regression has the highest accuracy of 100%.

Keywords: Chronic diseases, Supervised machine learning, Prediction, chronic diabetes disease.

INTRODUCTION

Blood glucose levels rise as a result of the body's inability to use insulin properly, to create enough of the hormone insulin, or to make any at all, leading to the deadly, chronic condition known as diabetes mellitus. It makes it possible for circulating glucose to enter cells of the body, where it can be stored or used as fuel. (Medicoverhospitals, 2015) For the metabolism of fat and protein, insulin is also necessary. High blood glucose levels (hyperglycemia), the clinical sign of diabetes, are caused by a failure of cells to respond to insulin or by a lack of it altogether. Numerous organs can be harmed by chronic insulin insufficiency, which can also lead to life-threatening and incapacitating health issues include cardiovascular disorders, nerve damage, eye conditions, lower limb amputations, and kidney damage that can lead to vision loss and even blindness. However, with the right diabetes care, these dire issues can be delayed or entirely averted.

One of the most prevalent chronic conditions affecting children is type 1 diabetes. The immune system of the body attacks and kills the pancreatic beta-cells, which are responsible for producing insulin, and this results in type 1 diabetes. Thus, either very little or no insulin is produced by the body. Even while

the exact reasons for this destructive process are unknown, it makes sense that a genetic weakness and an environmental trigger, like a viral infection, combine in concert to generate the autoimmune reaction. A person can get type 1 diabetes at any age, but children and young adults are the most often affected groups. Almost 90% of instances of diabetes globally are of type 2, making it the most prevalent. The main factor causing hyperglycemia in type 2 diabetes is insulin resistance, or the body's cells failing to react appropriately to insulin. As insulin resistance causes the hormone's efficacy to decline, insulin production gradually rises. Over time, there may not be enough insulin produced if the pancreatic beta cells cannot keep up with the demand. While the signs and symptoms of type 2 diabetes can occasionally resemble those of type 1 diabetes, they are often far less severe, and the illness itself may be asymptomatic. Furthermore, the precise time when type 2 diabetes first appeared. As a result, the pre-diagnosis period can be lengthy, and up to one-third to half of the population may have type 2 diabetes but have yet to be diagnosed. If the diagnosis is made later than expected, consequences include vision loss, lower-limb ulcers that are slow to heal, heart disease, or stroke may occur.

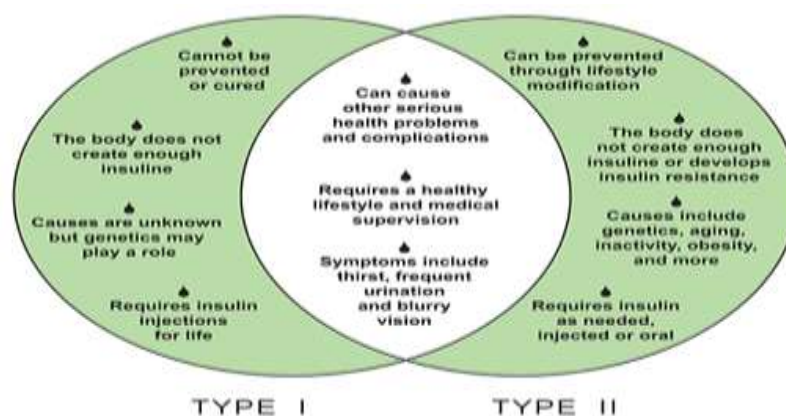


Figure-1: Types of diabetes

According to the IDF Diabetes Atlas-2021, an estimated 537 million adults i.e., 20-79 years old have diabetes. As a result, there may be a long period of pre-diagnosis, and up to one-third to half of the population may have type 2 diabetes but be unaware of it. In low- and middle-income nations, 3 in 4 adults with diabetes reside. Undiagnosed diabetes affects 240 million adults, or nearly one in two. 6.7 million people died from diabetes in 2017. Diabetes accounted for 9% of all health spending on adults, or at least USD 966 billion, in 2017. Because of this, there may be a lengthy pre-diagnosis period, and up to one-third to half of the population may have type 2 diabetes without even being aware of it.

RESEARCH AND FINDINGS

(Guo et al., 2012) Various ML models are employed in a study to predict diabetes using real world data. (Meng et al., 2013) Decision tree in this study had the highest accuracy 77.87%, followed by the regression model (76.13%), and the Artificial Neural Network model (73.23%). Using J48 DT as the basis classifier, (Praveen et al. 2014) analyse significance of Bagging and boosting techniques. (Nai Arun et al., 2014) in order to determine the existence of the disease as well as in consideration of its risk factors for determining the existence of the disease as well as in consideration of its risk factors. In order to estimate the likelihood of diabetes at a given age, (Orabi et al. 2016) suggested a framework for diabetes disease prediction. The proposed method is based on the notion of employing a decision tree. The outcomes were satisfactory for predicting diseases at a given age, with decision tree modelling providing the highest level of precision.

The genetic programming (GP) technique was used by Pradhan et al. (2012) to train and assess the UCI store's PID diabetic data set. Results obtained through the use of genetic programming. Comparing (Sharief et al. 2014) to other techniques, they provided the best accuracy. By putting less effort towards classifier age, accuracy can be improved significantly. A proposed algorithm for the prediction of diabetes includes sub-modules (Rashid et al. 2016). The Decision Tree (Han J. et al. 2016) classifier is used to distinguish diabetic symptoms in patients. developed a method for categorising the risk of developing type 2 diabetes (Nongyao et al. 2015). The authors used four approaches such as Decision Tree, SVM, Logistic regression, and NB. Results of the experiments show that, among other things, the

LRS produces excellent results. Although the aforementioned studies aided in the development of a number of machine learning (ML) strategies for diabetes prediction, none of them were more than 90% accurate. As a result, ML algorithms have the potential to be more accurate forecasters and produce satisfying results than existing methods, which would benefit the healthcare sector and reduce healthcare costs.

The main goal of this paper is to use ML models and analyse how well they predict diabetes. In this context, a strong diabetes dataset is investigated, and with the help of ML algorithms, interesting results are seen. As a result, a number of supervised machine learning algorithms, including Logistics Regression (LR), K-Nearest Neighbours (KNN), Multi-Linear Regression (MLR), Naive Bayes (NB), Random Forest (RF), Decision Tree (DT), and Support Vector Machine (SVM) have been thoroughly studied. An in-depth comparison is shown in this section. The effectiveness of several algorithms was examined using a variety of benchmarks, including accuracy, precision, F1-score, and support. This type of extensive investigation among all the ML models using the diabetes dataset will thus influence the development of a computer assisted healthcare system, which is desperately needed, particularly in impoverished countries such as Angola, Bhutan, Cambodia and Bangladesh.

3. Methodology Used:

3.1. Model Diagram: In this paper, the technique is presented as a model diagram in figure 2. The research process used to build the model is depicted in the picture. (Deepti Sisodia et al., 2018)

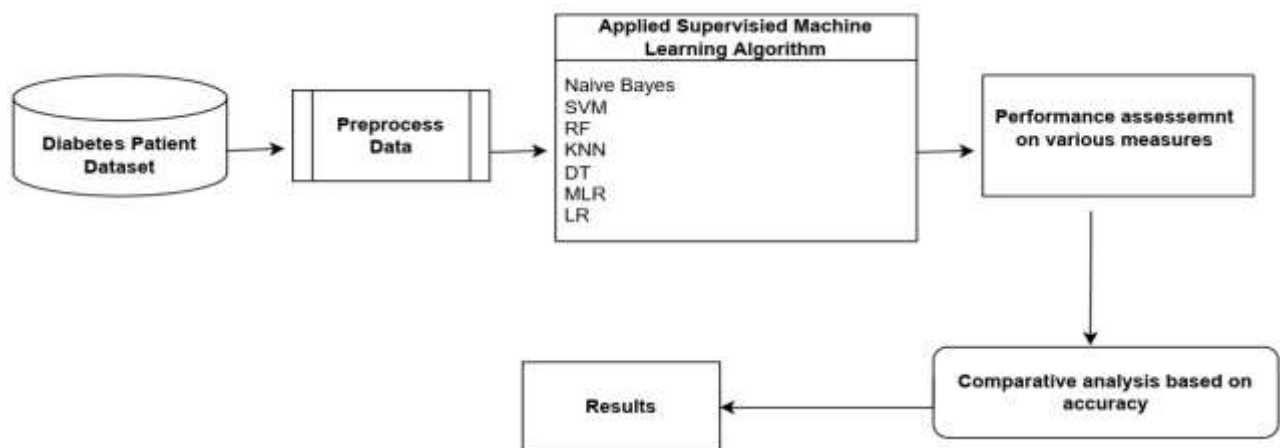


Figure-2: Proposed Model Diagram

3.2 Supervised Machine Learning Techinques:

The following is a description of the Supervised Machine Learning Techinques used in this study:

Logistic Regression(LR):

Basically, the LR technique depends on the characteristics of the existing data and applies the input feature mapping method to a class label. To categorise the data objects, the model will assign a threshold value. It classifies data objects based on the predicted likelihood exceeding a threshold value. If the expected value is less than 0.5, classify the data into one group or the other. The border of the decision can be linear or non-linear. (Han Wu . et.al 2017) Binary classification is the goal variable of the LR in several issues. The logistic regression mathematical model is provided by,

$$\ln \frac{P(y = 1)}{1 - P(y = 1)} = b_0 + b_1x_1 + b_2x_2...$$

The LHS is known as logit ($P(y=1)$), here $y=1$ which represents either yes or true.

3.2.2. Naive Bayes:

The Bayes Theorem-based Naive Bayes algorithm is frequently used in a variety of categorization scenarios (Balaji et al., 2020). This classifier uses an easy-to-implement probabilistic ML approach to

make quick, condensed predictions in real time. The Bayes principle (Aishwarya Jakka et al., 2019)

$$P(A|B) = \frac{P(B|A)P(A)}{P(B)}$$

Where, $P(A/B)$ = Probability of A occurring given event B has already occurred.

$P(B/A)$ = Probability of B occurring given event A has already occurred.

$P(A)$ = Probability of event A occurring.

$P(B)$ = Probability of event B occurring.

3.2.3 SVM Classification Technique:

It is used for both regression and classification. For a specific training data set, the algorithm chooses the ideal hyperplane separator between the two classes (Sisodia D.et.al 2010). To allow for generalisation, the hyperplane should be separated from the data points of a different class. To put it another way, the margin should be set up so that significant gap exists between the data points. Support vectors refer to the data point close to the hyperplane (Sisodia D. et.al 2012). By extending the gap between the two decision borders, the ideal margin can be found. The following gives the equation for the optimal hyperplane distance:

$$W^T x + b = -1 \text{ and } W^T x + b = 1$$

If the distance value equals $2/\|W\|$, it must be optimised again. Furthermore, the $x(i)$ should be classified by model, i.e.

$$Y_i * (W^T x_i + b) \geq 1 \text{ for all } i=1, \dots, n$$

3.2.4. K-Nearest Neighbors:

It is used for both regression and classification. The closest data points in the feature space are assumed by KNN. It classifies a data point based on its neighbours' classifications and feature similarity. (Hossain et al., 2019). To locate the closest data point, Euclidean distance (ED) calculation is used (neighbor). A well-liked and well-known option is the KNN of the new data point, as determined by the the ED

$$d(\mathbf{p}, \mathbf{q}) = \sqrt{\sum_{i=1}^n (q_i - p_i)^2}$$

Here p, q = two points in Euclidean n -space, q_i, p_i = Euclidean vectors beginning at the space's origin (initial point), and n = n -space.

3.2.5. Decision Tree:

Decision trees are used to solve categorization problems. Using a decision rule created from historical data, the decision tree's main objective is to forecast the target class. Classification and forecasting are done using nodes and internodes. Using a variety of characteristics, root nodes categorise instances. While the leaf nodes have different classifications, the root nodes might have two or more branches. The decision tree decides which node to employ for each step depending on the characteristic that yields the most information. (Iyer, A., et al., 2015).

3.2.6. Random Forest:

(Javeed et al., 2019) The principle of bagging and the random selection of features for each tree from our dataset as a subset are combined in the Random Forest method, which integrates many Decision Tree techniques. determining the classification based on the majority vote cast by the trees. And by removing some flaws and uncertainties from our system, which is already one of the best learning algorithms, the power of numbers can help it become more accurate. Its ability to effectively handle a large volume of data is one of its main advantages.

3.2.7. Multi-Linear Regressions:

A statistical technique known as multiple regression seeks to predict a variable of interest from a number of other variables (Myers et al., 1990). The criterion is the variable that is anticipated. Predictors are the variables that make the criterion predictable. Although categorical variables cannot be used in regression, there are unique methods that can be used. Multilinear regression is the use of linear regression to investigate the relationships between more than two variables. Unlike traditional linear relationships, which have only one predictor and one response variable, multiple regressions have multiple predictor and response variables. The general formula is:

$$y = a + b_1x_1 + b_2x_2 + \dots b_nx_n$$

Here, y is the response variable, a, b₁, b₂...b_n are the coefficients and x₁, x₂, ...x_n are the predictor variables.

3.3 Description about Dataset:

The dataset is taken from Kaggle. Information about the Kaggle diabetes dataset is shown in Table 1. There are 768 instances in this dataset with a total of 9 attributes. (L. J. Muhammad et al., 2020) In dataset first eight variables establish the input variables and the last variable called Outcome, determines whether or not a patient has diabetes. (Kaggle Repository, 2020).

Table-1: Information about diabetes dataset

S.No.	Column	Non-Null Count	Dtype
1	Pregnancies	768 non-null	int64
2	Glucose	768 non-null	int64
3	BloodPressure	768 non-null	int64
4	SkinThickness	768 non-null	int64
5	Insulin	768 non-null	int64
6	BMI	768 non-null	float64
7	DiabetesPedigreeFunction	768 non-null	float64
8	Age	768 non-null	int64
9	Outcome	768 non-null	int64

3.4 Performance Assessment:

Five performance evaluation measures are employed to evaluate the diabetic illness i.e., Recall, Precision, F1-Score, Accuracy, and Support. Confusion Matrix is used which allows to measure five performance evaluation measures. TP means predicted values correctly predicted as actual positive, FP means predicted values incorrectly predicted as actual positive, FN means positive values predicted as negative, TN means predicted values correctly predicted as an actual negative. Five performance evaluation criteria are described in the paragraphs that follow. (Janhavi R Raut et al., 2020).

3.4.1 Accuracy:

The accuracy is mathematically represented as the following:

$$accuracy = \frac{TP + TN}{TP + TN + FP + FN} * 100$$

3.4.2 Precision:

The precision is mathematically represented as the following:

$$precision = \frac{TP}{TP + FP}$$

3.4.3 Recall:

The recall is mathematically represented as the following:

$$recall = \frac{TP}{TP + FN}$$

3.4.4 F1-Score:

The F1-Score is mathematically represented as the following:

$$F1\ Score = \frac{2 * (Recall * Precision)}{Recall + Precision}$$

3.4.5 Support:

Support is the number of occurrences of each particular class in the true responses. It can calculate it by summing the rows of the confusion matrix.

The performance metrics of precision, recall, F1-score, and support on Supervised algorithms are listed in the below tables.

Table-2: performance metrics of KNN algorithm

	precision	recall	f1-score	support
0	0.71	0.70	0.71	125
1	0.46	0.46	0.46	67
accuracy			0.62	192
macro avg	0.58	0.58	0.58	192
weighted avg	0.62	0.62	0.62	192

Table-3: performance metrics of Logistic Regression

	precision	recall	f1-score	support
0	0.80	0.90	0.85	125
1	0.76	0.58	0.66	67
accuracy			0.79	192
macro avg	0.78	0.74	0.76	192
weighted avg	0.79	0.79	0.78	192

Table-4: performance metrics of Decision Tree

	precision	recall	f1-score	support
0	0.78	0.73	0.76	125
1	0.55	0.63	0.59	67
accuracy			0.69	192
macro avg	0.67	0.68	0.67	192
weighted avg	0.70	0.69	0.70	192

Table-5: performance metrics of Random Forest

	precision	recall	f1-score	support
0	0.81	0.81	0.81	125
1	0.65	0.66	0.65	67
accuracy			0.76	192
macro avg	0.73	0.73	0.73	192
weighted avg	0.76	0.76	0.76	192

Table-6: performance metrics of SVM

	precision	recall	f1-score	support
0	0.77	0.86	0.82	125
1	0.67	0.52	0.59	67
accuracy			0.74	192
macro avg	0.72	0.69	0.70	192
weighted avg	0.74	0.74	0.74	192

Table-7: performance metrics of Naïve bayes

	precision	recall	f1-score	support
0	0.82	0.87	0.84	125
1	0.73	0.64	0.68	67
accuracy			0.79	192
macro avg	0.77	0.76	0.76	192
weighted avg	0.79	0.79	0.79	192

The confusion matrix of the various supervised machine learning approaches for diabetes chronic illnesses are represented graphically in Figure 3.

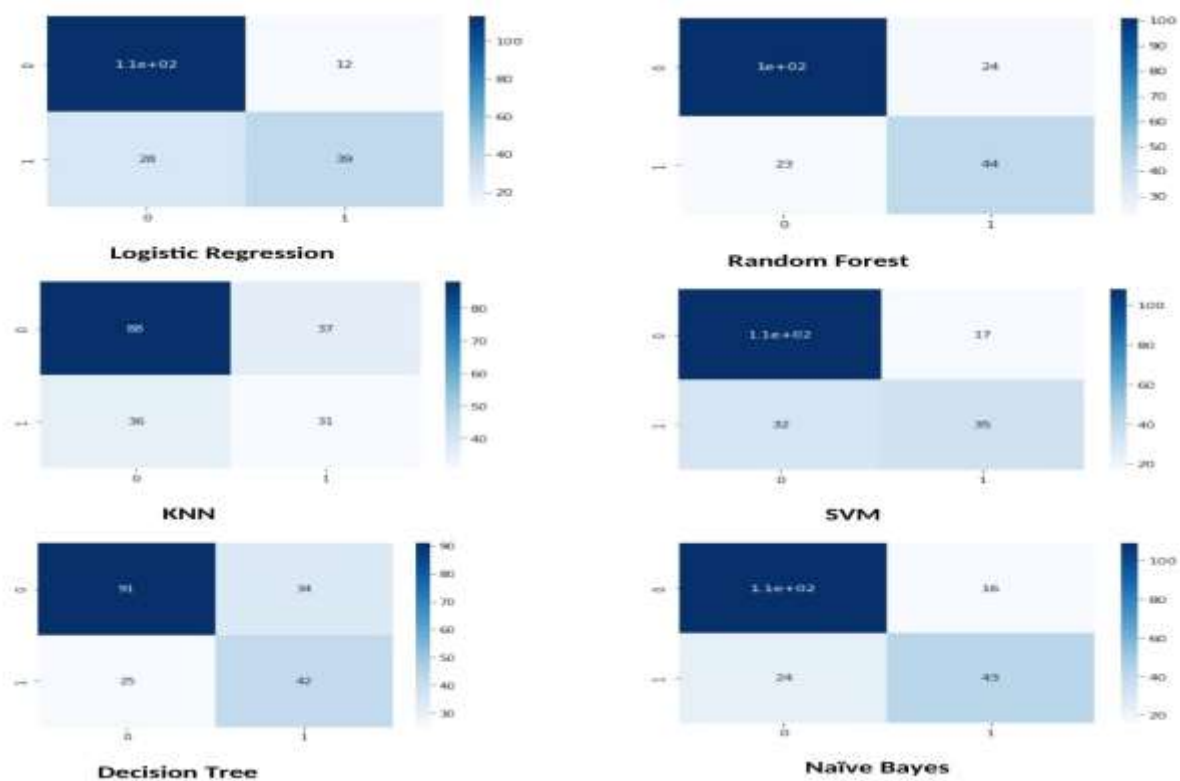


Figure-3: Confusion matrix of different supervised machine learning techniques

The comparison accuracy scores of the various supervised machine learning approaches for diabetes chronic illnesses are represented graphically in Figure 4.

The accuracy of the seven algorithms represented in this graph— LogisticRegression, K-NearestNeighbours, NaiveBayes, Multi-LinearRegression, RandomForest, DecisionTree, and SupportVectorMachine is shown as 79%,62%,79%,100%,76%,69% and 74% respectively. The results demonstrate that multi-linear regression has the highest accuracy of 100%.

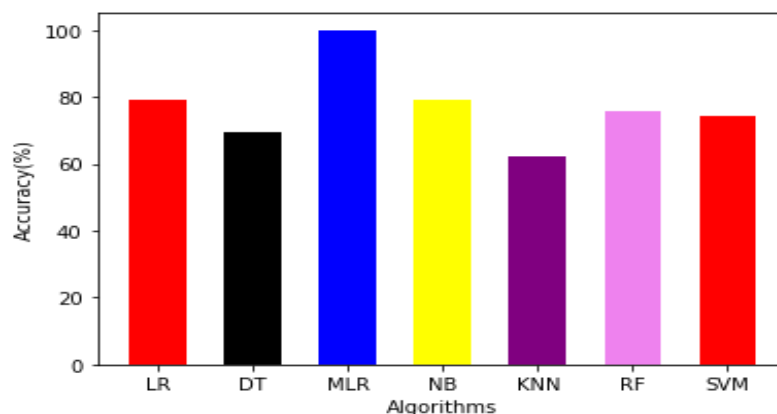


Figure-4: Performance assessment of different supervised machine learning techniques for diabetes chronic diseases

CONCLUSION

One of the most common medical issues in real life is the identification and prognosis of diabetes. Diabetes' microvascular consequences are brought on by it being in the body of the human for an extended period of time. In order to categorise diabetes in a human individual, a systematic experimental investigation was carried out in this paper employing a variety of Supervised Machine Learning classifiers. In order to assess and estimate the performance of the models that were used to fit the training set, precision, recall, accuracy, support, and F1-Score were taken into consideration. The outcomes demonstrate that Multiple Linear Regression (MLR), which had a greatest accuracy of 100%, performed better. This research can be expanded to include ensemble machine learning approaches to increase forecast accuracy with larger datasets.

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**SOCIAL, BEHAVIOURAL AND OTHER DETERMINANTS OF FOOD CHOICE AMONG
EUROPEAN ORIGIN YOUNG WOMEN: THE RESULTS OF CROSS-SECTIONAL
OBSERVATIONAL STUDY**

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ABSTRACT

Consumer's behaviors against different food products depend on many conditions. Food general purpose is to fulfill energy need of human body. However, there is another food choice aspect conditioned by lifestyle and personal beliefs. Main aim of this study was to defined determinants of food choice by European origin young women.

Study was conducted on a group of 2291 European origin young women, students from the following departments: Physical Education (PE, n=754), Physiotherapy (F; n= 744), Nutrition (D; n=476) and Tourism (T; n=317). A direct interview was conducted using the Questionnaire for examining views and eating habits.

Data analysis shows that young women while selecting a product pay special attention to product's price (excluding students of Dietetics) and expiration date of the product for consumption. Less important criterion with the lowest indication was product advertising and product packaging. Product price and its expiry date is the most important factor taken into consideration by European origin young women. However, among female dietetics students, when choosing food, the largest percentage of people (more than 90%) showed criteria related to the quality of food products such as product composition, fat content, amount of added preservatives, energy value and nutritional value.

Participants in study programs thematically related to food, dietetics are guided in their choice of nutrition products not by economic factors, but mainly by the quality and nutritional value and health aspects of the products. The conclusion for practical application from the above research indicates the need for nutrition education of academic youth, especially from majors not directly related to nutrition and food science.

Keywords: consumer's dietary preferences; criteria for food selection, population of young women, social and behavioural determinants

BIOMEDICAL APPLICATIONS OF 3D-BIOPRINTING TECHNIQUE: ADVANCES AND PROSPECTIVES

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ABSTRACT

3D Bioprinting was discovered in 1988. It came out as a technique that led to more personalized treatment, better pre-clinical trials as well as the possibility in eradicating the chances of organ rejection. The aim is to brief about 3D bioprinting, its techniques as well as recent advances. The increasingly growing techniques of 3D bioprinting has led to printing live vasculature model, live tissues as well as cells and researches are still going on for further advancements in printing fully functionalized organs. 3D Bioprinting eased the measurement of drug efficacy accurately and facilitated evolution in precision medicines. And possibly one day with the help of 3D bioprinting, fully functionalized organs will also be prepared.

Keywords: 3D-Bioprinting, Bioinks, Organ Printing, Bioprinting vasculatures, Bioprinting Human Bones.

FUNCTIONAL GROUPS OF INVERTEBRATES ACCORDING TO TROPHIC PREFERENCE

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ABSTRACT

Soil species interact differently with their environment. Feeding mode is among the most important relationships between organisms, and its quality and distribution shape the structure of soil food webs. Soil food web model analysis is a useful approach for understanding nutrient cycling and energy flows between soil communities, as well as establishing relationships between soil food web dynamics and ecosystem stability. Soil mesofauna and macrofauna break down dead organic matter into smaller pieces thereby increasing the surface area for decomposition and facilitate decomposition by soil bacteria and fungi that begin mineralizing organic nutrient forms into inorganic nutrients essential for plant growth.

Depending on the trophic preference, the species are divided into trophic groups: microbivores (nematodes, collembola, mites that feed on microorganisms: fungi, algae, bacteria), herbivores (nematode species, collembola, some mites that feed on plant material), omnivores (nematode species, collembola, some mites that increase connectivity in food webs because they feed on multiple resources), predators (do not change soil structure or plant productivity directly, but have an indirect effect on ecosystem functions through the impact on populations of other organisms), detritivores (most soil species are part of the decomposition process by feeding on dead organic matter (detritus).

Species that feed on similar resources are functionally equivalent, that is, they exert similar top-down forces on their prey. A large diversity of soil ecological niches, both in size and in the range of resources provided, leads to significant functional differentiation of subterranean soil invertebrates. This differentiation leads to changes in the trophic network, so changes in the rhizosphere, in the structure of the vegetal carpet, thus there are changes in the ecosystem services provided (including in the food provided by certain agricultural crops).

Keywords: invertebrates, functional groups of invertebrates, trophic preference

FOOD PRACTICE AND BMI AMONG COLLEGE GIRLS: AN ASSOCIATION

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ABSTRACT

Introduction: Food plays a vital role in the maintenance of good health and both in prevention and cure of diseases. Food is considered a natural body defender against different diseases, and it keeps the body healthy. The lifestyles always have a great influence on both health and food consumption. College students represent a major segment of the young adult population. Young adults, in consideration of important lifestyle changes, are arranged to negatively modify their way of eating. Hence, this study aims to assess the association of food Practice of college students with their Body Mass Index

Materials and Methods: A descriptive study conducted with 135 female nursing students at the College of Applied Medical Sciences, King Khalid University (KKU), Saudi Arabia during the 2022 academic year. The subjects recruited using convenience sampling and data were collected using a structured adapted Healthy Eating practice Assessment questionnaire -10 items via online survey. The responses obtained were subjected to statistical analysis using SPSS.16.0 version.

Results: The Chi-square ($\chi^2_{df=}$ 59.04₂, P=0.00) revealed that there is a significant association between Food practice and BMI of the college girls, and the Phi & Cramer's V value is 0.60 shown an evident effect of food pattern on BMI is large. 42% of college girls who have healthy food practice were on normal BMI status Whereas 17% of them that had an unhealthy food practice were seen with High BMI specifically overweight and obese category. The mean healthy food practice score is 31.05 represented "good category" and the overall 83% of college students reported that healthy food practice.

Conclusion: The college girls belong to unhealthy eating practice needs improvement that they must take necessary action plan for eating healthy that fits their lifestyle to prevent chronic diseases in future.

Keywords: Food Practice, BMI, Healthy eating

FUNCTIONALIZED REAGENTS IN CHEMICAL ANALYSIS OF AGRICULTURAL SOILS

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ABSTRACT

Agricultural soils are objects with a complex chemical composition. Recently a great attention is paid to detection of chemical toxicants (pesticides, organic surfactants, metal compounds) in soils, using new means and methods of chemical analysis. The application of spectral methods using dyes and luminescent substances expands the possibilities of chemical analysis. The aim of the study is to set the possibility of using dyes and functionalised organic reagents for the quantitative determination of toxic metals and surfactants in soils.

Dyes with high light absorption or luminescence intensity have been used (such as 4-[(*E*)-2-(1-ethylquinolin-1-ium-2-yl)ethenyl]-*N,N*-dimethylaniline iodide, C₂₁H₂₃IN₂, CAS 117-92-0; (2*E*)-1-ethyl-2-[(1-ethylquinolin-1-yl-2-yl)methylidene]quinolone, C₂₃H₂₃IN₂, CAS 977-96-8; 5,5'-dibromo-o-cresolsulfonphthalein, C₂₁H₁₆Br₂O₅S, CAS 115-40-2; ethyl eosin, C₂₂H₁₁Br₄KO₅, CAS 6359-04-2). These organic reagents significantly increase the sensitivity of the spectroscopic determination. This is due to the fact that the association of complex formation can significantly affect the spectral properties of the reagents. We have determined the spectral-equilibrium properties of the “dye as a reagent + metal” and “dye as a reagent + surfactants” systems.

We have developed methods for the spectrophotometric determination of copper, aluminium and ionic surfactants in agricultural soils. The technical result is to lower the limit of reliable determination of metals (1×10^{-6} mol/L) and ionic surfactants (1×10^{-5} mol/L) and to simplify the chemical analysis procedure.

Keywords: agricultural soils, functionalized reagents, dyes, chemical analysis.

BIOREMEDIATION: A SOLUTION TO DAIRY AND POULTRY WASTE DISPOSAL

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ABSTRACT

The dairy industry relies heavily on water, which results in the production of a large volume of wastewater that cannot be easily disposed of. On average, it has been reported that the dairy industry generates 6-10 litres of wastewater for every litre of milk processed. Additionally, it is estimated that around 2% of the total milk processed is lost and ends up in drains. Dairy wastewaters contain high concentration of heavy metals such as arsenic, cadmium, and lead, organic matters, and nutrients. Concentration of these constituents will depend on the product and process.

The process of bioremediation for dairy and poultry waste utilizes microorganisms to break down and convert the organic materials present in the waste into useful substances, such as bio fertilizers, compost, and biogas. The presence of uric acid in poultry waste, which is a common occurrence, can result in a rise in soil acidity if applied in substantial amounts. Such an increase in soil acidity can negatively impact plant growth and microbial activity in the soil. Additionally, dairy and poultry waste may harbour dangerous pathogens like Salmonella and E. coli, which pose a health risk to humans if not correctly handled. If untreated or treated inadequately, such waste when applied to soil can result in the contamination of groundwater and crops.

Keywords: wastewater, dairy industry, bioremediation, crops.

ENVIRONMENTAL ENRICHMENT IN CAPTIVE BEAR ENCLOSURES

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ABSTRACT

Environmental enrichment includes the provision of a dynamic environment, cognitive challenges and social opportunities to various species of animals in captivity. It is also known as behavioural enrichment and provides species-specific challenges and opportunities to promote the exhibition of natural behaviour and respond positively to potential stressors. This article highlights the various environmental enrichment protocol used in captive bear enclosures and their benefits on the behaviour and welfare of the animals. It is found that morphologically fixed, repetitive, apparently purposeless behavioural patterns termed stereotypes commonly occur in captive animals subjected to stress and boredom and is an indicator of poor animal welfare. Captive carnivores are more prone to such abnormal behavioural patterns. Among the carnivores, captive bears are the most susceptible species due to their highly active lifestyle in the wild. Bears in the wild spend considerable time foraging for a wide variety of food items. In captivity, food and water are supplied, the territory is already delineated, social groupings are usually fairly stable, there are no predators to avoid, and quite often mates are selected for them. With all the extra free time, the animals require new and challenging activities for physical and mental stimulation. The different facets of environmental enrichment can be broadly classified as sensory stimulation, manipulative engagement and cognitive enrichment. The provision of devices or activities that result in the engagement of one or more senses comes under sensory stimulation. Manipulative engagement often occurs as a part of exploratory behaviour such as food-seeking and foraging. Both these lead to cognitive engagement such as learning and problem-solving. Enrichment is found to support positive mental welfare and encourages natural behaviour in captive animals. This is important to satisfy ethical considerations and to achieve the goals of conservation.

Keywords: Enrichment, stereotypes, captive bears, behaviour, welfare

GAMIFICATION OF SCIENCE COMMUNICATION: USING GAMES TO ENGAGE AND EDUCATE PEOPLE ABOUT SCIENTIFIC CONCEPTS

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ABSTRACT

The process of communicating scientific findings and knowledge to a wider audience is known as science communication. It is necessary for the general public's comprehension of science and its function in society and is an essential component of the field. The use of games in science communication has become increasingly popular in recent years. It has been demonstrated that game-based learning is a useful method for educating and engaging individuals about scientific concepts. The process of using game elements like challenges, rewards, and interactivity to make science communication more engaging and interactive is referred to as gamification of science communication. This paper looks at examples of successful game-based science communication initiatives as well as the advantages and drawbacks of using games in science communication.

Benefits of Science Communication Gamification:

Benefits of Science Communication Gamification:

There are numerous advantages to using gamification in science communication. First and foremost, games are engaging and capable of capturing players' attention, particularly younger audiences. The learning experience can be made more enjoyable and fun when science communication is presented in the form of a game, which can result in increased interest and engagement with scientific concepts. Second, scientific concepts can be taught in an interactive and understandable way through games. The cause-and-effect relationships between various variables can be observed through player experimentation with various scenarios. Thirdly, games can give players immediate feedback and rewards, which can encourage them to keep learning and exploring scientific ideas.

Problems with Science Communication Gamification:

While there are numerous advantages to gamifying science communication, there are also some issues that must be resolved. To begin, a game's design must be carefully considered to ensure that it effectively conveys scientific concepts. The game's mechanics should be challenging but not overly complicated, and they should be in line with the learning goals. Second, there is a possibility that games will oversimplify scientific concepts, resulting in misunderstandings and misperceptions. It is essential to make certain that the games accurately depict scientific ideas and are founded on sound scientific principles. Thirdly, there is a possibility that games will be viewed more as a form of entertainment than as a means of learning, which could damage their credibility as a teaching tool.

Game-Based Science Communication Initiatives That Have Worked:

Gamification of science communication has had many positive outcomes. Foldit, a protein folding game developed by the University of Washington, is one such example. Scientists gain a better understanding of the structure and function of proteins by having players fold proteins into their correct three-dimensional structures. EteRNA, a game in which players must create RNA molecules with particular functions, is another illustration. New RNA structures and functions that could be used in biotechnology and medicine have been discovered thanks to this game.

Conclusion

Learning about scientific concepts can be made more interactive and engaging through gamification of science communication. Games have the potential to pique a player's interest while also providing a fun

and enjoyable learning experience. However, careful consideration must be given to the design of games in order to guarantee that they accurately represent scientific concepts and are in line with learning goals. New and creative game-based science communication initiatives that can inspire and educate people about the wonders of science are plentiful as technology advances.

Keywords: gamification, science, AI, science, communication

BIOECONOMY: A MECHANISM FOR SOLVING THE FOOD CRISIS

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ABSTRACT

The limits of the intensification of the production of agricultural products and food were determined by the possibility of using the renewable resources of the planet (energy, mineral resources for the production of machinery, fertilizers).

The crisis that arose after the unprovoked Russian invasion of Ukraine clearly shows that food security needs to be strengthened.

Modern science continues research on the improvement of farming systems, a set of measures to restore soil fertility, based on the understanding of the biological cycle of matter and energy in nature, taking into account the set of factors that shape the soil profile and fertility.

At the same time, as a result of the unreasonably large alienation of productive lands for non-agricultural needs and the progressive degradation of soils in the agro-industrial complex, the problem of decreasing soil fertility and loss of land resources is the main environmental problem of today.

Technologies could certainly contribute to the growth of agricultural productivity and the solution of the food problem in poor and developing countries. However, they are practically inaccessible to local farmers. Therefore, agricultural biotechnologies are currently not a sufficient condition for providing the world with food - they primarily ensure the maximization of the profits of farmers in developed countries.

Biotechnology has turned from an ordinary industry into a system-creating factor in the development of the economies of individual states and the world economy in general.

Thanks to the achievements of biotechnologies and the development of bioeconomy - an economy that provides for the use of biotechnologies, in the coming decades, humanity will be able to make full use of the plant as the cheapest and most environmentally safe factory for the production of most of the materials, food, medical drugs, chemical compounds, raw materials, etc. necessary for humans, and most importantly - believing food security.

Biotechnology helps the environment, because it reduces the risk of toxic contamination of soils and groundwater, and increases the efficiency of agriculture. As a result, providing food for the ever-growing population can be combined with stopping the trends of environmental destruction.

Keywords: Bioeconomy, Biotechnology, Ecology, Sustainable Development, Biomass.

INTRODUCTION

Developed countries, home to 21% of the world's population, account for 46% of the world production of grain crops (including wheat - 54%), potatoes - 58%, sugar - 32%, oil - 34%, meat - 45% , milk - 60%.

The situation with providing food products of own production in the least developed countries, where 43% of the world's population lives, is difficult. They provide, respectively, 24% of world grain production, potatoes – 19%, sugar – 24%, oil – 24%, meat – 9%, milk – 10%. The traditional system of agriculture, which provides the bulk of food in these countries, is not designed for such a large population.

Even more striking is the inequality in the distribution of the world consumption fund: the share of developed countries in the world consumption fund for all products (except rice) significantly exceeds the share of their population in the world. The uneven distribution of production and consumption in the world leads to a situation where in some countries there is malnutrition and hunger, and in others - excess production and consumption of food.

This state of the world food system implies a mandatory increase in the intensification of production and an increase in the circulation of food products through the channels of domestic and foreign trade for the normal supply of food products to the global population. It is absolutely obvious that there is a need for further development and expansion of the capacity of the world agro-food market, as well as the equalization of its certain disparities, based on the search for new biotechnologies.

The main advantages of agricultural products obtained with the help of new biotechnologies include:

- increasing the yield of crops due to providing them with specified properties and reducing losses from diseases and pests;
- reducing the use of pesticides and herbicides and thus reducing the chemical impact on the soil;
- releasing renewable natural resources, replacing them with more productive ones obtained with the help of biotechnology;
- creation of food products with predefined properties, for example, from products for people with diseases of the digestive system, for cancer and AIDS patients, milk substitutes for babies;
- creation of flavorings and food additives on a natural, not chemical basis (it is known that the capacity of the world market of flavoring and food additives, for the production of which chemical compounds are used, is more than 6 billion US dollars annually);
- reducing the level of impact on the environment due to the use of less harmful methods of soil cultivation; - reduction of plant and animal diseases.

In the development of human society in the third millennium, a decisive role is assigned to biotechnological research, including in the field of agrarian biotechnology and sustainable agriculture. In this connection, it is advisable to turn to the identification of modern concepts, which reveal the possible impact of new agricultural technologies on man and his environment (Oleshko, Olshanska, Budiakova, Bebko, 2022).

RESEARCH AND FINDINGS

Among many scientific concepts and views on ways to overcome the food problem, several main ones can be singled out. First of all, these are concepts that directly connect the provision of food to the population with the demographic situation on Earth. The second group should include technocratic teachings. Less numerous, but extremely versatile, is the humanistic direction (Olshanska, 2022).

Over the entire history of human economic activity, the total area of land that has irretrievably lost productivity is estimated at 200 million hectares. This is much more than the entire modern arable land of the planet. Now the irreversible average annual costs of productive land in the world reach 6-7 million hectares (according to estimates, twice as much). This is 30-35 times higher than the average annual loss during the 10,000-year history of agriculture.

Comparison of the loss of land resources with population growth shows that now per capita in the world there is an average of 0.3 hectares of arable land in 10 years will be 0.25 hectares.

What determines such large losses of arable land? There are many reasons for this process, and their number is growing along with the intensification of human activity in the separation of substances from nature.

Among them, the main ones are progressive desertification, water and wind erosion, flooding, inundation and repeated salinization of soils during hydrotechnical construction, alienation of land for non-agricultural needs, growing chemical pollution with heavy metals, oil, petroleum products, etc.

Rational use of land, smart specialization of agricultural branches, reuse of biomass are possible on the basis of bioeconomy knowledge.

Ukraine is one of the countries with favorable soil and climate conditions, its arable land is 67.7% of chernozems - the most fertile soils in the world.

Unfortunately, favorable conditions given by nature are used irrationally. Intensification of agriculture leads to growing human influence on resources, which leads to a change in their original properties.

In the post-war period, the bioeconomy should be a priority to support Ukrainian economic recovery, as a sustainable bioeconomy returns resources to the real sector, creates jobs, promotes environmental production and consumption, and makes optimal use of limited resources on a circular basis (Oleshko, Olshanska, Budiakova, Bebkko, 2022).

CONCLUSION

Taking into account the development of bioeconomy and knowledge about the use of biomass and mitigating the consequences of climate change and climatic conditions, the zoning of agricultural production, its smart specialization, is possible.

The development of the bioeconomy depends on the fulfillment of socio-economic and ecological tasks for the coming years and the future, as well as the development of the biosphere as a whole.

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DIFFERENT BIOMARKERS FOR QUANTIFYING HEAT STRESS REPOSE IN LIVESTOCK

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ABSTRACT

Sustaining livestock production in the changing climatic scenario is very important from economic perspective. There are several approaches available to sustain livestock production. Among the various approaches, genetic approach offers a permanent solution for sustainable livestock production in the changing climatic scenario. Molecular genetics play a vital role in imparting climate resilient potential to livestock. The advanced molecular tools, makes it possible to identify different biomarkers to quantify heat stress response in livestock. There are various biomarkers available which are specific to different adaptive mechanism in livestock. The Behavioral biomarkers include feed intake, water intake, drinking frequency, rumination time, defecating frequency and urinating frequency. Likewise, Physiological biomarkers include respiratory rate, rectal temperature, skin temperature and sweating rate. The Biochemical markers include hemoglobin, hematocrit, AST, ALT and Non-Esterified Fatty Acid (NEFA). The various endocrine biomarkers for climate resilience in livestock are cortisol, triiodothyronine (T3), thyroxine (T4) and aldosterone. The molecular biomarkers include heat shock factor 1, HSP 27, HSP 40, HSP 60, HSP 70, HSP 90 AND HSP 110. These identified biomarkers could be incorporated in the existing breeding programs through Marker Assisted Selection (MAS). Such an approach may help to develop more climate resilient livestock breeds. Such identified breeds may have the potential to produce optimally in addition to having the potential in surviving adverse environmental conditions. Thus, refining the existing breeding programs through MAS comprising traits governing adaptation and production could be the way forward approach for sustainable livestock production in the changing climate scenario.

Keywords: Biomarkers; Climate; Heat Stress; MAS; Thermo-tolerance.

**SHELTER MANAGERMENTAL STRATEGIES FOR PROTECTING GOATS FROM
CLIMATIC STRESS**

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ABSTRACT

Climate change is an alarming issue in the recent past affecting the livestock production, food security and the economy of the country. The increment in the environmental temperature with altered precipitation rates, increased carbon dioxide concentration, variation in relative humidity, frequency and magnitude of extreme environmental events such as heat waves, severe drought conditions, and coastal flood affects the critical factors for livestock production mainly the water availability, quantity and quality of forages, animal welfare, disease resistance and production ability. The intensity and duration of heat stress also affects livestock health by causing metabolic disruptions, oxidative stress, and immune suppression causing infections and death. Goats are excellent thermoregulators adapted to survive in harsh environments of the arid and semi arid regions wherein the microclimate plays a significant role in the animal productivity and welfare. The effect of climate change associated environmental stress can be nullified by providing suitable microclimate which favours metabolism, improved feed utilization and planned production results. Shelter management strategies play a key role in maintaining suitable microclimate for the livestock where the basic indices for evaluation of microclimate include the Temperature–Humidity Index (THI), The Black Globe Temperature (BGT), Heat Load Index (HLI) and Accumulated Heat Load index (AHLI). The objective of this paper is to define the shelter managerial strategies for protecting goats from climatic stress, choosing the most optimal shelter design, novelties in shelter management and sequencing the measures that affect the regulation of the microclimatic parameters for possible future implementation in automatic climatic systems for use in livestock buildings.

Keywords: Climate change, microclimate, heat stress, shelter management

**CLIMATE RESILIENT LIVESTOCK PRODUCTION: SIGNIFICANCE OF IDENTIFYING
AGRO ECOLOGICAL ZONES SPECIFIC BREEDS**

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ABSTRACT

Among the different components in agricultural sector, livestock are tipped to be highly climate resilient therefore, identifying climate resilient livestock breeds gains significance from economic perspective. Indigenous livestock can play a significant role in ensuring the livelihood security for poor and marginal farmers especially in the tropical countries. It is very essential to identify livestock breeds with a potential not only to adapt but also to produce optimally in adverse environment condition. The policy makers must ensure dissemination of appropriate breeds among the poor and marginal farmers. There is severe paucity of information pertaining to climate resilient indigenous livestock breeds. Therefore, generating base line information in unexplored indigenous breeds is of paramount importance. This is especially true given the fact that differences do occur for climate resilience even among indigenous breeds. Therefore it is the need of hour to identify more climate resilient livestock breeds and testing their survivability in multiple locations. This approach may help to identify breeds various indigenous livestock breeds which could have the potential to survive and produce optimally in specific environment. This will help the great deal in disseminating most appropriate breeds through specific agro ecological zone. This approach may help a farmer from a specific location to secure his livelihood by rearing suitable other indigenous breeds specific to a different location. This may play a vital role to ensure optimum economic income for the resource poor farmers. Hence research efforts pertaining to identifying specific agro ecological zone breeds gains momentum in the changing climate scenario.

Keywords: Adaptation; Climate resilience; Indigenous breeds; Livestock; Thermo- tolerance

**EFFECT OF VEGETABLE WASTAGE INCORTORATED *SPIRULINA* DIET ON THE
PIGMENTATION OF GOLD FISH**

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ABSTRACT

There are too much vegetable wastages are available at the local vegetable market at any season and the nutritional values of that vegetable wastes are also high. On the other hand, *Spirulina* is blue green algae which is known as superfood and rich source of pigments. The study was conducted to observe the colour changes in Gold fish by giving them feed prepared from the wastage of vegetables with the incorporation of *Spirulina* powder. The study was conducted for 3 months and pigment estimation was done as total carotenoid concentration at the initial stage of the experiment and at the end of the experiment. The monthly growth of fishes fed on the different feeds (commercial feed (F-1), control feed (F-2) and the experimental feed (F-3)) was measured with reference to length and calculated as length growth percentage of the fish and found higher length gain percentage in case of experimental fishes as it was 7.84 % at the end of the experiment. The colour variation of fishes was observed at 475 nm and found the best total carotenoid concentration in the experimental fishes (fed on F-3 feed) as it was measured 0.157 µg/g with compare to fishes fed on commercial feed (F-1) and control feed (F-2) as it was 0.058 µg/g and 0.040 µg/g. It was observed that the survival rate of experimental fishes was 100 % during the experiment.

Keywords: *Spirulina*, Vegetable waste, Goldfish, Pigmentation.

STUDIED THE EFFECT OF COW URINE AS A NUTRIENT ON THE GROWTH OF
SPIRULINA MAXIMA IN INDOOR CULTURE

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ABSTRACT

Spirulina is a typical blue-green algae with a spiral shape. Minerals, 24 different types of salts, 2.5% urea, 2.5% enzymes and 95% water are found in cow urine. Additionally present are ammonia, iron, phosphorus, potassium, carbonic acid, nitrogen, manganese, calcium, iron and sulfur, as well as amino acids, cytokines, enzymes, lactose, potassium and phosphate. The study's goal is to assess the use of cow urine as a nutrient substitute in the cultivation of *Spirulina maxima*. This study is the first in a series that will look at *Spirulina* nutrition as a fish feed source and the growth of *Spirulina* in cow urine. To produce a more affordable, sustainable and nutrient-dense meal that can be efficiently produced and supplied locally. An experimental study was conducted using five treatments of 0 ml, 0.2, 1 ml, 2 ml, 3 ml and 4 ml in 200ml. 0 ml is taken as control. This study conducted for 18 days in laboratory of Aquatic Biology (VNSGU). The results showed that *Spirulina* grown with urine at a concentration of 200 ml/0.2 ml performed better in terms of dry weight. Chlorophyll-a (8.0217 mg/L) in 200 ml/2ml, chlorophyll-b (2.1915 mg/L) in 200ml/0.2 and chlorophyll-c (0.6309 mg/L) in 200ml/4ml were observed. The concentration of chlorophyll a, b and c is higher than the control. As a result of this study, it is possible to conclude that cow urine can be used as a nutritional substitute in *Spirulina maxima* cultivation.

Keywords: *Spirulina maxima*, Cow urine, Growth (Dry weight), Chlorophyll

**CONSTRUCTED WETLANDS COUPLED WITH TUBESETTLER AND AERATION FOR
HOSPITAL WASTEWATER TREATMENT**

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ABSTRACT

Hospital, residential, and municipal wastewater all contain pharmaceutical compounds that are introduced from patient excreta. When handling hospital waste water, health and environmental agencies are faced with a challenging issue. Pharmaceutically active substances have a negative impact on sexual function, infertility, and the growth of bacterial resistance in both humans and aquatic life. Hospitals and healthcare institutions are another point source of pharmaceutical chemicals that have mainly been ignored in investigations. Due to its complexity and high propensity to spread disease, hospital wastewater poses a constant risk to the environment and human health security. To prevent pharmaceutical substances from contaminating the environment, hospital wastewater treatment, which is an integral aspect of any urban landscape, hasn't yet received much attention. The created wetland with tube settler is an appropriate, affordable, and environmentally beneficial choice for the restricted hospital aeration. Comparison of the removal of contaminants from hospital wastewater using constructed wetlands, along with the accompanying tube settler and aeration. A green, sustainable, ecological, and biological technology is the constructed wetland. The removal of nutrients, organic, inorganic, and poisonous materials from the environment is the consequence of the treatment process, which is based on the physical, biological, and chemical synergies of plants and microbes for their substrate. Both main and secondary wastewater has been successfully treated in constructed wetlands.

Keywords: Constructed wetland, Pharmaceutical compounds, Aeration, Tube settler, Treatment.

QUATERNARY SALTS: SYNTHESIS AND ENZYME INHIBITION STUDIES

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ABSTRACT

α -Glucosidase is a primary target for the development of anti-diabetic drugs, and its inhibitors are known to provide anti-hyperglycemic effects and aid in decreasing post-prandial blood glucose levels. In the present study, a series of benzimidazolium salts were synthesized, characterized by ¹H-NMR, ¹³C-NMR, and EI-MS and screened for in vitro α -glucosidase inhibitory activity. The synthesis was carried out through a multistep procedure, involving the synthesis of benzimidazole, N-alkylation and quaternization. The characterization of synthesized compounds was carried out by NMR, MS and xrd techniques. All the synthesized derivatives displayed a varied degree of α -glucosidase inhibitory potential having IC₅₀ values ranging between 14 ± 0.013 to 279.28 ± 0.030 μ M. Docking studies revealed the active interactions of docked compounds with amino acid residues Asp327, Asp203, Asp542, and Asp443.

Keywords: Benzimidazoles, Quaternary Salts, Biological Activities, Enzyme Inhibition

INTEGRATION OF ISLAMIC VALUES IN BIOLOGY SCIENCE LEARNING

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ABSTRACT

National education in Indonesia aims to form people who believe and pious and have a noble character, not only develop the potential of intelligence cognitive. One effort that can be done to realize the goal This is by developing Islamic values of students through integration of the Koran and Hadith in biology learning. Koran integration and Hadith in learning biology can direct the formation knowledge of biological concepts and can also develop students' Islamic values. This research method is a literature study (library research) conducted by collecting various sources of information relevant articles such as scientific journal articles, books, and other sources about integration of the Koran and Hadith in learning biology to develop Islamic values of students. Research results show the importance of integrating Islamic values in science learning into a normative framework in formulating educational goals, that the objectives of instilling Islamic values: (1) develop deeper spiritual insights and develop a rational understanding of Islam in the context of life, especially those related to the verses of kauniyah (nature). (2) Equipping students with various natural knowledge abilities. (3) Developing the ability in students to appreciate and justify the comparative superiority of the treasures of Islamic knowledge over all other treasures of knowledge. (4) Improving emotional drive through imaginative experiences, so that creative abilities can develop and function to know Islamic norms right and wrong. (5) Helping growing children to learn to think logically and guiding their thinking processes based on the hypotheses and concepts of natural knowledge required.

Keywords: Integration, Islamic value, biology, Learning

TRANSPORTATION STRESS IN FARM ANIMALS: IMPACT ASSESSMENT AND STRATEGIES TO AMELIORATE**E.Binuni Rebez¹**¹*Rajiv Gandhi Institute of Veterinary Education and Research, Kurumbapet, Puducherry-605009, India*¹*ORCID ID: <https://orcid.org/0000-0002-6360-2581>***V.Sejian²**²*Rajiv Gandhi Institute of Veterinary Education and Research, Kurumbapet, Puducherry-605009, India***ABSTRACT**

Transportation is considered as important animal husbandry practice and paramount stressor having deleterious effects on health, growth, performance and productivity of livestock. The aim of this paper is to synthesise information on different types of transportation stress and its impacts in livestock. Sea transport involves lateral movements, noise, ammonia accumulation, weather extremes, poor ventilation, limited space and difficulties in balance maintenance. Road transport stress includes; loading, confinement, poor air quality, vibration, noise, stakeholder attitudes, driving skills, road conditions, temperature extremes, diseases, food and water deprivation, mixing animals, stocking density and lack of bedding. Rail transport involves stressors like; repeated loading, high density confinement, lengthy waiting times, extended feed and water deprivation periods, varied microclimatic conditions, exposure to noxious gases, motion and loud noises. An animal's response to the effects of transportation stress creates a complex interaction between neurons and hormones. Behavioural responses like vocalisation, aversion, freezing, frequent urination and defecation, aggressive and sexual behaviours; physiological responses like increased heart rate, panting score, respiratory rate, osmolality, free fatty acids, β -hydroxy butyrate, muscle tremors and urea with decreased glucose levels; blood-biochemical and endocrine responses like increased total protein, albumin, PCV, cortisol, creatine kinase, lactate dehydrogenase, AST, ALT, vasopressin, epinephrine, norepinephrine, β -endorphins, ACTH, serum LPS, lactic acid, TNF- α , IL-1 β , IL-6, IL-10, IL-4, WBC, Monocyte, granulocyte %, MCHC, Platelets, etc. Different biomarkers of transport stress in livestock includes *HSP90*, *HSP70*, β -hydroxybutyrate, Haptoglobin, Fibrinogen, Cortisol, Dehydroepiandrosterone (DHEA), Cortisol : DHEA ratio, Testosterone, Progesterone, Total leukocyte count, Serum amyloid A, C-reactive protein, Apolipoprotein, In-IGF-I and IGF-II and Insulin-like Growth Factor Binding Protein, Total antioxidant capacity, etc. The strategies to mitigate transport stress include; nutritional manipulation, genetic selection, environment enrichment, habituation to human handling and biomarker-associated welfare indicators. These strategies when actively implemented might help in reversing economic loss incurred through different transportation stressors in livestock.

Keywords: Animal welfare; Biomarkers; Genetics; HSPs; Transport stress.

CRYSTAL STRUCTURE AND ELECTRONIC STRUCTURE OF QUATERNARY SEMICONDUCTORS $\text{Cu}_2\text{ZnTiSe}_4$ AND $\text{Cu}_2\text{ZnTiS}_4$ FOR SOLAR CELL ABSORBER

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ABSTRACT

We design two new I2-II-IV-VI4 quaternary semiconductors $\text{Cu}_2\text{ZnTiSe}_4$ and $\text{Cu}_2\text{ZnTiS}_4$, and systematically study the crystal and electronic structure by employing first-principles electronic structure calculations. Among the considered crystal structures, it is confirmed that the band gaps of $\text{Cu}_2\text{ZnTiSe}_4$ and $\text{Cu}_2\text{ZnTiS}_4$ originate from the full occupied Cu 3d valence band and unoccupied Ti 3d conducting band, and kesterite structure should be the ground state. Furthermore, our calculations indicate that $\text{Cu}_2\text{ZnTiSe}_4$ and $\text{Cu}_2\text{ZnTiS}_4$ have comparable band gaps with $\text{Cu}_2\text{ZnTSe}_4$ and Cu_2ZnTS_4 , but almost twice larger absorption coefficient. Thus, the materials are expected to be candidate materials for solar cell absorber.

Keywords: quaternary semiconductors, kesterite, solar cell

SYNTHESIS, CHARACTERIZATION, BIOLOGICAL ACTIVITY AND DNA BINDING OF PYRIDAZINE CONTAINING IMIDAZOLIDINE MOIETY

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ABSTRACT

New binuclear transition metal complexes K1–6 bearing the bioactive Imidazolidine analogs were prepared and distinguished by spectroscopic and elemental analysis methods. The interaction of calf thymus DNA (CTDNA) with the synthesized compounds was studied at physiological pH by spectrophotometric, spectrofluorometric, cyclic voltammetry, and viscometric techniques. The entire DNA binding results suggested the intercalative mode of binding for the synthesized compounds. Interestingly, the binding strength of the complexes is found to be greater than that of the free ligands. Among the complexes explored, complex K5 reveals strong hypochromism and a slight red shift as compared to the other complexes highlighting its higher DNA binding propensity. The intrinsic binding constant values of the complexes compared to cisplatin reveal that all the complexes are greater in magnitude than that of cisplatin. Fluorescence titrations show that the Cu(II) complexes have the ability to displace DNA-bound ethidium bromide. Also, these compounds induce cleavage in pBR322 plasmid DNA as indicated in gel electrophoresis and exhibit excellent nuclease activity in the presence of H₂O₂. Moreover, the complexes were screened for in-vitro antimicrobial activity along with free ligands and solvent control. The outcome is that the complexes possess good activity than the free ligands.

Keywords: Biological Activity. Heterocyclic compounds. Pyridazine. DNA Binding

Introduction

The heterocyclic 1,2-diazine is called pyridazine, officially derived from the replacement of two carbon atoms of the benzene ring by atoms of nitrogen. The discovery of biological activity in a series of pyridazine derivatives stimulated the vigorous growth of investigations in this area. Pyridazines further drew our attention because of their easy functionalization at various ring positions of pyridazine ring, which makes them attractive synthetic building blocks for designing and development of novel pyridazine based pharmacotherapeutic agents. During the last ten years, there has been in increased attentions preparation and the most important Characteristics of pyridazines fused heterocyclic derivatives such as pyridopyridazinones, pyridazines, and pyridazinones as a result of they are substantial biologically active scaffolds, antipyretics, analgesic, anti-inflammatory, possessing antihypertensive and protein tyrosine phosphatase 1B (PTP1B) inhibitors. These components have been screened as agents of tuberculostatic, antiasthmatics, cardiogenic, anti-tumor, anticancer, selective COX² inhibitor anti-HIV, analgesics, herbicides, antibacterial, diuretic, antituberculosis, antifeedant, fungicides present muscle relaxant activities, inflammation inhibitors, antihypertensive, anticonvulsant and antispasmodic. They are active in the therapy of complications of diabetic and inhibit blood platelet aggregation. Lately, the nucleus of pyridazinone has been extensively studied in a variety of medicinal agents, particularly as an important pharmacophore in the search for drugs acting on the cardiovascular system and in particular, intermediates for drugs and agrochemicals

In this study, we are reporting the synthesis, characterization and biological activities of Schiff base derived from pyridazine containing imidazolidine moiety and their metal complexes and to study their coordination behavior, spectral, biological activity and DNA binding.

Experimental**Instruments**

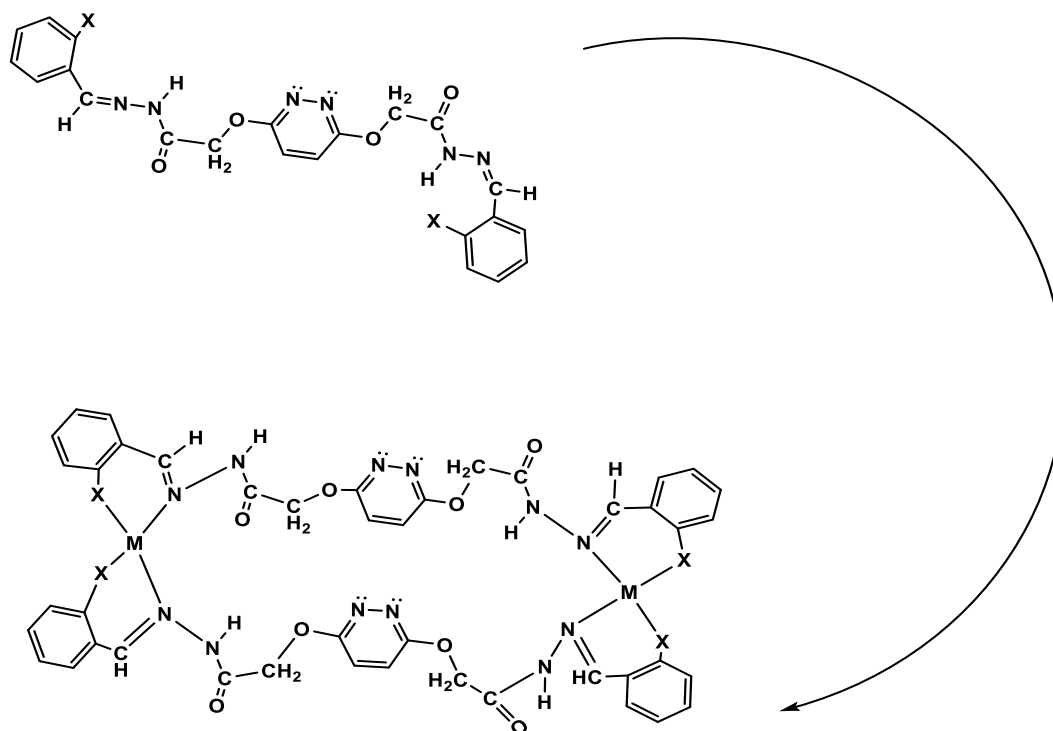
Gallenkamp electric melting point apparatus was used to measure the melting points for all synthesized compounds. While used SHIMADZU FT.IR 8300 spectrophotometer to record FT.IR spectra for all synthesized compounds. Also applied UV/Vis varian UV-Cary-100 spectrophotometer to record UV/Vis spectra for all synthesized Ligand and their complexes. And ^1H NMR spectra were measured on BRUKER- 400 MHz operating 300 MHz spectrometer and the chemical

Finally, the biological activity against various microorganisms has performed the complexes and ligand. Molar conductivity of the complexes was measured on pw 9526 digital conductivity in DMSO at 10^{-3}M . Magnetic susceptibility was recorded by magnetic susceptibility balance, made, Ms-BMKI and made in Al-Nahrain University.

Synthesis of compound 2,2'- [pyridazine-3,6-diylbis(oxy)]diacetyl chloride A [7].

To (0.02 mol) of a chloroacetyl chloride solution in 15 ml ethanol, (0.02 mol) potassium bicarbonate and (0.01 mol) of pyridazine-3,6-diol in chloroform (20 mL) were added with stirring during (30 minutes) at $(5)^\circ\text{C}$ temperature the reaction mixture was heated under reflux for 5h. The output got after cooling onto water (25 mL) was filtered off from ethanol and crystallized to get a component A as yellow yield.

It was obtained as yellow crystals from ethanol, yield 65%; m.p. $105-107^\circ\text{C}$. IR (KBr): $\nu\text{ cm}^{-1}$, 3045 (CH_{arom}), 2954 (CH_{aliph}), 1762 ($\text{C=O}_{\text{acetyl chloride}}$), 1247 (C-O); 710 (C-Cl); ^1H NMR (DMSO-d_6): $\delta = 5.09$ (s, 2H, CH_2), 7.12 (s, 1H, C=). ^{13}C NMR (DMSO-d_6) $\delta\text{ C} = 79.35$ (s, 2CH_2), 120.76 (2C=), 154.21, (2CO), 170.34 (2COCl); Anal. Calc. for $06\text{ C}_8\text{H}_6\text{N}_2\text{O}_4\text{Cl}_2$; (265.50): C, 36.25; H, 2.28; Cl, 26.75; N, 10.57% Found: C, 35.87; H, 2.13; Cl, 26.37; N, 9.45%. ES mass spectrum at $m/z = 264$ (80%) for $\text{C}_8\text{H}_6\text{Cl}_2\text{N}_2\text{O}_4$, requests = 263.97 The other bonds revealed at $m/z = [\text{M}+\text{H}]^+$ (68%) for $\text{C}_8\text{H}_{12}\text{N}_6\text{O}_4$, requires = 263.97 The other bonds revealed at $m/z = 202$ (37%), 188 (24%), 172 (13%) 112 (43%), 110 (21%), 80 (13%), 48 (8%) correspond to $[\text{M}+ (\text{COCl})]^+$, $[\text{M}+ (\text{CO} + \text{CH}_2\text{Cl})]^+$, $[\text{M}+ (\text{COCl} + \text{CH}_2\text{O})]^+$, $[\text{M}+ (2\text{CO} + 2\text{CH}_2\text{Cl})]^+$, $[\text{M}+ (2\text{COCl} + \text{CH}_2\text{O})]^+$, $[\text{M}+ (2\text{COCl} + 2\text{CH}_2\text{O})]^+$, $[\text{M}+ (2\text{COCl} + 2\text{CH}_2\text{O} + \text{C}_4\text{H}_4)]^+$ respectively.



Scheme1

Synthesis of compound 2, 2'-[pyridazine-3, 6-diylbis (oxy)] diacetohydrazide B [8].

The ethanolic solution of compound (A) (0.005 mol) and hydrazine hydrate (85-99%) (0.10 mol), was added and the finished reaction was refluxed on the anhydrous state for 11 h. The solution was settled, cooled and into crushed ice teemed down. The resulting dark yellow solid compound (B) was separated out and filtered, washed with water, dried and recrystallized from ethanol.

It was gotten from ethanol as yellow crystals, yield 63%; m.p. 157-159°C ;IR (KBr): ν cm⁻¹ 3437-3321 (NH), 3059 (CH_{arom.}), 2959 (CH_{aliph.}); 1673 (C=O); 1582 δ (NH), 1253 (C-O); ¹H NMR (DMSO-d₆): δ = 5.08 (s, 2H, NH₂), 5.21 (s, 2H, CH₂), 7.02 (s, 1H, C=). 9.18 (s, H, NH) ¹³C NMR (DMSO-d₆) δ C = 70.12 (s, 2CH₂), 120.78 (2C=), 154.7, (2CO), 168.06 (2CON); Anal. Calc. for C₈H₁₂N₆O₄ ;(256.22): C, 36.50; H, 4.72; N, 32.80% Found: C, 36.81; H, 4.27; N, 32.19%. ES mass spectrum at m/z = 257 [M+H]⁺ (70%) for C₈H₁₂N₆O₄, requires = 256.09 The other peaks detected at m/z = 241.4 (86%), 226.19 (20%), 198.18 (9%) and 196 (12%), 168.16 (20%) 153.14 (14%) and 80 (38%) correspond to [M - NH₂]⁺, [M - (N₂H₄)]⁺, [M - (N₂H₄ + CO)⁺ and [M - (N₂H₄ + CO + OCH₂)]⁺, [M - (2N₂H₄)]⁺, [M - (2N₂H₄ + 2CO)]⁺, [M - (2N₂H₄ + 2CO + 2CH₂)]⁺ respectively.

Preparation of Compounds C1 and C2: General Procedure

A mixture of compound (B) (0.005) with 2-Carboxybenzaldehyde or 2-hydroxy benzaldehyde (0.005 mole), with few drops of glacial acetic acid in absolute ethanol (20 mL) was refluxed for (7 hrs.). After the finished reaction, It was cooled and filtered to give product, that was from ethanol re-crystallized to output C1 and C2.

2,2'-(((2,2'-(pyridazine-3,6-diylbis (oxy)) bis (acetyl)) bis (hydrazin-2-yl-1-ylidene)) bis (methaneylylidene)) dibenzoic acid (C1)

It was obtained as yellow crystals from ethanol, yield 70%; m.p. 210-212 °C. IR (KBr): ν cm⁻¹ 3372, (OH); 3372, (NH); 3083 (CH_{arom.}), 2978 (CH_{aliph.}); 1670 (C=O); 1645 (C=O); 1610 δ (NH), 1598 (C=N); 1271 (C-O); ¹H NMR (DMSO-d₆): δ = 4.34 (s, 4H, CH₂), 6.75-8.21 (s, 8H, C=), 8.08 (s, 2H, CH=N), 10.78, 12.82 (s, 2H, NH), 13.07 (s, 2H, COOH) ¹³C NMR (DMSO-d₆) δ C = 70.07 (s, 2C, CH₂), 120.23 (s, 2C, C=C_{pyrz}), 122.34-136.76 (m, 12C, C=C), 142.17 (s, 2C, C=N), 151.57 (s, 2C, C=N_{pyrz}), 168.06 (s, 2C, COOH), 172.65 (s, s, 2C, CON); Anal. Calc. for C₂₄H₂₀N₆O₈ (520.46): C, 55.39; H, 3.87; N, 16.15%. Found: C, 54.98; H, 3.75; N, 15.86 %. EIMS mass spectrum at m/z = 520.46 [M-H]⁺ (64 %) for C₂₄H₂₀N₆O₈, requires = 521. The other peaks detected at m/z = 400 (9%), 386 (43%), 278 (56 %), 359 (6%), 329 (22%), 299 (18%), 169 (20%), 139 (14%) and 80 (3%) correspond to [M - C₇H₅O₂]⁺, [M - (C₇H₅O₂ + CH₂)]⁺, [M - (2C₇H₅O₂)]⁺, [M - (C₇H₅O₂ + CH₂ + N₂H₂)]⁺, [M - (C₇H₅O₂ + CH₂ + N₂H₂ + CO)]⁺, [M - (C₇H₅O₂ + CH₂ + N₂H₂ + CO + CH₂)]⁺, [M - (2C₇H₅O₂ + CH₂ + N₂H₂ + CO + CH₂)]⁺, [M - (2C₇H₅O₂ + 2CH₂ + 2N₂H₂ + CO + CH₂)]⁺ and M - (2C₇H₅O₂ + 2CH₂ + 2N₂H₂ + 2CO + 2CH₂)]⁺ respectively.

2,2'-(pyridazine-3,6-diylbis(oxy))bis(N'-(2-hydroxybenzylidene)acetohydrazide) (C2)

It was obtained as brown crystals from ethanol, yield 63%; m.p. 157-159 °C. IR (KBr): ν cm⁻¹, 3372 (OH); 3437-3321 (NH), 3059 (CH_{arom.}), 2959 (CH_{aliph.}); 1673 (C=O); 1615 δ (NH), 1582 (C=N); 1253 (C-O); ¹H NMR (DMSO-d₆): δ = 4.31 (s, 4H, CH₂), 6.70-8.19 (s, 8H, C=), 8.24 (s, 2H, N=CH), 10.83 (s, 2H, NH), 11.43 (s, 2H, OH) ¹³C NMR (DMSO-d₆) δ C = (DMSO-d₆) δ C = 70.12 (s, C, CH₂), 119.43 (s, C, C=N), 120.78-137.00 (m, 10C, C=C), 142.43 (s, C, C=N), 154.7 (s, 2C, C=N_{ring}), 170.21 (s, C, CON) 172.65 (s, C, CO); Anal. Calc. for C₈H₁₂N₆O₄ ;(256.22): C, 37.50; H, 4.72; N, 32.80% Found, 36.81; H, 4.27; N, 32.19. EIMS mass spectrum at m/z = 464.14 [M+H]⁺ (43%) for C₂₂H₂₀N₆O₆, requires = 465 The other peaks detected at m/z = 372 (61%), 280 (16%), 266 (41%), 234 (39%), 206 (54%) 162 (5%), 132 (2%) and 80 (15%) correspond to [M - C₆H₅O]⁺, [M - (2C₆H₅O)]⁺, [M - (2C₆H₅O + CH₂)]⁺, [M - (2C₆H₅O + CH₂ + N₂H₃)]⁺, [M - (2C₆H₅O + CH₂ + N₂H₃ + CO)]⁺, [M - (2C₆H₅O + 2CH₂ + 2N₂H₃ + CO)]⁺, [M - (2C₆H₅O + 2CH₂ + 2N₂H₃ + CO + OCH₂)]⁺, [M - (2C₆H₅O + 2CH₂ + 2N₂H₃ + CO)]⁺ and [M - (2C₆H₅O + 2CH₂ + 2N₂H₃ + 2CO + 2OCH₂)]⁺ respectively.

Formation of the Complexes (K1-6)

Metal chloride salt (Cu, Ni, Zn) (1 mmol) was dissolved in absolute ethanol (10 ml), the mixture was then introduced into (1mmol) of Schiff base with 5 drops of KOH solution to adjust the pH >8 in 15 ml

of ethanol. The mixture was stirred magnetically at room temperature. The deposited complexes were filtered, washed with ether and dried in a desiccator for a few days.

Copur-2,2'-(((2,2'-(pyridazine-3,6-diylbis (oxy)) bis (acetyl)) bis (hydrazin-2-yl-1-ylidene)) bis (methaneylylidene)) dibenzoic acid complexes (C1 -Cu) K1

It was obtained as brown crystals from ethanol, yield 63%; m.p. 157-159 °C. IR (KBr): ν cm⁻¹, 3368, (NH); 3012, (CH-arom.), 2977 (CH-aliph.); 1608 $\nu_{\text{asym}}(\text{COO})$; 1428 $\nu_{\text{sym}}(\text{COO})$; 1286 (C-O); ¹H NMR (DMSO-d₆): δ = 4.91 (s, 8H, CH₂), 6.85 (s, 4H, $\underline{\text{C}}=\text{Pyrz}$), 7.22 (s, 4H, NH), 7.82-8.10 (s, 16H, $\underline{\text{C}}=$), 8.54 (s, 4H, $\underline{\text{CH}}=\text{N}$); ¹³C NMR (DMSO-d₆) δ C=70.07 (s, 4C, CH₂), 121.15 (s, 4C, $\underline{\text{CH}}=\text{N}_{\text{ring}}$), 128.23-136.15 (m, 24C, $\underline{\text{C}}=\text{C}$), 152.11 (s, 4C, $\underline{\text{C}}=\text{C}_{\text{Parz}}$), 152.11 (s, 4C, $\underline{\text{CH}}=\text{N}_{\text{Parz}}$), (s, 2C, $\underline{\text{C}}=\text{O}$), 154.23 (s, 2C, $\underline{\text{C}}=\text{N}$), , 171.23 (s, s, 2C, CON); Anal. Calc. for C₄₈H₃₆Cu₂N₁₂O₁₆; (1193.05): C, 50.11; H, 3.54; N, 13.87; Cu, 10.23. Found: C, 50.25; H, 3.63; N, 14.06; Cu, 10.63. EIMS mass spectrum at m/z = 1193.05 [M+H]⁺ (43%) for C₄₈H₃₆Cu₂N₁₂O₁₆, requires = 465 The other peaks detected at m/z = 372 (61%), 280 (16%), 266 (41%), 234 (39%), 206 (54%) 162 (5%), 132 (2%) and 80 (15%) correspond to [M - C₆H₅O]⁺, [M-(2C₆H₅O)]⁺, [M-(2C₆H₅O+CH₂)]⁺, [M-(2C₆H₅O+CH₂+N₂H₃)]⁺, [M-(2C₆H₅O+CH₂+N₂H₃+CO)]⁺, [M-(2C₆H₅O+2CH₂+2N₂H₃+CO)]⁺, [M-(2C₆H₅O+2CH₂+2N₂H₃+CO+OCH₂)]⁺, [M-(2C₆H₅O+2CH₂+2N₂H₃+CO)]⁺ and [M-(2C₆H₅O+2CH₂+2N₂H₃+2CO+2OCH₂)]⁺ respectively. 277(36101), 385(25974), 423 (23640).

Nickel-2,2'-(((2,2'-(pyridazine-3,6-diylbis (oxy)) bis (acetyl)) bis (hydrazin-2-yl-1-ylidene)) bis (methaneylylidene)) dibenzoic acid complexes (C1-Ni) K2

It was obtained as brown crystals from ethanol, yield 63%; m.p. 157-159 °C. IR (KBr): ν cm⁻¹, 3361, (NH); 3085 (CH-arom.), 2977 (CH-aliph.); 1676 (CON); 1615 δ (NH), 1605 (C=N); 1612 $\nu_{\text{asym}}(\text{COO})$; 14208 $\nu_{\text{sym}}(\text{COO})$; 1280 (C-O); ¹H NMR (DMSO-d₆): δ = 4.89 (s, 8H, CH₂), 6.88 (s, 4H, $\underline{\text{C}}=\text{N}_{\text{ring}}$), 7.19 (s, 4H, NH), 7.79-8.06 (s, 16H, $\underline{\text{C}}=$), 8.48 (s, 4H, $\underline{\text{CH}}=\text{N}$); ¹³C NMR (DMSO-d₆) δ C=79.16 (s, 8C, CH₂), 121.23 (s, 4C, $\underline{\text{C}}=\text{C}_{\text{Pyrz}}$), 122.78-138.12 (m, 24C, $\underline{\text{C}}=\text{C}$), 152.78 (s, 4C, $\underline{\text{C}}=\text{N}$), 155.98 (s, 4C, $\underline{\text{C}}=\text{N}_{\text{Pyrz}}$), 169.65 (s, s, 2C, CON), 171.22 (s, s, 2C, C=O); Calc. for C₄₈H₃₆N₁₂Ni₂O₆; (1152.77): 49.95; H, 3.14; N, 14.54, Ni, 10.17 % Found, C, 49.22; H, 3.01; N, 14.22, Ni, 9.56. EIMS mass spectrum at m/z =; (1152.77): [M+H]⁺ (43%) for C₄₈H₃₆N₁₂Ni₂O₆, requires = 465 The other peaks detected at m/z = 372 (61%), 280 (16%), 266 (41%), 234 (39%), 206 (54%) 162 (5%), 132 (2%) and 80 (15%) correspond to [M - C₆H₅O]⁺, [M-(2C₆H₅O)]⁺, [M-(2C₆H₅O+CH₂)]⁺, [M-(2C₆H₅O+CH₂+N₂H₃)]⁺, [M-(2C₆H₅O+CH₂+N₂H₃+CO)]⁺, [M-(2C₆H₅O+2CH₂+2N₂H₃+CO)]⁺, [M-(2C₆H₅O+2CH₂+2N₂H₃+CO+OCH₂)]⁺, [M-(2C₆H₅O+2CH₂+2N₂H₃+2CO+OCH₂)]⁺, [M-(2C₆H₅O+2CH₂+2N₂H₃+2CO+OCH₂)]⁺ respectively; UV- vis nm(cm): 260 (38461), 352 (28409), (20790), 657 (15220), 843 (11862).

Zinic-2,2'-(((2,2'-(pyridazine-3,6-diylbis (oxy)) bis (acetyl)) bis (hydrazin-2-yl-1-ylidene)) bis (methaneylylidene)) dibenzoic acid complexes (C1 -Zn) K3

It was obtained as brown crystals from ethanol, yield 63%; m.p. 157-159 °C. IR (KBr): ν cm⁻¹, 3371, (NH); 3094 (CH-arom.), 2974 (CH-aliph.); 1670 (CON); 1619 δ (NH), 1608 (C=N); 1610, $\nu_{\text{asym}}(\text{COO})$; 1424 $\nu_{\text{sym}}(\text{COO})$; 1283 (C-O); ¹H NMR (DMSO-d₆): δ = 4.80 (s, H, CH₂), 6.90 (s, 4H, $\underline{\text{CH}}=\text{CH}_{\text{Pariz}}$), 7.12 (s, 4H, NH), 7.70-8.06 (s, 16H, $\underline{\text{C}}=\text{N}_{\text{Pariz}}$), 130.78-140.23 (m, 24C, $\underline{\text{C}}=\text{C}$), 159.12 (s, C, $\underline{\text{C}}=\text{N}$), 172.14 (s, 4C, $\underline{\text{CON}}$), 174.23 (s, 4C, $\underline{\text{CO}}$); Anal. Calc. for C₄₈H₃₆N₁₂O₁₆Zn₂; (1167.64): C, 49.38; H, 3.11; N, 14.54, Zn, 11.20 % Found, C, 49.07; H, 2.97; N, 14.16, Zn, 11.01. EIMS mass spectrum at m/z = 1167.64 [M+H]⁺ (43%) for C₄₈H₃₆N₁₂O₁₆Zn₂, requires = 465 The other peaks detected at m/z = 372 (61%), 280 (16%), 266 (41%), 234 (39%), 206 (54%) 162 (5%), 132 (2%) and 80 (15%) correspond to [M - C₆H₅O]⁺, [M-(2C₆H₅O)]⁺, [M-(2C₆H₅O+CH₂)]⁺, [M-(2C₆H₅O+CH₂+N₂H₃)]⁺, [M-(2C₆H₅O+CH₂+N₂H₃+CO)]⁺, [M-(2C₆H₅O+2CH₂+2N₂H₃+CO)]⁺, [M-(2C₆H₅O+2CH₂+2N₂H₃+CO+OCH₂)]⁺, [M-(2C₆H₅O+2CH₂+2N₂H₃+2CO+OCH₂)]⁺, [M-(2C₆H₅O+2CH₂+2N₂H₃+2CO+OCH₂)]⁺ respectively; UV- vis nm(cm):

Copur-2,2'-(((2,2'-(pyridazine-3,6-diylbis (oxy)) bis (acetyl)) bis (hydrazin-2-yl-1-ylidene)) bis (methaneylylidene)) dibenzoic acid complexes (C2 -Cu) K4

It was obtained as brown crystals from ethanol, yield 63%; m.p. 157-159 °C. IR (KBr): ν cm⁻¹, 3368, (NH); 3089 (CH-arom.), 2974 (CH-aliph.); 1673 (CON); 1652 (C=O); 1615 δ (NH), 1608 (C=N); 1286 (C-O); ¹H NMR (DMSO-d₆): δ = 4.80 (s, 8H, CH₂), 6.98 (s, 4H, $\underline{\text{CH}}=\text{C}_{\text{Pariz}}$), 7.18 (s, 4H, NH), 7.45-8.06 (s, 16H, $\underline{\text{C}}=$), 8.75 (s, 4H, $\underline{\text{CH}}=\text{N}$); ¹³C NMR (DMSO-d₆) δ C=79.12 (s, 4C, CH₂), 124.33 (s, 4C, $\underline{\text{C}}=\text{C}_{\text{Pariz}}$), 130.23-

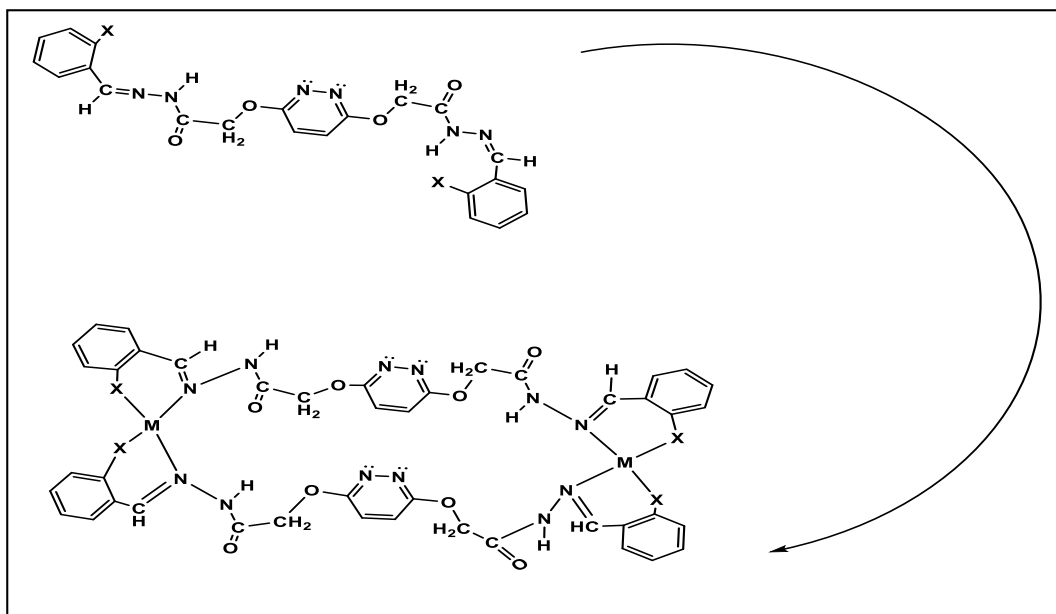
138.15 (m, 24C, $\underline{\text{C}}=\text{C}$), 153.27 (s, s, 4C, $\text{C}=\text{N}_{\text{Pariz}}$), 156.22 (s, 2C, $\underline{\text{C}}=\text{N}$), 172.65 (s, s, 2C, CON); Anal. Calc. for $\text{C}_{48}\text{H}_{36}\text{Cu}_2\text{N}_{12}\text{O}_{16}$; (1193.05): C, 50.11; H, 3.54; N, 13.87; Cu, 10.23. Found: C, 50.25; H, 3.63; N, 14.06; Cu, 10.63. EIMS mass spectrum at $m/z = 1193.05$ $[\text{M}+\text{H}]^+$ (43%) for $\text{C}_{48}\text{H}_{36}\text{Cu}_2\text{N}_{12}\text{O}_{16}$, requires = 465 The other peaks detected at $m/z = 372$ (61%), 280 (16%), 266 (41%), 234 (39%), 206 (54%) 162 (5%), 132 (2%) and 80 (15%) correspond to $[\text{M} - \text{C}_6\text{H}_5\text{O}]^+$, $[\text{M} - (2\text{C}_6\text{H}_5\text{O})]^+$, $[\text{M} - (2\text{C}_6\text{H}_5\text{O} + \text{CH}_2)]^+$, $[\text{M} - (2\text{C}_6\text{H}_5\text{O} + \text{CH}_2 + \text{N}_2\text{H}_3)]^+$, $[\text{M} - (2\text{C}_6\text{H}_5\text{O} + \text{CH}_2 + \text{N}_2\text{H}_3 + \text{CO})]^+$, $[\text{M} - (2\text{C}_6\text{H}_5\text{O} + 2\text{CH}_2 + 2\text{N}_2\text{H}_3 + \text{CO})]^+$, $[\text{M} - (2\text{C}_6\text{H}_5\text{O} + 2\text{CH}_2 + 2\text{N}_2\text{H}_3 + \text{CO} + \text{OCH}_2)]^+$, $[\text{M} - (2\text{C}_6\text{H}_5\text{O} + 2\text{CH}_2 + 2\text{N}_2\text{H}_3 + \text{CO})]^+$ and $[\text{M} - (2\text{C}_6\text{H}_5\text{O} + 2\text{CH}_2 + 2\text{N}_2\text{H}_3 + 2\text{CO} + 2\text{OCH}_2)]^+$ respectively; UV- vis nm(cm) : 262 (38167), 335 (29850), 742 (13477), 824 (12135).

Nickel-2,2'-(((2,2'-(pyridazine-3,6-diylbis (oxy)) bis (acetyl)) bis (hydrazin-2-yl-1-ylidene)) bis (methaneylylidene)) dibenzoic acid complexes (C2 -Ni) K5

It was obtained as brown crystals from ethanol, yield 63%; m.p. 157-159 °C. IR (KBr): ν cm^{-1} , 3361, (NH); 3085 ($\text{CH}_{\text{arom.}}$), 2977 ($\text{CH}_{\text{aliph.}}$); 1676 (CON); 1652 ($\text{C}=\text{O}$); 1615 δ (NH), 1605 ($\text{C}=\text{N}$); 1280 ($\text{C}-\text{O}$); ^1H NMR (DMSO- d_6): $\delta = 4.71$ (s, 8H, $\underline{\text{CH}_2}$), 6.87 (s, 4H, $\underline{\text{CH}}=\text{C}_{\text{Pariz}}$), 7.18 (s, 4H, $\underline{\text{NH}}$), 7.36-8.00 (s, 16H, $\underline{\text{C}}=\text{N}$), 8.65 (s, 4H, $\underline{\text{CH}}=\text{N}$); ^{13}C NMR (DMSO- d_6) δ $\text{C} = 79.53$ (s, 4C, $\underline{\text{CH}_2}$), 124.11 (s, 4C, $\underline{\text{C}}=\text{C}_{\text{Pariz}}$), 130.87-138.67 (m, 24C, $\underline{\text{C}}=\text{C}$), 153.27 (s, s, 4C, $\text{C}=\text{N}_{\text{Pariz}}$), 155.56 (s, 2C, $\underline{\text{C}}=\text{N}$), 171.89 (s, s, 2C, CON); Anal. Calc. for $\text{C}_{48}\text{H}_{36}\text{N}_{12}\text{Ni}_2\text{O}_6$; (1152.77): 49.95; H, 3.14; N, 14.54, Ni, 10.17 % Found, C, 49.22; H, 3.01; N, 14.22, Ni, 9.56. EIMS mass spectrum at $m/z = (1152.77)$: $[\text{M}+\text{H}]^+$ (43%) for $\text{C}_{48}\text{H}_{36}\text{N}_{12}\text{Ni}_2\text{O}_6$, requires = 465 The other peaks detected at $m/z = 372$ (61%), 280 (16%), 266 (41%), 234 (39%), 206 (54%) 162 (5%), 132 (2%) and 80 (15%) correspond to $[\text{M} - \text{C}_6\text{H}_5\text{O}]^+$, $[\text{M} - (2\text{C}_6\text{H}_5\text{O})]^+$, $[\text{M} - (2\text{C}_6\text{H}_5\text{O} + \text{CH}_2)]^+$, $[\text{M} - (2\text{C}_6\text{H}_5\text{O} + \text{CH}_2 + \text{N}_2\text{H}_3)]^+$, $[\text{M} - (2\text{C}_6\text{H}_5\text{O} + \text{CH}_2 + \text{N}_2\text{H}_3 + \text{CO})]^+$, $[\text{M} - (2\text{C}_6\text{H}_5\text{O} + 2\text{CH}_2 + 2\text{N}_2\text{H}_3 + \text{CO})]^+$, $[\text{M} - (2\text{C}_6\text{H}_5\text{O} + 2\text{CH}_2 + 2\text{N}_2\text{H}_3 + \text{CO} + \text{OCH}_2)]^+$, $[\text{M} - (2\text{C}_6\text{H}_5\text{O} + 2\text{CH}_2 + 2\text{N}_2\text{H}_3 + \text{CO})]^+$ and $[\text{M} - (2\text{C}_6\text{H}_5\text{O} + 2\text{CH}_2 + 2\text{N}_2\text{H}_3 + 2\text{CO} + 2\text{OCH}_2)]^+$, respectively; UV- vis nm(cm) : 260 (38461), 352 (28409), (20790), 657 (15220).

Zinc-2,2'-(((2,2'-(pyridazine-3,6-diylbis (oxy)) bis (acetyl)) bis (hydrazin-2-yl-1-ylidene)) bis (methaneylylidene)) dibenzoic acid complexes (C2 -Zn) K6

It was obtained as brown crystals from ethanol, yield 63%; m.p. 157-159 °C. IR (KBr): ν cm^{-1} , 3372, (OH); 3437-3321 (NH), 3059 ($\text{CH}_{\text{arom.}}$), 2959 ($\text{CH}_{\text{aliph.}}$); 1673 ($\text{C}=\text{O}$); 1582 δ (NH), 1253 ($\text{C}-\text{O}$); ^1H NMR (DMSO- d_6): $\delta = 4.65$ (s, 8H, $\underline{\text{CH}_2}$), 6.85 (s, 4H, $\underline{\text{CH}}=\text{C}_{\text{Pariz}}$), 7.43 (s, 4H, $\underline{\text{NH}}$), 7.12-8.54 (s, 16H, $\underline{\text{C}}=\text{N}$), 8.32 (s, 4H, $\underline{\text{CH}}=\text{N}$); ^{13}C NMR (DMSO- d_6) δ $\text{C} = 79.56$ (s, 4C, $\underline{\text{CH}_2}$), 124.12 (s, 4C, $\underline{\text{C}}=\text{C}_{\text{Pariz}}$), 130.56-138.46 (m, 24C, $\underline{\text{C}}=\text{C}$), 154.43 (s, s, 4C, $\text{C}=\text{N}_{\text{Pariz}}$), 155.56 (s, 2C, $\underline{\text{C}}=\text{N}$), 171.88 (s, s, 2C, CON); Anal. Calc. for $\text{C}_{48}\text{H}_{36}\text{N}_{12}\text{Zn}_2\text{O}_6$; (256.22): C, 37.50; H, 4.72; N, 32.80% Found, 36.81; H, 4.27; N, 32.19. EIMS mass spectrum at $m/z = 464.14$ $[\text{M}+\text{H}]^+$ (43%) for $\text{C}_{48}\text{H}_{36}\text{N}_{12}\text{Zn}_2\text{O}_6$, requires = 465 The other peaks detected at $m/z = 372$ (61%), 280 (16%), 266 (41%), 234 (39%), 206 (54%) 162 (5%), 132 (2%) and 80 (15%) correspond to $[\text{M} - \text{C}_6\text{H}_5\text{O}]^+$, $[\text{M} - (2\text{C}_6\text{H}_5\text{O})]^+$, $[\text{M} - (2\text{C}_6\text{H}_5\text{O} + \text{CH}_2)]^+$, $[\text{M} - (2\text{C}_6\text{H}_5\text{O} + \text{CH}_2 + \text{N}_2\text{H}_3)]^+$, $[\text{M} - (2\text{C}_6\text{H}_5\text{O} + \text{CH}_2 + \text{N}_2\text{H}_3 + \text{CO})]^+$, $[\text{M} - (2\text{C}_6\text{H}_5\text{O} + 2\text{CH}_2 + 2\text{N}_2\text{H}_3 + \text{CO})]^+$, $[\text{M} - (2\text{C}_6\text{H}_5\text{O} + 2\text{CH}_2 + 2\text{N}_2\text{H}_3 + \text{CO} + \text{OCH}_2)]^+$, $[\text{M} - (2\text{C}_6\text{H}_5\text{O} + 2\text{CH}_2 + 2\text{N}_2\text{H}_3 + 2\text{CO} + 2\text{OCH}_2)]^+$, respectively; UV- vis nm(cm) : 261 (38314), 353 (28328)

**Scheme2****Result and desiccation**

The Pyridazine derivatives of Schiff base ligands C1 and C2 were prepared according to the protocol sketched in Scheme 1. The overall reaction situations and the structure depiction are given in the experimental part. Our study was to prepare some new Schiff bases compounds and to finally synthesize different copper, nickel and zinc binuclear complexes in excellent yields having good biological activities. The synthesis was pursued in various stages. The premier stage contains the formation of 2,2'-[pyridazine-3,6-diylbis(oxy)]diacetyl chloride (A) from corresponding pyridazine-3,6-diol in chloroform and chloroacetyl chloride in ethanol in the presence of potassium bicarbonate by refluxing for 5 h. Secondly, (A) was converted into the corresponding (B) by stirring for 11 h with hydrated hydrazine (85-99%) in an alcoholic medium. Further, the Schiff bases compounds C1 and C2 were synthesized by the condensation to the analogous 2-substituted-benzaldehyde compounds and finally a series of Cu, Ni and Zn complexes of Schiff bases (K1-6) were obtained after the reaction of Schiff bases ligands (C1 and C2) with ($\text{CuCl}_2 \cdot 2\text{H}_2\text{O}$, $\text{NiCl}_2 \cdot 6\text{H}_2\text{O}$, and ZnCl_2) metal chloride salts in the existence of ethanol and NaOH which gives as a base (Scheme 2). The structures of the $\delta = 5.08$ (s, 2H, DMSO), 4.34 (s, 2H, CH_2), 6.75-8.21 (s, 10H, C=), 8.08 (s, 1H, CH), 10.78 (s, 1H, NH), 13.07 (s, 1H, COOH) prepared compounds were ascertained by IR, ^{13}C , ^1H NMR, mass.

^1H - and ^{13}C -NMR spectral values as performed in experimental section. For example, the ^1H NMR spectrum of C1 appeared the existence of a multiplet signal at $\delta = 6.75\text{-}8.21\text{ ppm}$ corresponding to protons of aromatic and one signal at $\delta = 10.78\text{ ppm}$ corresponding to NH group. It should be confirmed here that the signal analogous to NH function of hydrazo group shows at downfield at $\delta = 13.22\text{ ppm}$ due to the intramolecular hydrogen bonding with carbonyl group beside the signals assigned to C=N protons in the molecule. Also, ^{13}C NMR of the structure detected signals at 70.07 ppm (CH_2), 120.23 ppm ($\text{C}=\text{C}_{\text{Pyrz}}$), 122.34-136.76 (m, 12C, $\text{C}=\text{C}$), 142.43 ppm ($\text{C}=\text{N}$), 151.57 ppm ($\text{C}=\text{N}_{\text{Pyrz}}$), 168.06 (s, 2C, COOH), 172.65 (s, 2C, CON), in addition to the sp^2 carbon atoms and a multiplet signals at δ at 120.78-137.00 ppm assigned to aromatic carbons as in the experimental section.

The ^1H NMR spectrum of compound C2 detected the existence of a multiplet signal at $\delta = 6.70\text{-}8.19\text{ ppm}$ congruous to aromatic protons, NH group and singlet signal at $\delta 8.24\text{ ppm}$ assigned to NH group beside the signal assigned to CH_2 protons in the molecule at $\delta 4.31\text{ ppm}$, in addition singlet signal at $\delta 11.43\text{ ppm}$ assigned to the OH proton atoms. Also, ^{13}C NMR of the structure detected signals at 70.12 ppm (CH_2), 142.43 ppm ($\text{C}=\text{N}$), 154.7 ppm ($\text{C}=\text{N}_{\text{Pyrz}}$), 170.21 (CON) 172.65 ppm ($\text{C}=\text{O}$), in addition to the sp^2 carbon

atoms and a multiplet signals at δ at 120.78-137.00 ppm assigned to aromatic carbons as in the experimental section. Also, The IR spectrum of the same output further supports the hydrozo structure. The IR spectra showed that the three ligands exhibited vibrational modes of ν C=N of azomethine group, (ν C–O, δ NH), (ν O–H, C=O), of assigned to a moiety. The structures of C1 and C2 were assured based on elemental analysis and spectral data.

Thus, the IR spectrum of compounds C1 and C2, for example, indicated the presence of the absorption band of the C=N functional group at ν 1598 and 1582 cm^{-1} respectively, and the appearance of an absorption band due to the OH functional group of C1 and C2 at ν 3372 and 3372 cm^{-1} respectively. The comparative IR spectral study of the ligands C1, C2 and their Cu(II), Ni(II) and Zn(II) complexes reveals the coordination style of the ligand during the complex formation. These bands are absent in complexes. Evanescence of the stretching vibration at 1645 cm^{-1} assigned to ν (COOH) in the ligand C1 and in the complexes occurrence new ν_{asym} and ν_{sym} vibrations of the (COO⁻) moiety refer which has reacted with the hydrazone. Since the metal ion moiety may chelation to the carboxylate in either bidentate and bidentate style, the “ $\Delta\nu$ criterion” [$\Delta\nu = \nu_{\text{asym}}(\text{COO}) - \nu_{\text{sym}}(\text{COO})$] was appointed to calculate the chelation vibration of the moiety of carboxylate. The metal complexes offer strong frequencies conforming to $\nu_{\text{asym}}(\text{COO})$ at 1608–1612 cm^{-1} and 1420–1428 cm^{-1} . The $\Delta\nu$ data of 180–186 in our complexes are analogous to that advertised for the metal complexes with both bidentate carboxylate moieties, thus suggesting the carboxylate moieties conduct both as a bidentate and bidentate ligand. Also, new frequencies appear in the range 3367-3489 cm^{-1} refrenceting the involvement of –OH moiety in complex figuration. In the complexes spectra, the kind of the metal-ligand bonding is confirmed by the newly formed bands at 535-550 cm^{-1} and 456-470 cm^{-1} that is tentatively designated to vibrations of M-O and M-N.

Electronic spectra

The electronic spectra are often very beneficial in the estimation of consequences provided by other processes of constitutional realization. The UV-Vis absorption determents were applied for designating the stereo-chemistries of metal ions in the metal complexes founded on the number and the sites of d-d transition bands. The electronic spectra of the Schiff base ligands and their complexes were registered in DMF solution in the region of 200-800 nm. The absorption spectra of ligands C1 and C2 depend on an intense peaks settled in the region 36101 and 38167 cm^{-1} assigned to $n \rightarrow \pi^*$ transferences of the imine moieties. Other intense peaks in the higher energy range of 36101 and 38167 cm^{-1} the spectra of ligands C1 and C2 were regarded as $\pi \rightarrow \pi^*$ transferences of benzene moieties. These transferences are furthermore establishing in the complexes spectra, but they moved towards lower absorptions, supported the chelation of the ligands to the metal ions. Further, the d-d transferences of the complexes showed broad peaks centered at 17361 and 16103 cm^{-1} for complexes. These are assigned to ${}^2B_{1g} \rightarrow {}^2A_{1g}$ transferences. Complexes in the visible zone at about 20120 -20120 and 19569- 19569 cm^{-1} are due to ${}^1A_{1g} \rightarrow {}^1A_{2g}$, ${}^1A_{1g} \rightarrow {}^1B_{1g}$, transferences, proposing an sacrificial square planar arraigments of the ligands C1 and C2 around the metal ions. The intense peaks at 460 and 470 cm^{-1} in Zn(II) complexes due to charge transfer transferences. This is due to electron delocalization over whole molecules on complexation. Founded on these values, square planar arraigments have been due to the complexes. These values are similar to other reported complexes.

Biological Studies

Antibacterial and Antifungal Activity

The potential antimicrobial efficacy of the ligands and their new complexes towards one fungal strain (Candida Albicans)and five standard bacterial strains (S. marcescens, E. coli, B. Subtilis, S. aureus, P. aeruginosa) was checked. Qualitative calculation of antimicrobial efficacy was done utilizing the disk diffusion process. A microorganism as the full knob was vaccinated in a nutrient medium (NM) (10 ml) and brooded for 10-14 hours at $37 \pm 1^\circ\text{C}$. Later, 200 μL of the overnight culture was transported into fresh 10 ml NM and grown up to the mesial logarithm stage (0.4 - 0.55). The microorganisms were then washed twice with (pH 7.4) sterile saline and in 1 ml of (phosphate buffer saline), PBS re-suspended to $1-2 \times 10^9$ CFU/ml of concentration. Then, it was added bacterial load ($1-2 \times 10^7$ CFU) to 5ml agar NM and diffusion in a Petri- plate. In order to raise the antimicrobial compound, a circular hole was punched in the agar plate. After that, the 10 μL of antimicrobial screen component was seated into the plates and

well were incubated at $37 \pm 1^\circ\text{C}$ for 24 h in taken from placement. The suppression areas around each disc were determined by utilizing the Hiantibiotic area scale TM in mm and liken with the c dominances after 24 hour zone of incubation. Candida was utilized as a standard drug for antifungal efficiency and Ampicillin was utilized as a standard drug for antibacterial efficiency. It may be shown which the ligands (C1, C2) and their complexes (K1-6) when checked with fungus and bacteria, offered to diverge activities. It is distinct from the data which (C1 and C2) displayed antibacterial efficiency similar to standard as Ampicillin, except which these are inefficient with *Pseudomonas aeruginosa*. The antifungal efficiency of (C1 and C2) is nearly two times more liken with standard as candida. Through all the components, the C1 appeared evident antifungal and antimicrobial efficacy which can be ascribable to the presence of nitrogen and oxygen groups in it. Then this may be reconditioned with relatively high Log p data which relates to high lipophilicity, and less dipole moment data which envisages the less polarity of compound. The Cu complex of C1 showed activity against all chosen microorganism aforementioned, despite the fact that C2 being inefficient with *Pseudomonas aeruginosa*. The Cu complexes of C1 and C2 also showed (+)ive antifungal and antibacterial efficacy.

Binding of the complexes with CT DNA

To study the interaction method of DNA with the complexes, the shifts in the absorbance of the complexes the addition CT- DNA aliquots were observed. Generally, intercalative process of binding of DNA with the complexes appears hypochromism without or with red shift. Electrostatic interaction/non-intercalative produces in hyperchromism. From spectra of the absorption, it was clear that upon on adding of CT- DNA to the complexes, hypochromism happened with 2–3 nm red shifts in the intra-ligand peak (23–40%), that referred to intercalative method of linking. To compare the ability of the DNA linking of the complexes, constant (K_b) of the equilibrium binding was determined to employ the neutralization.

$$[\text{DNA}]/(\epsilon_a - \epsilon_f) = [\text{DNA}]/(\epsilon_b - \epsilon_f) + 1/K_b(\epsilon_b - \epsilon_f) \quad (1)$$

Where, ϵ_b is coefficient of the extinction for the component in the total bound shape, $[\text{DNA}]$ is the DNA concentration in base pairs, ϵ_f is the extinction coefficient of the free compound and, ϵ_a is coefficient of the apparent extinction, data establish by determining $A(\text{spotted})/[\text{complex}]$. K_b gets from A plot of $[\text{DNA}]/(\epsilon_a - \epsilon_f)$ against $[\text{DNA}]$ as the proportion of slope to the intercept (Fig. 5). The determined (K_b) for complexes(K 1–6) were in the range of 1.17×10^4 – $7.30 \times 10^4 \text{ M}^{-1}$ respectively (Table 3). The affinity of binding for the complexes followed the order $K_6 > K_5 > K_4 > K_3 > K_2 > K_1$. The data of K_b for complexes was comparable with the adduced K_b of analogous complexes.

The competitive (EB) binding researching gave assistance for the complexes interaction with DNA. Upon addition (0–50 mM) from the complexes (K1–6) to CT DNA preceded at pH 7.2 with EB in 50 mM NaCl buffer 5 mM Tris-HCl/ 5% DMF, the intensity of emission for EB -bound DNA at 600 nm reduces (Fig. 6). The quenching proportion for complexes K 1–6 was got to be 61.5, 62.6, 63.7, 64.9, 65.3 and 66.1% respectively with 10–12 nm bathochromic transfers. The quenching extent detected the displacement extent of the EB molecules from the CT DNA. Conformity to the equation of the Stern–Volmer, relative fluorescence is straight commensurate to the quencher concentration. The equation of Stern–Volmer is gotten by

$$F^0/F = 1 + K_q[Q],$$

where F^0 and F are intensities of the fluorescence in the absence and presence of the complex, K_q is constant and $[Q]$ is the concentration of the complex, of a linear Stern–Volmer quenching and respectively. The slope of the plot of F^0/F with $[Q]$ gets K_q . From the plot of the spotted intensities with $[\text{complex}]$, the data of constant (K_{app}) of the visible DNA binding were determined to utilize the neutralization

$$KEB[EB] = K_{app}[\text{complex}]$$

Where $[EB] = 5 \text{ mM}$, $[\text{complex}]$ is the complex concentration in reduction at 50% in the intensity of fluorescence of EB, and, and $KEB = 1.0 \times 10^7 \text{ M}^{-1}$ data K_{app} and K_q is shown in Table 3. The interaction of CT DNA with the complexes directed the arrangement $K_6 > K_5 > K_4 > K_3 > K_2 > K_1$. The outcomes are supported those give from the absorption of electronic. Measurements of viscosity suggested the influence of the complexes on viscosity of the specific relative for DNA. Since viscosity of the specific

relative (Z/Z^0 ; Z^0 and Z are the DNA specific viscosities in the absence and presence of the complexes, respectively) will have an influence when the contour length shifts of DNA, it is useful in the definition of the style of the interaction of DNA with the complexes. The rise in length of the contour associated with the secession of base pairs for DNA caused by intercalation of a classical DNA intercalator like EB displays an important raise in the viscosity for solutions of the DNA. In disparity, fractional or/and non-intercalation of the complex might consequence in a minus proclaimed influence on the viscosity. The DNA viscosity raised in addition by gradually of the complexes, that offered the intercalative process of linking (Fig. 3). Six complexes showed a comparatively raised influence on the viscosity among the complexes screened. Complex K1 did not result in a stationary rise in the DNA viscosity. The influence of the complexes on the DNA viscosity directed the arrangement, which was in good support with the results got from the studies of spectroscopic.

DNA Cleavage Studies

Agarose gel electrophoresis is utilized for studies of DNA cleavage. Electrophoresis of agarose gel is an effective way to split excellent twisted DNA into stringy DNA and Nicked Circular formulas. For the hydrolytic of DNA cleavage, supercoiled (SC) plasmid DNA is a central substrate. For the analysis of DNA cleavage, a potency of compounds is quantitatively evaluated on supercoiled plasmid PBR322 in the absence of oxidizing or reducing agents. The ligands C1, C2, and their metal complexes have been screened on studies of DNA split. The outcomes detected that only Cu (II)-C2 is a great active DNA cleaver as it has transformed excellent twisted DNA (form I) into convenient and stringy DNA (form II & form III) (Fig. 4).

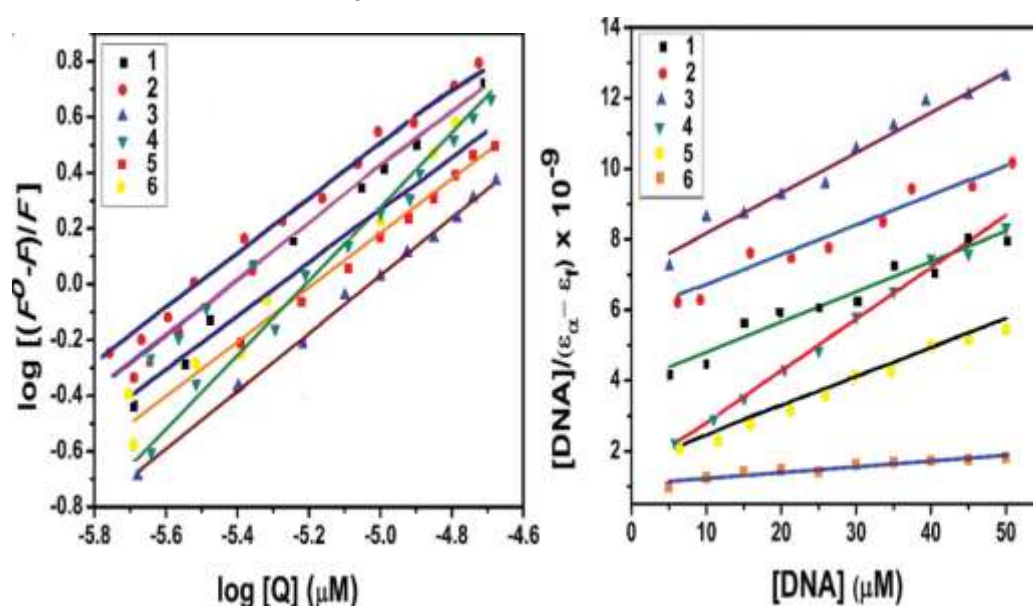


Figure 1 Effects of increasing amount of Ethidium bromide (E), complex (1) Cu(II)-C1, complex (2) Ni(II)-C1, complex (3) Zn (II) -C1, complex (4) Cu (II) -C2 complex (5) Ni (II) -C2 and complex (6) Zn (II) -C2 on the relative viscosity of CTDNA at $29 \text{ C} \pm 0.1$, $[\text{DNA}] = 15 \text{ IM}$.

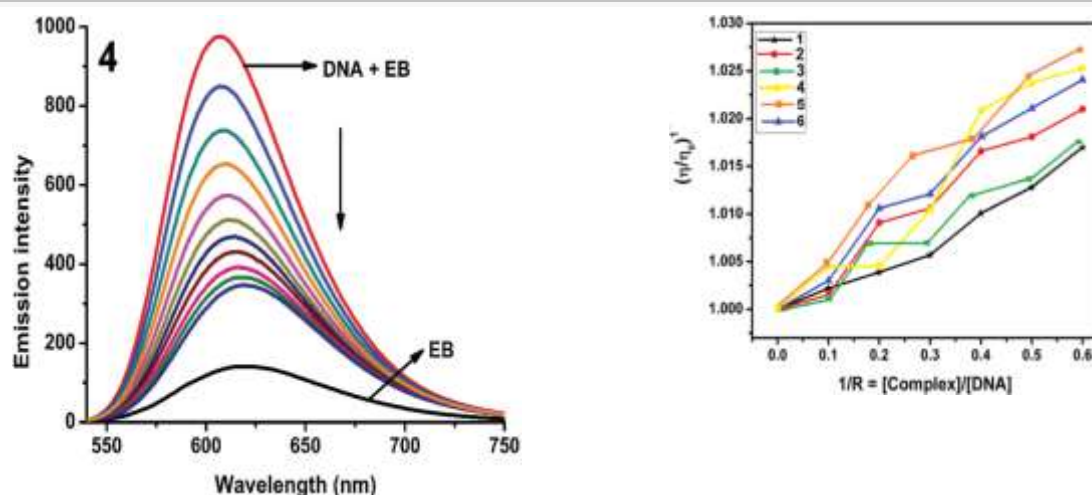


Figure 2 Plots of absorbance versus temperature (C) for the melting of CT DNA: D (only DNA), complex (1) Cu(II)-C1, complex (2) Ni(II)-C1, complex (3) Zn (II) -C1, complex (4) Cu (II) -C2 complex (5) Ni (II) -C2 and complex (6) Zn (II) -C2

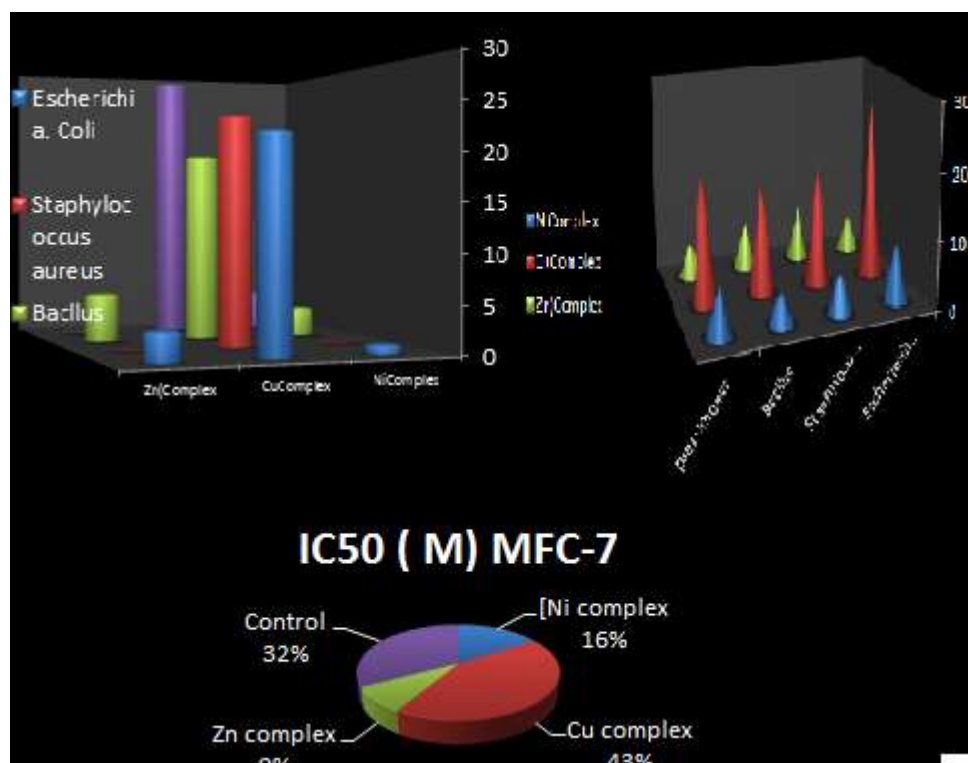


Fig 3 Biological activities of C2, Cu (II), (Ni II) and Zn(II) complexes: Zone of inhibition in mm against different bacteria and fungi C1 and its complexes (a) C1 and its complexes (b); a percentage of cell Viability against MCF-7 cell line (c).

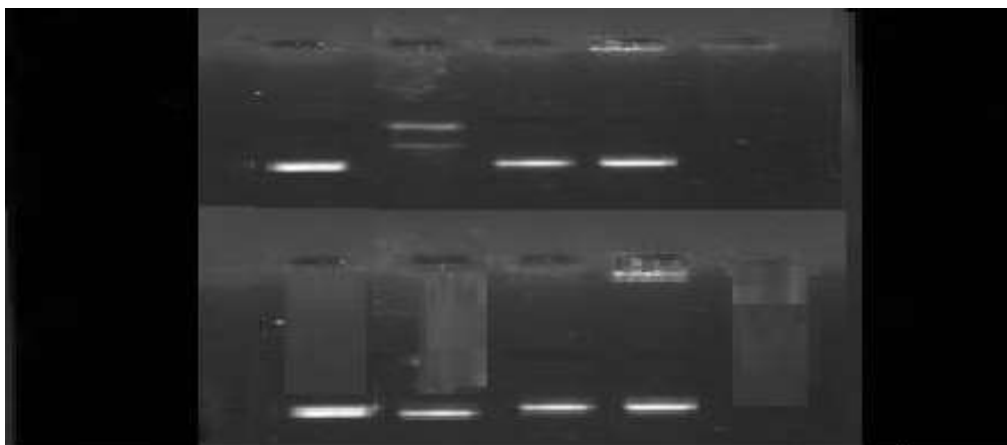


Figure 4 DNA cleavage activity of ligands and its Cu-complexes

Lane 1: DNA marker (1 μ l+4 μ l Tris – HCl Buffer) Lane 2: DNA (1 μ l+4 μ l Tris – HCl Buffer) + C1 (5 μ l of 2 mg/ml) Lane 3: DNA (1 μ l+4 μ l Tris – HCl Buffer) + Cu (II) complex (5 μ l of 2 mg/ml) Lane 4: DNA (1 μ l+4 μ l Tris – HCl Buffer) + Ni (II) complex (5 μ l of 2 mg/ml) Lane 5: DNA (1 μ l+4 μ l Tris – HCl Buffer) + Zn(II).

Conclusion

This research reports the effective preparation of the C1 and C2 components in good yields and from the UV-Visible, IR spectra and elemental analysis data it was potential to calculate the kind of chelation of the ligands in their metal complexes. In the complexes, it is accomplished that the ligands act as a neutral bidentate through the carbonyl azomethine and nitrogen atom mieoties and all the compounds have good microbicidal activity. New Cu(II) complexes were prepared, described and structurally illustrated by the data gotten from deferent techniques of spectroanalytical. The studies on antimicrobial activity inferred that Cu (II)- complexes of C1 and C2 appeared both antibacterial and antifungal activity. Gel-Electrophoresis mobility check way to study DNA cleavage inferred that Cu (II)-C2 is more effective in the cleavage of plasmid PBR-322 DNA.

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SYNTHESIS, DESCRIPTION, TOXICITY, ANTIBACTERIAL AND ANTIFUNGAL ESTIMATION OF SCHIFF-BASE OF DRUG SUBSTANCE

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ABSTRACT

Metal(II) chelation components of [HPMOC] ligand derived from the condensation of 2-aminobenzoic acid with cephalixin antibiotic were prepared. The [HPMOC] ligand and mononuclear $[M(\text{PMOC})(\text{OAc})(\text{H}_2\text{O})_2]$ (M(II)Mn, Ni, Cd, Co, Zn, Cu) complexes were depicted by various measurements, including molar conductance and sensitivity of magnetic techniques C.H.N and TGA analysis, electronic, FT-IR, and ^1H NMR spectral evaluations. The arrangement of all the Metal(II) complexes shows to be octahedral. The biological implementations of complexes have been studied on three bacteria and two fungi. Compared with amoxicillin as control, the Co(II) and Ni(II) complexes against the bacteria strains *Escherichia coli* and *Staphylococcus aureus*. All the complexes showed perfect activity versus against four Gram-negative (*E. coli*, *S. sonnei*, *P. aeruginosa*, *S. Typhi*) and two Gram-positive (*S. aureus*, *B. subtilis*) bacterial strains and six fungal strains (*T. longifusus*, *C. Albicans*, *A. flavus*, *M. canis*, *F. solani*, and *C. glabrata*) appeared perfect activity. It is lower efficacy than ligand and also found toxicity was reduced (lower LD50 values) by complexation.

Index Terms—, cephalixin, Metal(II) complexes, antibacterial, Schiff bases

Introduction

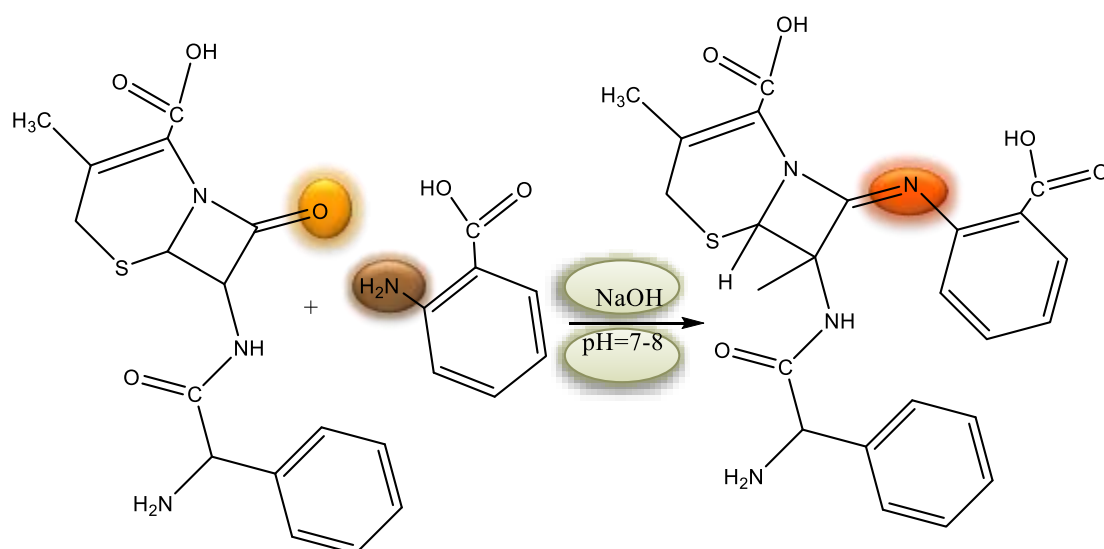
Schiff bases are known components including an Imines or azomethine moiety ($-\text{CH}=\text{N}[1]$). A primary amine condensation with a carbonyl component as aldehydes and ketones usually are formed Schiff base[2]. The complexes of Schiff bases have a large variety of useful applications in many fields such as the fluorescent [3] and photometric analysis[4], industrial[5], biological[6], clinical fields [7], Some applied as liquid crystals[8], organic synthesis[9] due to reactions are beneficial in producing bonds of nitrogen-carbon and in catalysis display to be substantial intermediates in a many of enzymatic reactions including the interaction of the substrate of a carbonyl or an amino moiety with an enzyme[10]. The wide use of antibiotics in man and animals and their extensive use in areas other than the treatment and prophylaxis of disease have resulted in a serious problem of drug resistance[11]. More and more bacterial strains have become resistant to available drugs[12]. The preparation of different synthetic derivatives of antibiotics based on the structure-activity relationship has been one of the best approaches[13]. A relation between the structure of the complexes and their anti-bacterial activity can be observed[14]. Cephalixin is utilized in contagions of urinary tract [15] and (caused by *Klebsiella* and *Staphylococcus* species)[16], throat ear, & nose[17] (chronic and acute) and aerobic tract (infected bronchiectasis & bronchitis)[18]. So it has been synthesized newer Schiff bases from cephalixin can be evaluated antibacterial and antifungal efficacies had not been reported[19]. Synthesis, Description, Toxicity, Antibacterial and Antifungal Estimation of Schiff-Base of 2-aminobenzoic acid with cephalixin antibiotic and their complexes Mn(II), Ni(II), Cd(II), Co(II), Zn(II) and Cu(II)) Experimental Section General Procedure

All the solvents, catalysts, and reagents are of analytical grade purchased from used directly and commercial scours. All the Melting points were determined in a DBK programmed melting point apparatus and are uncorrected. The TLC of the components was carried out on a silica gel G coated glass plate with ethanol: chloroform (1:9) as a solvent. Iodine vapour was used as a detecting agent. The absorbance maxima (λ_{max}) were recorded on Shimadzu 2401 UV-Visible spectrophotometer. ^1H NMR was recorded on Bruker DRX-300 (300 MHz FT NMR), using DMSO, IR spectra were recorded on Shimadzu 8000S, and Mass spectra were recorded on Joel SX-120 mass spectrophotometer.

General Procedure for Synthesis of Schiff Base:

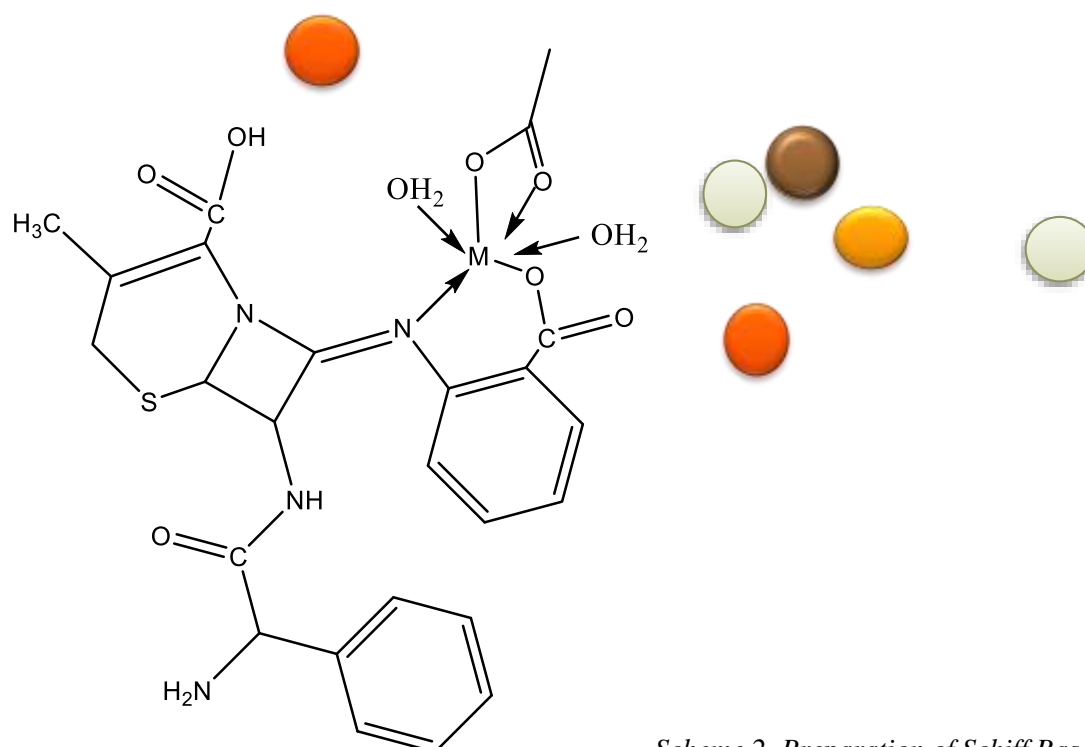
Cephalixin Drug (2 mmol) dissolved in (25 ml) methanol was mixed with 2-aminobenzoic acid (2 mmol) dissolved in (25 ml) methanol. To this (0.1% methanol) of NaOH was added to adjust the solution

pH=7,8 and the mixture was refluxed for four 4h., cooled at room temperature, filtered, washed, dried, crystallized from suitable solvents. Micro and Physical, analytical values of the Schiff base were given in Table I and a general method for the Preparation of Schiff Base Scheme 1.



Scheme(1) Preparation of Schiff Base

Preparation of metal complex same overall procedure was synthesized (II) complexes Scheme 2. A solution of 1 mmol of HL in 10 ml of ethanol was added slowly to a solution of 20 ml of water of 1 mmol of the acetate of metal with stirring. To this KOH solution (0.1% methanol) was added to adjust the pH =7–8 and the mixture was refluxed for 3 h three colored products were formed. The complexes were separated from the reaction mixture, dried, washed with ether, methanol, and water several times, and dried at room temperature under reduced pressure. Complexes were refined by recrystallization from a water /DMSO mixture. The progress of the reaction and purity of the products was monitored by TLC using silica gel G yield % (82-68).



Scheme 2. Preparation of Schiff Base

Table1: Some of the physical properties and microanalysis of products

Compound	Empirical Formula	Molecular Formula	Yield %	Colour	Elemental Analyses Found (Calc.) %(calculated)					crystallisation
					C	H	N	S	M	
[HPMOC]	C ₂₃ H ₂₀ N ₄ O ₅ S	466	82	Pale yellow	59.76 (59.22)	4.38 (4.75)	12.65 (12.01)	6.64 (6.87)	-	water/ether/ethanol
[Co(PMOC)(OAc)(H ₂ O) ₂]	C ₂₅ H ₂₄ CoN ₄ O ₇ S	583	75	Dark yellow	51.78 (1.46)	4.45 (4.15)	9.87 (9.60)	5.68 (5.49)	10.76 (10.10)	water/DMSO
[Ni(PMOC)(OAc)(H ₂ O) ₂]	C ₂₅ H ₂₄ N ₄ NiO ₇ S	583	68	green	58.81 (58.67)	4.62 (4.15)	9.85 (9.61)	5.69 (5.50)	10.25 (10.06)	=
[Cu(PMOC)(OAc)(H ₂ O) ₂]	C ₂₅ H ₂₄ CuN ₄ O ₇ S	588	76	Dark yellow	50.96 (51.06)	3.43 (4.11)	9.86 (9.53)	5.86 (5.45)	10.67 (10.81)	=
[Mn(PMOC)(OAc)(H ₂ O) ₂]	C ₂₅ H ₂₄ MnN ₄ O ₇ S	579	70	yellow	51.45 (51.82)	3.43 (4.11)	9.15 (9.67)	5.43 (5.45)	10.67 (9.48)	=
[Cd(PMOC)(OAc)(H ₂ O) ₂]	C ₂₅ H ₂₄ CdN ₄ O ₇ S	636	69	Pale brown	47.85 (47.14)	4.05 (4.17)	8.21 (8.80)	5.45 (5.03)	16.87 (17.65)	=
[Zn(PMOC)(OAc)(H ₂ O) ₂]	C ₂₅ H ₂₄ ZnN ₄ O ₇ S	589	71	Brown	51.23 (50.90)	4.53 (4.10)	9.27 (9.50)	5.31 (5.43)	10.78 (11.08)	=

Biological Activity According to the literature protocol, the antibacterial activity of Schiff base ligand and its metal(II) complexes was investigated against four Gram-negative (*E. coli*, *S. sonnei*, *P. aeruginosa*, *S. Typhi*) and two Gram-positive (*S. aureus*, *B. subtilis*) bacterial strains. The results were compared to those obtained with the standard antibiotic Amoxicillin and ampicillin as a simple. The Schiff base ligand inhibited the growth of the various strains tested in different ways. Its metal(II) complexes inhibited the growth of development bacterial strains in a moderate to significant way. The antibacterial efficacy of Schiff base ligand was signified substantial with *C. albica*Albicansoderate (40–45%) with *T. long focus*, *A. flavus*, and *C. glabrata* bacterial strains. Cu(II) complex appeared significant activity (58–78 %) with all of the tested bacterial strains, while compounds Ni(II) and Mn(II), as seemed have been significant efficacy (58–73%) with all of the tested bacterial strains, and moderate efficacy (45–58%) with *C. glabrata*. Similarly, compounds Mn(II) and Zn(II) complexes appeared significant effectiveness (51–83%) with all tested bacterial strains. As well as modeffectiveness efficacy (55%) with *F. Solani* with tested bacterial strains. Cd(II) complex demonstrated significant efficacy (56–73%) with all tested bacterial strains and moderate efficacy with Albicanscans (42%). Accordingly, Zn(II) complex demonstrated significant efficacy (64–69%) with all tested bacterial strains and moderate efficacy (47 %) except with *A. flavus*. When metal ions are coordinated, Metal(II) complexes have higher efficacy, according to the average data of efficacy (15.5mm) of ligand and the data of moderate efficacy (17.61mm) of its complexes.

All the synthesised compounds were screened for their antifungal and antibacterial activity (MIC- minimum inhibition concentration) in vitro by broth dilution method with one-gram negative bacteria like *P. aeruginosa*, two- gram-positive bacteria as *S. aureus*, *E. coli*, and two-fungi species like *A. niger* and *C. Albicans* occupying. Muller Hinton broth was applied as a nutritious milieu to expand and dilute the drug suspension

Antifungal activity (in vitro)

Antifungal activities of all compounds were studied against six fungal strains (*T. longifusus*, *C. Albicans*, *A. flavus*, *M. canis*, *F. solani*, and *C. glabrata*) according to literature protocol. Sabouraud dextrose agar was seeded with 10^5 (CFU) mL^{-1} fungal spore suspensions and transferred to Petri plates. Disks soaked in 20 ml (200 $\mu\text{g/mL}$ in DMSO) of test compounds were placed at different positions on the agar surface. The plates were incubated at 32 °C for seven days. The results were expressed as a percentage of inhibition and were compared to the conventional medications miconazole and amphotericin B. The smallest inhibitory dose (MIC). Compounds with significant antibacterial activity (greater than 80%) were chosen for minimum inhibitory concentration (MIC) studies using the disk diffusion technique. The minimal inhibitory concentration was determined by producing disks containing 10, 25, 50, and 100 $\mu\text{g/mL}$ of the test compounds and following the protocol.

Toxicity study

Meyer et al. methodology was used to evaluate in vitro. In a shallow rectangular plastic dish (22-32 cm) filled with artificial saltwater, brine shrimp eggs (*Artemia salina* Leach) were hatched. Meyer et al. methodology was used to evaluate in vitro. In a shallow rectangular plastic dish (22- 32 cm) filled with artificial saltwater, brine shrimp eggs (*Artemia salina* Leach) were hatched. A perforated device was used to create an asymmetrical division in the plastic dish. Then, 50 mg of eggs were sprinkled into the vast chamber in the dark.

On the other hand, the matter compartment was exposed to a conventional light. After two days, nauplii were collected using a pipette from the side under standard lighting. A test compound sample was generated by dissolving 20 mg of each chemical in 2 mL of DMSO. In 9 vials, 500, 50, and 5 $\mu\text{g/mL}$ were transferred (three for each dilution were used for each test sample and LD_{50} is the mean of three values). In 9 vials, 500, 50, and 5 $\mu\text{g/mL}$ were transferred (three for each dilution were used for each test sample and LD_{50} is the mean of three values). Overnight, the solvent was allowed to evaporate. After two days, when the shrimp larvae were ready, each vial was filled with salt water (1 mL) and ten shrimps (30 shrimps per dilution). Seawater was used to adjust the volume to 5 mL for each vial. The number of survivors was counted after 24 hours. The Finney computer software evaluated the data and determined the LD_{50} values.

Toxicity Assay

Experiments were implemented on albino Wistar male rats, 150–170 gm. Animals were preserved at a steady temperature (25 ± 0.5 °C) and moisture. Laboratory of traditional water and diet were freely obtainable. The complexes under investigation were administered orally in 0.15% agar suspension (50 $\text{cm}^3 \text{ kg}^{-1}$) to four sets of 10 rats. After therapy, the animals were observed for hours every hour and 14 days, every day.

Results and Discussion

The elemental analyses of the prepared compounds are contained in Table 1 and they agree well with a 1:1:1:2 acetate: metal: ligand: coordinated water stoichiometry[1]. Thus, the general formulae $[\text{M}(\text{PMOC})(\text{OAc})(\text{H}_2\text{O})_2]$ ($\text{M}(\text{II}) = \text{Mn}, \text{Ni}, \text{Co}, \text{Cd}, \text{Zn}, \text{and Cu}$) have been assigned to the complexes and they are very air-stable produces at room temperature without decomposition for a long time. The complexes are insoluble in water and other ordinary organic solvents such as chloroform, benzene, ethanol, acetone, acetonitrile, dichloromethane, DMF, and ether but soluble in DMSO[11]. Endeavours to form a complex with iron(II) and chromium(III) ions under the situations above ns were unsuccessful. The molar conductance data determined at room temperature in DMSO vary from 8.7 to 12.1 $\text{S cm}^2 \text{ mol}^{-1}$, suggestive of the non-electrolytic nature of the complexes[2].

Thermal analysis

Thermal analysis has been given datum on data on their characteristics, kind of intermediate and final produces, which obtained by their thermal decomposition. Loss of the mass from TGA curves was determined for the various stages and liken with that determined for the proposed form founded on the outcomes of molar conductance and elemental analyses calculations. TGA suggested the fashioning of MO as the end product from that content of the metal could be determined and liken with

that got from analytical calculation[3]. Thermal analysis of the hydrated metal complexes suggests decompositions of endothermic in three stages and then detect that the complexes are stable with no solvent molecules and hydration water. The 1st stage in the reign 50 to 2,50°C, is attributed to the loss of chelated H₂O molecules[4]. The last dissociation stage contents overall evaporation of the ligand and the fashioning of MO as the previous product from the range tent of the metal was given to be perfected correspondence with the value got from analyses of complexometric[5]. So, the complete thermogravimetric outcomes are compatible with these complex formulations. During the thermaobtainedanalysis of complexes, the solid reremainsre appropriate MO: CoO, CdO, MnO CuO, ZnO, and NiO (Table 2).

Table 2: Thermal decomposition data of the ligand and its metal complexes

<i>Compounds</i>	<i>Temp. rang °C</i>	<i>Wt. loss % found (calculate)</i>	<i>Fragments loss</i>
[Co(<i>PMOC</i>)(<i>OAc</i>) (H ₂ O) ₂]	60–190 190–520 > 520 residue	7.5(7.6) 27.3(28.6) 46.3(47.6) 10.4 (10.5)	Loss of 2H ₂ O Loss of C ₇ H ₉ N + CH ₃ COOH Loss of C ₈ H ₁₂ N ₂ O ₂ S + C ₆ H ₆ CoO
[Ni(<i>PMOC</i>) (<i>OAc</i>) (H ₂ O) ₂]	55–200 200–560 > 560 residue	7.7 (7.8) 30.9(31.7) 36.8(37.0) 11.7 (12.3)	Loss of 2H ₂ O Loss of HCN + C ₇ H ₁₂ N ₂ S Loss of C ₆ H ₆ + CH ₃ COOH NiO + CO ₂
[Cu(<i>PMOC</i>) (<i>OAc</i>) (H ₂ O) ₂]	58–185 185–530 > 530 Residue	7.6 (7.5) 30.9(31.7) 36.8(37.0) 10.4 (10.3)	Loss of 2H ₂ O Loss of C ₇ H ₉ N+ C ₇ H ₁₂ N ₂ S Loss of C ₆ H ₆ + HCN CuO
[Mn(<i>PMOC</i>) (<i>OAc</i>) (H ₂ O) ₂]	70–210 200–500 > 540 Residue	7.9 (8.0) 32.7(33.3) 18.1(18.1) 10.1 (10.8)	Loss of 2H ₂ O Loss of C ₈ H ₉ NO+CH ₃ COOH Loss of C ₆ H ₆ + HCN MnO
[Cd(<i>PMOC</i>) (<i>OAc</i>) (H ₂ O) ₂]	60–200 220–510 > 500 residue	7.2 (7.3) 26.7(27.5) 10.6(115)	Loss of 2H ₂ O Loss of C ₇ H ₉ N + CH ₃ COOH Loss of C ₈ H ₁₂ N ₂ O ₂ S + C ₆ H ₆ CdO
[Zn(<i>PMOC</i>) (<i>OAc</i>) (H ₂ O) ₂]	58–187 187–550 > 550 residue	7.0 (7.1) 35.7(36.4) 25.6(24.7) 12.6(13.8)	Loss of 2H ₂ O Loss of C ₆ H ₆ + HCN Loss of C ₇ H ₁₂ N ₂ S + CH ₃ COOH ZnO+ CO ₂

¹H-NMR

The chemical shifts data were similar to this of ligand adduced in the literature. In e ligand spectrum of single peaks assigned to methyl, COOH for and benzoic acid and cephalixin moieties exhibited at 2.30, 11.56, and 11.78ppm respectively in figure (I)[6]. One moiety of four resonance signals commensurate with an AB structure assigned to S-CH₂ on the dihydrothiazine ring was exhibited in the 3.10–3.57 ppm region with a coupling constant of 16.7 Hz for JAB[7]. Three moieties of double peaks given by N=C-CH and N-CH on the β-lactam ring and O=C-NH- appeared at 4.90, 5.45, and 9.01 ppm, respectively. Furthermore, the coupling between NH₂ and the adjacent CH moieties could not be distinguished and a broad single due to NH₂ protons was observed at 5.05 ppm[8]. A multiplet in the range 6.70–7.90 ppm due to aromatic ring protons was also present[9]. All the complexes are paramagnetic except for the zinc(II) complex. Therefore the ¹H-NMR spectra of the complexes could not be obtained comparison of the 1H-NMR range of the ligand with that of the diamagnetic zinc(II) complex, which shows the absence of the proton signals assigned to the group of COOH for hydrazone ligand indicating deprotonation and suggests the formation of COO⁻-metal bond[10]. No significant changes in ¹H chemical shifts were observed for other atoms upon complexation suindicatedhat, in

solution, the aromatic rings are not involved in stacking interactions. Owing to their low solubility I, it was impossible to record a satisfactory ^{13}C -NMR spectrum for the diamagnetic complex[11].

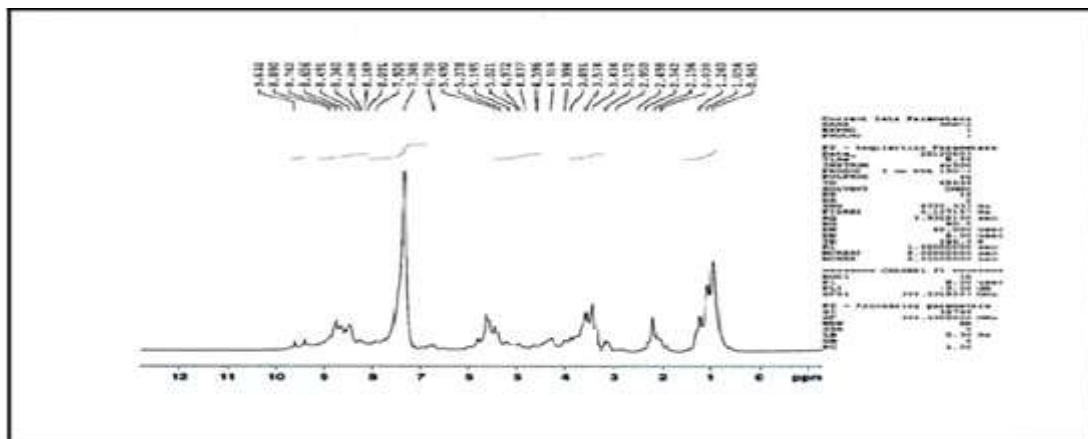


Figure (1): ^1H NMR spectrum of ligand

Infrared spectra

The complexes spectral were listed down to 200 cm^{-1} for the far-IR, one and hesitant band attributions of some bands of ligand [HPMOC] were made by analogy with other related systems in Table 3. In the cephalixin, spectra show laccrow(C=O) band =O) at 1733 cm^{-1} . The ligand [HPMOC] spectrum appears no absorption bands that may be attributed to lactam $\nu(\text{C=O})$ vibrations due to cephalixin. The non-attendance of the like band to together with the occurrence of a new absorption at 1642 cm^{-1} assigned to $\nu(\text{C=N})$ vibrational mode, is appropriate with the product being the anticipated ligand [HPMOC][12]. The complexes spectra show IR frequencies in the $1628\text{--}1632\text{ cm}^{-1}$ reign that may be designated to the C=N stretching vibrations of the chelated ligand [HPMOC], strongly indicating the participation of this group in chelating [13]. In the complexes spectra the rise in the vibration of this band, attributed to the increase in the bond strength, again emphasises the chelation by nitrogen of the azomethine. Evanescence of the stretching vibrations at 1682 and 1667 cm^{-1} attributed to $\nu(\text{COOH})$ of benzoic acid and cephalixin groups in the ligand [HPMOC] and occurrence in the complexes of new ν_{asym} and ν_{sym} forms of the $\nu(\text{COO}^-)$ group signalises which the benzoic acid has reacted[14]. Since the metal ion may chelate to the carboxylate moiety in either monodentate or bidentate mode, the “ $\Delta\nu$ criterion” [$\Delta\nu = \nu_{\text{asym}}(\text{COO}^-) - \nu_{\text{sym}}(\text{COO}^-)$] was utilised to calculate the chelated method of the carboxylate group. The metal complexes offer strong frequencies coinciding to $\nu_{\text{asym}}(\text{COO})$ at $1612\text{--}1605\text{ cm}^{-1}$ and $1582\text{--}1575\text{ cm}^{-1}$, and $\nu_{\text{sym}}(\text{COO})$ at $1442\text{--}1427\text{ cm}^{-1}$ and $1382\text{--}1365\text{ cm}^{-1}$ [15]. The ν data of $170\text{--}182\text{ cm}^{-1}$ and $200\text{--}211\text{ cm}^{-1}$ in the complexes are very comparable to which reported for the metal complexes with both monodentate $\mu_2\text{-O, O'}$ and bidentate groups of carboxylate(OAc), respectively, consequentsignalisingng the carboxylate moieties conduct both as a bi-dentate and monodentate ligand. The residual carboxylate frequencies, viz $\gamma(\text{COO})$, $\omega(\text{COO})$, and $\rho(\text{COO})$ were, previously at 785 cm^{-1} , 610 cm^{-1} , and 530 cm^{-1} , respectively, furthermore, shift as an outcome of chelation[16]. Thus, the occurrence of new frequencies in the $449\text{--}487\text{ cm}^{-1}$ scope due to $\nu(\text{M-N})$ stretching vibrations, got in the complexes spectra (in the free ligand was missing) supply proof which the group of azomethine may be bonded through the nitrogen atom to the metal ion[17]. The frequencies in the $389\text{--}415\text{ cm}^{-1}$ range exhibited in the complexes, and the free ligandwasremissing, are temporarily attributed to $\nu(\text{M-O})$ vibrational modes[18]. Broad frequencetredered in 3278 cm^{-1} attributed to the $\nu(\text{COOH})$ stretching vibrations of benzoic acid and cephalixin moieties in the ligand [HPMOC] and occurrence in the complexes of new frequencitredered in range ($3412\text{--}3378$) may be designated to the $\nu(\text{OH})$ stretch of chelated water molecules[19]. The coordinated water exhibited, in addition to these modes, the $\nu_r(\text{H}_2\text{O})$, rocking near $848\text{--}894\text{ cm}^{-1}$. These overall values indicate the bonding positions, azomethine nitrogen, carboxylate oxygen atom and two water-oxygen atoms are participatory in chelation in the complexes and which the ligand conducts as a bi- dentate NOO chelating agent[20].

Table (3): IR spectral data of the synthesized complexes

Compound	$\nu(\text{OH})$ $\nu(\text{OH})$ (H_2O)	ν ($\text{C}=\text{O}$) ν_{amide}	ν ($\text{C}=\text{N}$) imine	$\text{C}=\text{O}$ ν_{sym}	$\text{C}=\text{O}$ ν_{asym}	$\Delta\nu$	$\text{C}=\text{O}$ ν_{asym}	$\text{C}=\text{O}$ ν_{sym}	$\Delta\nu$	$\nu(\text{M}-\text{OH}_2)$	$\nu(\text{M}-\text{N})$ $\nu(\text{M}-\text{O})$
[HPMOC]	3278 -	1654	1642	1612	1442	170	1582	1382	200	-	-
[Co(HPMOC)(OAc)(H_2O) ₂]	- 3378	1653	1630	1607	1430	177	1578	1371	207	894	449 408
[Ni(HPMOC)(OAc)(H_2O) ₂]	- 3412	1654	1632	1605	1433	172	1576	1365	211	852	453 389
[Cu(HPMOC)(OAc)(H_2O) ₂]	- 3397	1652	1627	1609	1427	182	1580	1376	204	867	490 400
[Mn(HPMOC)(OAc)(H_2O) ₂]	- 3380	1650	1631	1610	1432	178	1575	1374	201	858	469 409
[Cd(HPMOC)(OAc)(H_2O) ₂]	- 3406	1653	1628	1614	1440	174	1579	1374	205	871	461 415
[Zn(HPMOC)(OAc)(H_2O) ₂]	3386	1654	1625	1611	1431	180	1577	1368	209	848	485 397

Electronic spectra

A long-range survey of UV-Vis was investigated to prove in DMSO solution the steadiness of new complexes liken with ligand [HPMOC] and the complexes found which the complexes in DMSO solution were stable. The ligand spectrum showed three broad bands at 322, 337, and 365 nm. The former two bands are assigned to the $\pi - \pi^*$ transmissions within the aromatic rings and remains almost unchanged in the spectra of the metal complex. In contrast the third band, due to the $\pi \rightarrow \pi^*$ transmissions within the chromophore of $>\text{C}=\text{N}$, is changed to a longer wavelength as a result of chelation when binding with the metal atom, assuring the composition of metal complexes and considering which nitrogen of azomethine is implicated in chelation[21]. The IR-spectrum of Co(II) complex shows two peaks at 387 and 536 nm, assigned to ligand-metal charge and $^4\text{T}_{1\text{g}}(\text{F}) \rightarrow ^4\text{A}_{2\text{g}}(\text{F})$ (ν_2) transmissions respectively, proposing around the metal ion octahedral stereochemistry[22]. The nickel(II) complex spectrum shows two main peaks maxima, at 410 and 608 nm assigned to d-d bands that may be assigned, considering that the immediate chelation sphere of the metal is Oh stereochemistry, to the spin led transmissions $^3\text{A}_{2\text{g}} \rightarrow ^3\text{T}_{1\text{g}}(\text{P})$ (ν_3) and $^3\text{A}_{2\text{g}} \rightarrow ^3\text{T}_{1\text{g}}(\text{F})$ (ν_2) respectively. Parameters of Ligand field (b, B, 10Dq) and ν_1 have been determined for Ni(II) complex utilizing ν_2 , ν_3 . The results are favourable because the proportion ν_2/ν_1 is getting to be 1.57 as given for the octahedral Ni(II) complexes[23]. The data of $\nu_1 = 11,562 \text{ cm}^{-1}$, the calculated parameters of ligand field of $b = 0.51$, $B = 562 \text{ cm}^{-1}$ and $Dq = 1,148 \text{ cm}^{-1}$, are furthermore harmonious with stereochemistry of the octahedral. The minimal data of Racah (B) parameter for the complexes liken to the free ion data signifies considerable covalent property of the ligand-metal bonds. In this complex, the ratio of nephelauxetic (b) furthermore is backing covalent property[24]. The copper(II) complex spectrum displays a broad peak centralised 700 nm ($\epsilon = 280.1 \text{ M}^{-1} \text{ cm}^{-1}$) attributed to the $^2\text{E}_{2\text{g}} \rightarrow ^2\text{T}_{2\text{g}}$ transmissions in a distorted octahedral stereochemistry around an ion of the copper(II). A band at 400nm is attributed to charge transfer, fundamentally of the $\text{L} \rightarrow \text{Cu}$ kind[25]. The manganese(II) complex spectrum displays a broad peak centralised 453 nm attributed to the $\text{A}_{1\text{g}}(\text{F}) \rightarrow ^4\text{T}_{2\text{g}}(\text{G})$ transmissions in an octahedral stereochemistry around an ion of the manganese(II). The Cd (II) and Zn (II) complexes spectra display strong intense charge transfer transmissions (LMCT) bands at 390 nm and 410 nm[26].

Table (4): Electronic spectral data of the ligand and its metal complexes

Compound	μ_{eff}	$\lambda_{\text{m}}, \text{S cm}^2 \text{mol}^{-1}$	$\lambda \text{ nm}$	$\nu \text{ cm}^{-1}$	Transition	stereochemistry
(HPMOC)	-	2.12	322 337 365	31055 29673 27397	$(\pi \rightarrow \pi^*)$ $(n \rightarrow \pi^*)$	---
[Co(PMOC)(OAc) (H ₂ O) ₂]	5.1	11.90	320 335 387 536	31250 29850 25839 18656	L.F C.T $^4\text{T}_{1\text{g}}(\text{F}) \rightarrow ^4\text{A}_{2\text{g}}(\text{F}) (\text{U}_2)$	Octahedral
[Ni(PMOC)(OAc) (H ₂ O) ₂]	3.36	14.43	323 337 360 410 608	30959 29673 27777 24390 16447	L.F C.T $^3\text{A}_{2\text{g}} \rightarrow ^3\text{T}_{1\text{g}}(\text{P})$ $^3\text{A}_{2\text{g}} \rightarrow ^3\text{T}_{1\text{g}}$	Octahedral
[Mn(PMOC)(OAc) (H ₂ O) ₂]	5.90	18.92	320 330 358 453	31250 30303 27932 22075	L.F C.T $\text{A}_{1\text{g}}(\text{F}) \rightarrow ^4\text{T}_{2\text{g}} (\text{G})$	Octahedral
[Cd(PMOC)(OAc) (H ₂ O) ₂]	-	16.65	323 338 364 390	30959 29585 27472 25641	L.F C.T C. T	Octahedral
[Zn(PMOC)(OAc) (H ₂ O) ₂]	-	15.12	320 339 370 410	31250 29498 27027 24390	L.F C. T C. T	Octahedral

Magnetic properties

The grade of the material magnetisation in reply to a magnet is called magnetic sensitivity. The process determines the Boltzmannutilisatiionn of all levels of energy. Corrected magnetic sensitivities from values of the molar magnetic sensitivity were chosen to utilutilise the constants of Pascal. The magnetic sensitivities for the complexes were paramagnetically placed within the reigns got together with ions of free-spin high spin in octahedral geometries. Data of the Mn(II) complex is 5.90 μB that is a model of high-spin d^5 arrangement with $S = 5/2$ ground situation, and 5 electrons were unpaired[27]. A magnetic sensitivity of the Co(II) complex is 4.60 μB that is a model value of a d^7 arrangement with 3 electrons were the unpairedsignalisingg situation of a quartet around the metal in an octahedral structure, as likened with the adduced data (4.7–5.2 μB) for cobalt(II) complexes were octahedral[28]. A magnetic sensitivity of the Ni(II) complex is 3.24 μB characteristic of 2electrons were unpaired and more than data of the spin-only, perhaps attributed to the orbital contribution produced from the transfer of an electron from the dx^2-y^2 orbital to the dxy orbital[29]. The complex, therefore probably has distorted octahedral geometry. At room temperature, a magnetic moment of 1.9–2.2 μB is usually observed for mononuclear copper(II) complexes, regardless of stereochemistry. A magnetic moment of 2.10 μB is kept for the copper(II) compound in the solid state[30].

Coordination sites

The coordination chemistry of transition metal ions with antibiotics has been reported as ceftazidime, cefepime, ceftriaxone, and cefotaxime. In the present case, the ligand [HPMOC] including cephalixin has a digit of atoms of the potential donor in different locations that may link to the metal ions formation multinuclear coordinate. The values show that each metal ion gets in distorted octahedron chelation with ligand via azomethine nitrogen and two carboxylate oxygen atoms, perhaps a link to ions of the octahedral[32]. Consequently, the metal ions in the $[\text{M}(\text{PMOC})(\text{OAc})(\text{H}_2\text{O})_2]$ complexes including acetate with bidentate mode and one water molecule at the tops of an octahedron are Hexa-coordinate. We have endeavoured to increase crystals of a single for the metal chelates because of their insolubility in widespread organic solvents in no status have we had any prosperity, assigned to the complexes only

shape unorganised materials like evidenced by the patterns of XRD[33]. Nanocrystal frameworks of complexes including cephalexin have been adduced. These researches appear a redounding to analyses crystallographic in future, which are convoluted by the quandaries difficulties of X-ray quality crystals of complexes were derived from cephalexin. The chelation surroundings of mononuclear complexes wherefore crystal structures of the complexes are not renowned[34].

Antibacterial Activity

The outcomes of biological testing are given in Table 5. A superficial opinion of the values signalized in direction in vitro biological efficacies was determined from the diameter of prominent suppression scopes induced by samples against the *S. aureus*, *E. coli* and *P. aeruginosa* bacteria and under identical experimental conditions[35]. As estimated by colour, the complexes stayed intact during antimicrobial screening. To illustrate the role of DMSO in any sharing and metal (II) acetate salts in the antimicrobial screening, separate studies were investigated with the free metal salt and the solutions alone of DMSO and they have been getting that they have an effect on the growth of any microorganisms taken. The Schiff base ligand 2- amino benzoic acid-cephalexin (HPMOC) has comparable antibacterial efficacy using amoxicillin as control. The ligand [HPMOC] and cephalexin drug have similar antibacterial efficacy would to have lower activity than the studied complexes of Co(II) and Ni(II) against the bacteria strains under the screen conditions, displaying as bactericides show good efficacy. The complexes Zn(II) Co(II) and Cd(II) that they have less toxic than the standard drug and ligand [HPMOC][36]. The magnified efficacy of complexes liken to ligands may be assigned to π -electrons of ligand growing delocalisation the whole coordinate ring, Approving to the theory of Tweedy. The metal ion growing lipophilic feature of the coordinate and decreases the polarity in coordination, which posteriorly favours the metal linking positions on microorganism enzymes and its penetration through the cell membrane in layers of lipid[37].

Antifungal Activity Formed the screening results of the parent drugs appeared very perfectly versus *A. Niger* and *C. albicans*, is lower efficacy than ligand[38]. The metal complexes show less effectiveness moderately efficacy versus all fungal strains (Table 5).

Cytotoxic bioassay

The ligand and its metal complexes were tested for cytotoxicity (Brine Shrimp bioassay) using the Meyer et al. technique [39]. According to the cytotoxic findings in Table 6, all drugs were considered practically inactive in this assay. In comparison to the ligand, the metal complexes demonstrated significantly higher cytotoxicity. This activity relationship could be used to help design new cytotoxic drugs for therapeutic use in the future. The LD50 data (quantities resulting in the death of half the rats) are given in Table 6. Toxicity was reduced (lower LD50 values) by complexation[39].

Table 6 Toxicity was reduced (lower LD50 values) by complexation

Compounds	LD50 (g kg ⁻¹)
Amoxicillin	2.5
Cephalexin	5.5
(HPMOC)	5.0
[Co(HPMOC)(OAc) (H₂O)₂]	6.3
[Ni(HPMOC)(OAc) (H₂O)₂]	20
[Cu(HPMOC)(OAc) (H₂O)₂]	8.4
[Mn(HPMOC)(OAc) (H₂O)₂]	9.0
[Cd(HPMOC)(OAc) (H₂O)₂]	10.5
[Zn(HPMOC)(OAc) (H₂O)₂]	11

Table (5): antibacterial and antifungal activity of the Compounds

Compounds	% Zone of inhibition (mm)							
	Gram-positive			Gram-negative				
	E. coli	S. aureus	P. aeruginosa	S. sonnei	Typhi	S. typhi	Statistical analysis.	Average
(HPMOC)	32	17	23	16	15	20	1.47	14.0
[Co(PMOC)(OAc)(H ₂ O) ₂]	28	14	20	20	13	17	2.60	18.1
[Ni(PMOC)(OAc)(H ₂ O) ₂]	21	13	19	14	12	15	1.20	19.7
[Cu(PMOC)(OAc)(H ₂ O) ₂]	7.5	11	17	9	10	16	1.71	17.6
[Mn(PMOC)(OAc)(H ₂ O) ₂]	18	14	16	13	11	15	2.35	19.1
[Mn(PMOC)(OAc)(H ₂ O) ₂]	11	10	13	10	9	14	2.96	19.1
standard drugs (Amoxicillin)	24	28	30	23	30	29	2.63	24.4
standard drugs (ampicillin)	27	30	32	25	32	31	2.63	26.1

Table 5 The selected chemicals' MIC (M/mL) Complexes of Ni and Cu against certain microorganisms

Bacterial strains	[Ni(PMOC)(OAc) (H ₂ O) ₂]	[Cu(PMOC)(OAc) (H ₂ O) ₂]
Gram-negative S. sonnei	1.76x 10 ⁻⁷	—
Gram-positive B. subtilis	-	1.18 x 10 ⁻⁷

Compounds	% Zone of inhibition (mm)							
	T. longifucus	Albicans	P. aeruginosa	A. Niger	A. flavus	M. canis	Statistical analysis	Average
(HPMOC)	290	300	300	300	290	290	1.47	14.0
[Co(PMOC)(OAc)(H ₂ O) ₂]	300	340	270	300	300	300	2.60	18.1
[Ni(PMOC)(OAc)(H ₂ O) ₂]	180	200	170	190	180	180	1.20	19.7
[Cu(PMOC)(OAc)(H ₂ O) ₂]	200	230	190	220	200	200	1.71	17.6
[Mn(PMOC)(OAc)(H ₂ O) ₂]	250	280	200	250	250	260	2.96	19.1
[Cd(PMOC)(OAc)(H ₂ O) ₂]	230	270	180	240	230	250	2.90	18.4
[Zn(PMOC)(OAc)(H ₂ O) ₂]	220	260	190	230	240	240	2.84	17.3
standard drugs (Amoxicillin)	24	28	30	250	30	29	2.63	24.4
standard drugs (ampicillin)	27	30	32	210	32	31	2.63	26.1

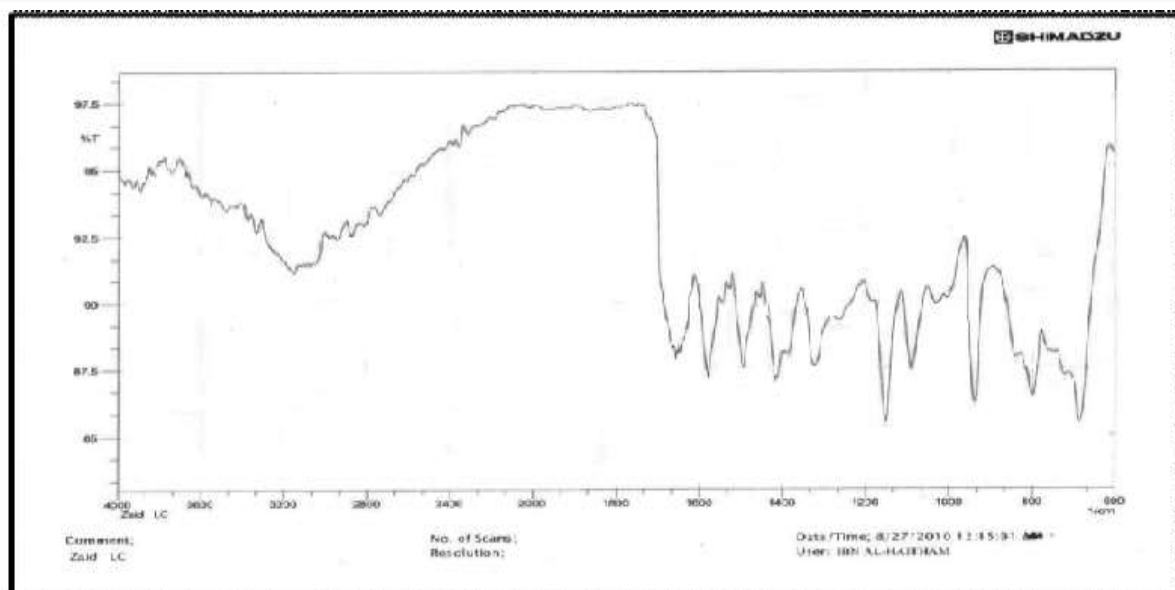


Figure (2) IR spectrum of ligand

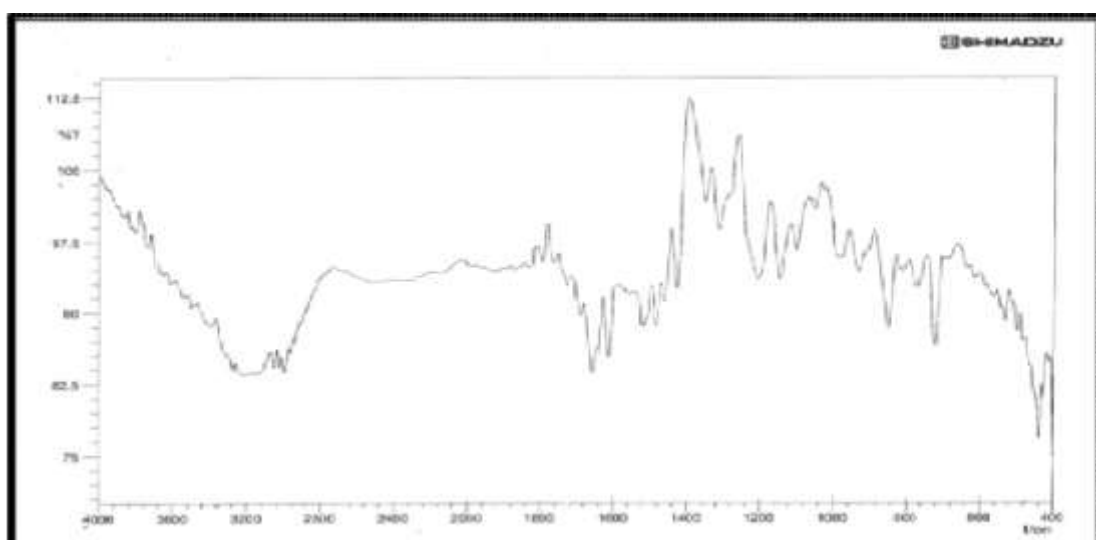


Figure (3) IR spectrum of Cd(II) complex

Figure (1): Effect of Toxicity for the ligand and its complexes

Conclusions

A ligand derived from cephalexin and 2-aminobenzoic acid and its transition metal complexes have been prepared. The ligand (HPMOC) coordination to metal occurs through the azomethine-N and two carboxylate-O atoms. Co(II) and Ni(II) complexes were found to have higher bactericidal activity than the uncomplexed cephalexin and the ligand against the bacteria strains. The biological activity data revealed that when Schiff base ligands were coordinated with different metal elements, the majority of them had higher activity. It was showing that they have good at training bactericides. The Co(II) and Ni(II), Cu(II), Mn(II), and Zn(II) complexes showed to be less toxic than the reference drug and the ligand. Apart from membrane permeability, the antibacterial activity of metal complexes depends mainly on the metal ion and the type of microorganism[40]. On the basis of Overtone's notion and chelation theory, the improvement in biological activity after coordination can be explained.

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DISCOVERY OF NEW ANTI-CANCER AGENTS VIA BIOINFORMATIC APPROACH

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ABSTRACT

Conducting research on potential cancer treatments can be a time-consuming, expensive and arduous process. However, computer-assisted drug discovery (CADD) and bioinformatics tools can accelerate drug design, reduce costs and enhance efficiency. This study aimed to identify and propose novel treatments for breast cancer by assessing 3D-QSAR and molecular docking of thioquinazolinone derivatives with aromatase (PDB ID: 3S7S). A CoMSIA model with high Q^2 , R^2 and R^2_{pred} values was constructed and the model's predictive ability was assessed through external validation using a test set. The research findings indicated that electrostatic, hydrophobic and hydrogen bond donor/acceptor fields play critical roles in treating breast cancer. Based on these findings, a series of highly effective new aromatase inhibitors were designed and the most promising model was used to predict their inhibitory activities. Additionally, pharmacokinetic features of the medication candidates were analyzed through ADMET investigation.

Keywords: Breast cancer; Bioinformatic; Drug; Molecular docking; QSAR; ADMET.

**EFFETS DE L'INSTALLATION HUMAINE SUR L'ENVIRONNEMENT DANS
L'ARRONDISSEMENT DE TOGBA (BENIN)**
**EFFECTS OF HUMAN SETTLEMENT ON THE ENVIRONMENT IN THE DISTRICT OF
TOGBA (BENIN)**

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Résumé

L'installation des populations engendre la dégradation de l'environnement dans l'arrondissement de Togba. L'objectif général de cette recherche est d'analyser les effets de l'installation humaine sur l'environnement dans l'arrondissement de Togba.

L'approche méthodologique adoptée se résume à la collecte des données, le traitement des données et l'analyse des résultats. Les principales techniques de collecte utilisées sont la recherche documentaire et les enquêtes de terrain menées auprès de 100 personnes. Les résultats ont été analysés à l'aide du modèle PEIR (Pression, Etat, Impact et Réponse).

Les résultats de cette recherche ont montré que la population de Togba est passée de 18674 habitants en 2002 à 73331 habitants en 2013. Cela montre qu'il y a une forte croissance de la population dans cet arrondissement. L'analyse comparée des cartes d'occupation des sols de 2001 et 2021, il ressort que les superficies des agglomérations ont augmenté de 12,74 %. Cette évolution continue de la population entraîne le développement des activités qui génère assez de déchets. Ces déchets proviennent des activités socio-économiques. La dégradation de l'environnement de la localité se caractérise par le rejet des déchets dans l'environnement, un faible taux de couverture des ouvrages d'assainissement à tous les niveaux et leur mauvaise gestion.

Mots clés: Togba ; installation humaine ; environnement ; dégradation

Abstract

The settlement of populations causes environmental degradation in the district of Togba. The general objective of this research is to analyze the effects of human settlement on the environment in the district of Togba.

The methodological approach adopted boils down to data collection, data processing and analysis of the results. The main collection techniques used are documentary research and field surveys conducted with 100 people. The results were analyzed using the PEIR model (Pressure, State, Impact and Response).

The results of this research showed that the population of Togba increased from 18674 inhabitants in 2002 to 73331 inhabitants in 2013. This shows that there is a strong population growth in this district. The comparative analysis of land use maps for 2001 and 2021 shows that the areas of agglomerations have increased by 12.74%. This continuous evolution of the population leads to the development of activities that generate enough waste. This waste comes from the activities of socio-economic activities. The degradation of the environment of the locality is characterized by the discharge of waste into the environment, a low rate of coverage of sanitation works at all levels and their poor management.

Keywords: Togba; human settlement; environment ; degradation

**PLASTIC BIODEGRADATION: A NOVEL APPROACH TO PROTECT HUMAN HEALTH
AND THE ENVIRONMENT**

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ABSTRACT

Plastics are being used more often, and when they deteriorate, they pose a serious threat to society. This chapter poses the following dilemma: How can we strike a balance between our wants and safety? As a result, the word "biodegradation" is widely used to describe how microorganisms can break down organic materials. The importance of the biodegradation of plastic items, a constantly expanding sector that offers a new dimension solution with novel qualities in waste management regions, will be presented in this chapter. In order to exploit these materials as a source of energy and carbon, microorganisms including bacteria, fungus, and actinomycetes have devised a unique method. The most practical, eco-friendly, and acceptable process is biodegradation. However, more research must be done to fully characterize the bacteria and microbial enzymes that efficiently break down plastic. Also, the chapter would broaden readers' comprehension of how plastic items degrade through a deeper understanding of that topic. When considered collectively, these results will help develop a strategy for bio-upcycling plastic wastes by tying the biodegradation of plastic wastes to the production of useful compounds in microorganisms. Last but not least, we talked about the difficulties with microbial decomposition and recycling of plastic trash.

Keywords: Biodegradation, Microbial enzymes, Waste management Plastics, Safety

**TRANSMISSION COEFFICIENT AND THE INTERSUBBAND TRANSITIONS IN
ZnO/Mg_xZn_{1-x}O UNSTRESSED QUANTUM WELL HETEROSTRUCTURES**

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ABSTRACT

In this paper, we have calculated the electronic states and the coefficient of transmission in ZnO/Mg_xZn_{1-x}O quantum well structures (QW), with 20% of Magnesium in both the parabolic and the non-parabolic cases. Our calculations are performed in the context of the approximation of the envelope function formalism, and using the finite difference method. The results show that the intersubband transition energy increases rapidly with well width until L_w=5nm and becomes almost constant (specially transitions E13 et E23). Wavelength λ₂₃ decreases with well width until L_w=5nm and becomes constant. The non-parabolicity effect is more pronounced for small QW (L_w ≤ 5nm) and less marked in narrow and large QW. Also, we are studied the coefficient of transmission. We notice that when the height of barrier increases the coefficient of transmission decreases. It will be necessary to provide more energy to the electron so that it can cross the barrier. We also notice the variations related to a phenomenon of reflection quantum.

Keywords: Quantum well, Intersubband transitions, Conduction band, Non-parabolicity, Transmission coefficient, Wavelength.

FOURIER TRANSFORM INFRARED SPECTROSCOPY: A NOVEL APPROACH FOR CHARACTERIZATION OF FRYING PROCESS

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ABSTRACT

Frying is considered an important unit operation during the food processing of various products. It imparts taste, flavor color and other physicochemical characteristics to the fried product that generate due chemical reactions taken place during frying. All these characteristics can be imparted to the end fried product by ensuring the quality oil. Different characteristics of oil such as peroxide value, free fatty acid and iodine value are considered as an important determinant of quality that may affect the properties of the final fried item. Moreover, the same oil is being used for frying at intermittent intervals that may result in deterioration of quality of the oil due to excessive heating. Previously, these processes and parameters were determined using conventional methods that are laborious and produce chemical waste that may take part in environmental pollution. Therefore, Fourier transform infrared spectroscopy (FTIR) was being used to characterize the oils rapidly and non-destructively in this modern era. Oil spectra can be taken with the help of FTIR spectroscopy in the region of 600 cm^{-1} to 4000 cm^{-1} wavenumber. The spectral signatures are normally subjected to different preprocessing techniques such as standard normal variate (SNV), baseline correction and De-trending etc. to remove the abnormalities in the dataset. The preprocessed data can be subjected to various explorative and predictive chemometric models such as principle component analysis (PCA) and partial least square regression (PLSR) respectively. PCA tells about the trend of the data whereas PLSR can predict the oil quality parameters such as free fatty acids, peroxide and iodine values from the spectral fingerprints with high correlation coefficients. Hence it can be concluded that FTIR spectroscopy has the potential to characterize the oil stability parameters during frying process rapidly and non-invasively.

Keywords: Frying; FTIR; oil stability; PCA; PLSR

POTENTIAL IMPACTS OF BRINE DISCHARGE ON MARINE LIFE

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ABSTRACT

Saudi Arabia is the world's largest producer of desalinated seawater. The Saline Water Conversion Office (SWCO) had constructed thirty-two desalination plants across the Saudi Arabian coast, including the twelve major plants on the western coast on the Red Sea. Despite all of their benefits, Desalination plants could have several impacts on the surrounding environment. The major concern of these impacts surrounds the outfall brine discharge in the red seawater, and that because of its physical and chemical features. High salinity and high temperature of the discharge brine could have several positive and negative impacts on the surrounding environment.

Keywords: Desalination, seawater, brine, marine life.

MICROWAVE PYROLYSIS OF HIGH-DENSITY POLYETHYLENE AND POLYPROPYLENE USING SODIUM ZEOLITE CATALYST AND ACTIVATED CARBON

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ABSTRACT

The unsustainable production and environmental effluence of plastics have become a concerning issue nowadays due to their rapid use. Waste plastics pyrolysis has been rising as a useful chemical recycling approach for producing energy and materials from this waste. Pyrolysis of plastic wastes was obtained by a unique catalytic microwave pyrolysis system (CMP) in the presence of Zeolite Socony Mobil ZSM-5 catalyst, activated carbon, or carbon black used as a microwave susceptor. The plastic composition, the effect of catalyst, plastic type on product compositions were studied and production of hydrogen gas was calculated. The breaking of long-chain hydrocarbons of waste plastic and the manufacture of lightweight and even more stable hydrocarbons at given pyrolysis temperatures was studied. The catalysis and pyrolysis moderate temperature was between 400 °C to 450 °C. The electrical energy of 1.8 MJ and 1KW microwave power was used to degrade high-density polyethylene (HDPE) and polypropylene (PP) waste plastics by catalytic microwave pyrolysis. The heavy hydrocarbons (wax), hydrogen fuel and solid residue (CNTs) were obtained from this in-situ microwave pyrolysis process. The chemical compositions, thermal degradation, surface morphology, and crystallographic structures of the liquid, gas, and solid (CNTs) were analyzed by XRD, FTIR, STEM, TGA, and Gas Chromatography (GC). The gas analyzed was used to calculate the production of gases evolved from this process. The highest hydrogen gas yield 129.6 mmol/g was produced. The TGA results showed that the thermal degradation temperature for waste plastic is 100°C-650°C, FTIR analysis and GC results showed liquid oil is consist of C₁₃+ fraction hydrocarbons (waxes) of alkanes, alkanes, and aromatics. XRD and STEM results illustrated tubular-like structural morphologies of CNTs synthesized from plastic waste.

SENSITIVITY ANALYSIS OF KINETIC RATE REACTIONS FOR THERMAL DEGRADATION OF PLASTIC WASTE AT A FIXED TEMPERATURE USING STATISTICALLY ASSUMED EXPONENTIAL FACTORS AND ACTIVATION ENERGIES

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ABSTRACT

The rise in the production of plastic waste has prompted the exploration of various recovery options instead of landfilling, burning, and other unethical ways of decomposing. The key focus of this work is the extraction of experimental rate constants from the pyrolysis experimentation that is not providing a suitable percentage of liquid fuels and gases for commercial-scale applications. It is imperative to predict statistical rate constants using a correlated combination of activation energies (E_a), and frequency (A_o) factors at a specific temperature range. This approach also assists in controlling the selectivity and quantity of the pyrolysis products. In this study, a statistical kinetic model was developed to find the best combination of kinetic rate constants for the pyrolysis of high-density polyethylene (HDPE) based on the different combinations of E_a and A_o . Two series of E_a and A_o at 370°C to 380°C in R software were assumed with the Arrhenius equation to predict kinetic rate constants and analyze the sensitivity of the individual kinetic rate reactions. MATLAB was used to examine the sensitivity of individual kinetic reactions to temperature and statistically predict rate constants. The rate constants varied from 0 to 200% of their original values during the sensitivity study. It was found that the rate constant $k(7)$ dominated the other predicted rate constants when high oil and gas yields were concerned. The gas yield increased from lower to higher extreme positions in the range of 60% to 74% with the first series and from 65% to 81% with the second series of E_a and A_o . The oil content increased from 60% to 74% and 65% with the first and second series, respectively.

Keywords: High-density polyethylene; thermal pyrolysis; kinetic rate constant; sensitivity analysis; activation energy; frequency factor; R software.

REALISTIC TOP MANAGEMENT REPORTING THROUGH THE DISPLAY OF FINANCIAL REPORTING

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ABSTRACT

Real reporting to the top management is fundamentally of great importance for the real business of the company. It is possible to manage the company on the basis of realistic representations of all important parts and jobs that took place in the business of the company. The reporting is done through the presentation in the reports submitted by all parts of the company according to the top management. They should be realistic and should reflect the real financial situation that is revealed after the business operations in the companies have been completed. Reporting is carried out continuously according to the requests of top management, but also according to the requests of state authorities, banks, as well as according to the requests of shareholders in heterogeneous companies. In transition countries, such as the Republic of Serbia, one of the ways to improve the success of business is to introduce innovations in business, where one of the key factors is the improvement of real reporting of companies.

Keywords: reporting, finance, management, real reporting.

INTERNAL CONTROL SETTING IN THE CONTEXT OF COMPANY BUSINESS

The setting of internal control in the context of the operation of a large number of heterogeneous companies is established in order to improve the overall operation of the companies [1-6]. The application of internal control in companies is carried out in order to establish a realistic business system.

Respecting internal control and the achievement of dream goals in research is monitored through financial reporting to the company's top management [7-11].

Observation of the control that is organized in companies within the framework of reporting improvement is given in the form of the author's view in figure number 1.

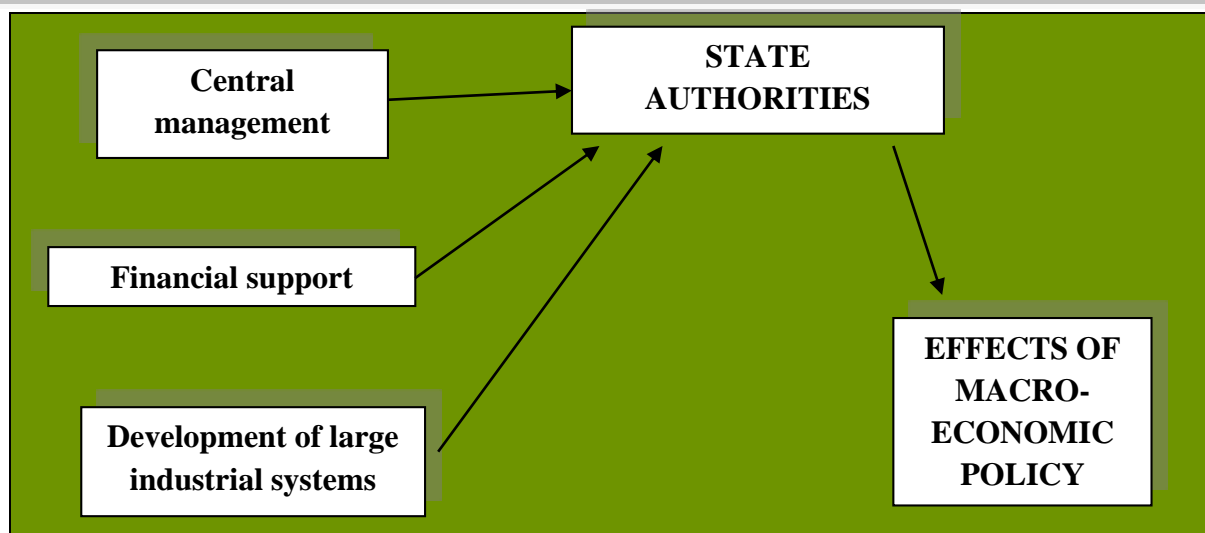


Figure 1: Presentation of the traditional functioning of state bodies.

A PRESENTATION OF REAL FINANCIAL REPORTING IN COMPANIES IS GIVEN IN THE PRESENTATION REGULARLY SUBMITTED TO COMPANIES

The presentation of real financial reporting in companies is given in the report that is regularly submitted to the top management of the company [12-15]. The authors presented below the possible reporting in the procedures of regular reporting in companies in Tables 1-4.

Table 1: Summary of Income Statement for 3 years

POSITION	YEAR OF BUSINESS		
	1	2	3
BUSINESS INCOME	484.627	546.868	615.486
BUSINESS EXPENSES	491.634	555.281	646.086
OPERATING PROFIT	0	0	0
BUSINESS LOSS	7.007	10.002	30.600
FINANCIAL INCOME	7.871	4.840	4.154
FINANCIAL EXPENSES	87	68	450
OTHER INCOME	3.917	7.264	18.561
OTHER EXPENSES	4.641	18.498	3.265
NET PROFIT	108	0	0
NET LOSS	62.734	17.194	11.600
The note is written by top management:	Signature hand-written by a member of top management:		

Table 2: Overview of capital utilization efficiency for a period of 3 years

INDICATORS	YEAR OF BUSINESS		
	1	2	3
PROFIT MARGIN	1	0	0
CRAFT OF TOTAL PROPERTY	1,96	2,06	2,4
CRAFT BUSINESS PROPERTY	1,96	2,06	2,4
FIXED PROPERTY CRAFTS	4,73	5,4	6,67
CRAFT PROPERTY	3,24	3,57	3,72
The note is written by top management:	Signature hand-written by a member of top management:		

Table 3: Summary of current assets and short-term capital sources over a 3-year period

LIQUIDITY RACIO	YEAR OF BUSINESS		
	1	2	3
LIQUIDITY RACIO AND	14,86	90,29	2,40
RACIO OF LIQUIDITY II	268,38	193,34	164,27
LIQUIDITY RACIO III DEGREE	333,8	239,15	221,73
The note is written by top management:	Signature hand-written by a member of top management:		

Table 4: Display of turnaround time in days for a period of 3 years

TURNING TIME IN THE DAYS	YEAR OF BUSINESS		
	1	2	3
Time of collection of working property	113	102	98
Inventory turnover time	18	34	20
Customer credit time	42	37	35
Time to regulate obligations to suppliers	81	80	86
Turnaround time of fixed assets	77	68	55
Turnaround time for business assets	191	114	158
The note is written by top management:	Signature hand-written by a member of top management:		

CONCLUSION

Reporting through financial reports is done with the aim of establishing financial stability, which is imperative for the successful operation of a large number of heterogeneous companies. Financial reporting is one of the important parts of reporting to top management, and it is regularly performed at the request of top management. It should be emphasized that the top management of the company establishes a total comprehensive overview of the situation in the company, but only after proper financial reporting of all parts of the company, all sectors, that is, all structures in the company. In addition, top management provides frameworks for understanding the scope, structure and speed of financial reporting in companies. A large number of companies essentially deal with the best and most regular provision of a framework for performing financial reporting of all subordinate structures in the economy of a country.

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THE SIGNIFICANCE OF INTRODUCING TASKS FROM THE FIELD OF INTERNAL AUDIT IN THE CONTEXT OF IMPROVING THE ANALYSIS OF THE FUNCTIONING OF AGRICULTURAL ENTERPRISES ON THE EXAMPLE OF THE REPUBLIC OF SERBIA

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ABSTRACT

The importance of introducing real jobs that are fundamentally related to the functioning of internal audit in agricultural companies is gaining more and more importance. In this context, it is important to determine real business improvements based on the application of internal audit, which can be improved through the analysis of the functioning of agricultural enterprises at all levels in agricultural enterprises. This is of great importance for the functioning of weak economies, small in scope, in countries in transition and others, and this paper gives an overview of such appreciation of internal audit on the example of the functioning of agricultural enterprises in the Republic of Serbia. The practical application of the functioning of the internal audit in agribusiness is reflected in the fact that the work of the internal audit enables the making of valid business decisions as safely as possible by the top management, which in its functioning has introduced a business system that imitates the functioning of the internal audit. Therefore, the internal audit in its work raises the quality of business decision-making by that management. In this way, the internal audit contributes to the most optimal and safe process of making valid business decisions in companies that basically have agribusiness as their core activity.

Keywords: business. agribusiness, internal audit, reporting, decision-making.

1. INTRODUCTION

With the work and functioning of internal audit, it is possible to improve the overall business decision-making, which is carried out at all levels by the company's top management [1-4]. In this way, internal auditors can fundamentally raise the overall quality of business decision-making by that management, especially in a way to improve the security of business decision-making, and at the same time, in this way, it is possible to prevent speculative business in companies operating in the field of agribusiness [5-8].

Thus stated observation of the work of the internal audit can essentially contribute to raising a more optimal and safer general process of making valid business decisions in companies that are based on agribusiness [9-12].

As a special observation, it can be pointed out that the internal audit introduced by the company's top management is seen as a real business mechanism in the function of improving the overall process of making valid business decisions in agribusiness companies, but also a wider observation of other

heterogeneous companies [13-17]. as a basic activity. and as realistically as possible could cancel the company.

This contributes to the company being able to realize its existence in the market. In their real internal audit work, it should be emphasized that internal auditors are guided in the analysis processes by essential analysis based on the collected valid financial and other reports that they received from all sectors and all parts of the company in which they operate.

2. THE CONNECTION OF THE WORK OF INTERNAL AUDIT AND OTHER PARTS IN THE COMPANY

The connection between the work of internal audit and the operations of other or other parts in the company is best outlined by the connection of real documentation that essentially follows all processes in companies, all phases, all reports to top and middle, or lower management. In addition, the documentation should realistically reflect the state of business in companies and in the reports that the company submits to state authorities as part of its regular reporting. The presentation of the actual establishment of control in agribusiness enterprises is shown in Figure 1, where the work of the formed internal audit certainly occupies a significant place.

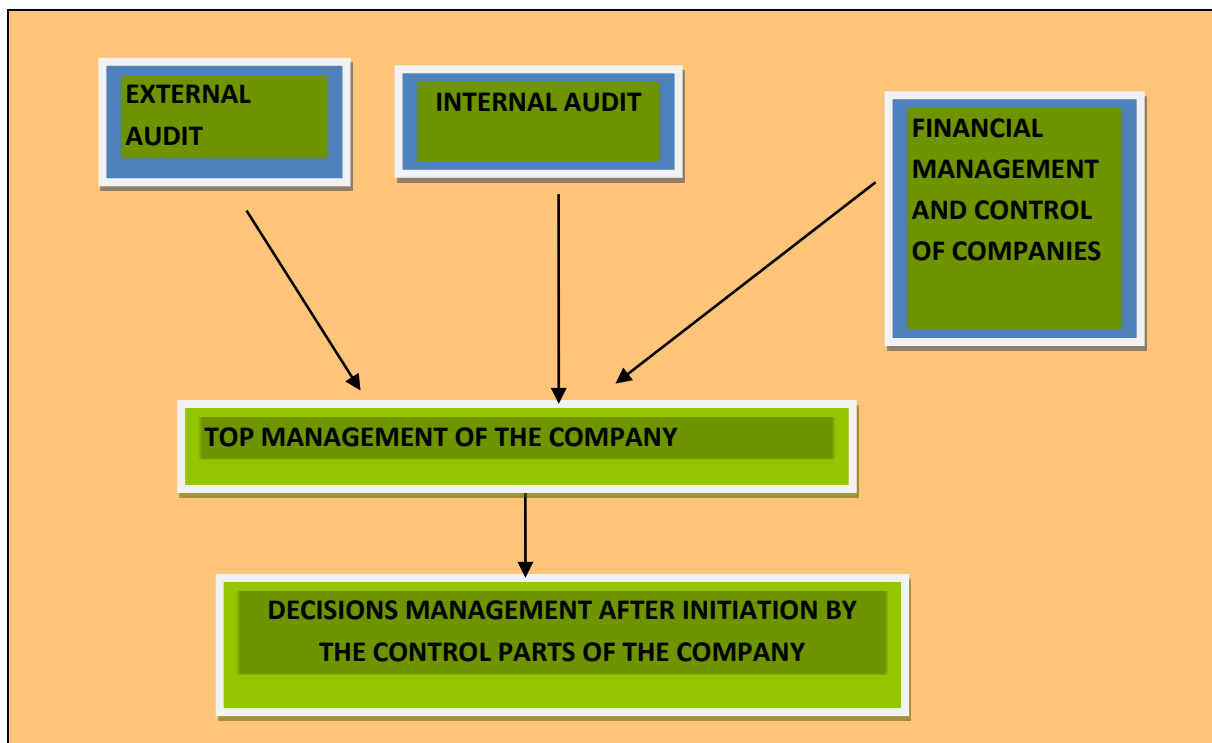


Figure 1: Presentation of established control in the functioning of agribusiness companies.

3. THE FIELD OF OPERATION OF INTERNAL AUDIT, ESPECIALLY WITHIN THE FRAMEWORK OF OBSERVING AGRIBUSINESS

Internal audit is implemented in all parts of the economy and this observation should be understood as a basic observation of the position of internal audit, regardless of the basic activity in which the company achieves its existence.

The goal of introducing internal audit is to improve the overall management decisions of top management. This can only be achieved by receiving valid information from all parts of the company, which can increase the overall reliability of the obtained business reports, which are the basis for obtaining an audit report.

The most common reports that internal auditors use in their operations are:

- Balance sheet
- Profit and loss

- Statements of changes in equity
- Statements of cash flows and
- Notes to the financial statements.

Internal audit uses numerous methods in its work. As an example, the authors present in Table 1 a presentation of possible methods of application primarily focused on the presentation of internal audit within the overall reporting of companies from the field of agribusiness.

Table 1. Presentation of possible methods of applying the internal audit presentation within the process of overall reporting to the top management of agribusiness companies.

The method of application and presentation of the internal audit within the reporting of enterprise management	Advantages	Disadvantages	Rating of top management in the rating interval
Presentation	<ul style="list-style-type: none"> • Interactive • Flexible • Easier acceptance • Assist in the review of serious issues and solutions • Increase the chance of implementing measures • Contributes to focus on priority issues • Audit can influence taking action 	<ul style="list-style-type: none"> • You can not present all of the evidence • It can lead to difficulty in presenting complex data, which can lead to misunderstandings • Needed are presentation skills and active participation of two persons • Thorough preparation • The possibility of domination by one person or a certain problem • The user may continue to require reports 	1-10

Source: Production authors.

4. DESCRIPTION OF THE IMPLEMENTATION OF INTERNAL AUDIT IN AGRIBUSINESS COMPANIES AND BASIC STANDARDS THAT ARE POSSIBLE IN THE MEANING OF USING DECISION-MAKING

The presentation of the implementation of internal audit in agribusiness companies and the basic standards that are possible in terms of the use of top management decision-making is presented by the author in the form of a presentation in Table 2.

Table 2. Presentation of the use of internal audit in companies engaged in agriculture with an example of the possible use of the influence interval given in the ratings by the top managers of the company

FORMS OF STANDARDIZATION	REQUIREMENTS REGARDING THE PERFORMANCE OF CONTROL AND AUDIT	INTERVAL OF POSSIBLE APPLICATION IN THE ASSESSMENT OF TOP MANAGEMENT
Atribut standard	Applying standard requires a professional attitude, competence and professional care, competence, knowledge and other competencies to perform internal audits.	1-10
Implementation standards	The auditor must obtain help, if there is no knowledge, skills, or other competencies needed to perform all tasks related to the audit or his involvement.	1-10
Performance standards	The auditor must effectively manage internal audit activities. Must plan and prioritize internal audit, based on the assessed risk.	1-10
Implementation Standards - advice	The auditor should consider accepting proposed involvement in the assessment and should propose improving the organization of the subject in which audits. Data Solutions suggestions.	1-10

Source: Production authors.

CONCLUSION

Companies that operate in the field of agribusiness are determined to operate with the use of new solutions, the application of which could improve the overall operations of the mentioned companies. One of the ways to improve business operations is to introduce the mechanisms of internal audit application into the procedures of actual and real business in all companies in Serbia. It is of particular importance to be established in companies from the field of agribusiness. The application of internal audit can improve overall business decision-making, but it can also contribute to and improve the effectiveness, efficiency and economy of business decision-making, and affect the improvement of the final business result. This especially applies to companies that operate in the field of agribusiness, because they deal in a large part of their business with the field of primary production in agriculture, as well as the placement of primary production on the markets, the circulation of necessary raw materials, and the employment of a large number of able-bodied people. Companies in agribusiness need to improve their operations, and in this way the operations of the mentioned companies are seen as an innovative improvement of management decisions of top management, where the implementation of internal audit in regular operations can take a special place, because it improves overall business decision-making.

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**NUTRIENT BASED LAND SUITABILITY OF BORO PADDY AND WHEAT AND PROFIT
MARGIN ASSESSMENT: A CASE FROM WEST BENGAL, INDIA**

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ABSTRACT

Soil nutrient characters of agricultural land are strongly determined by the natural soil-water-atmospheric system and external treatment of soil. The cumulative effect of all determines the land suitability. This is highly required in order to agricultural planning and obtaining optimum productivity as well as profit. Considering this the present work aimed to identify the suitable land for boro paddy and wheat based on soil nutrients. Further it aimed to compute profit margin at different suitable lands. Rule based decision tree (RBDT) was applied for land suitability analysis. Profit margin was computed using break even analysis. The result revealed that 25-45% was found suitable for both boro paddy and wheat and profit margin was found higher in these areas. The study also revealed that proper amelioration of soil and application of quality treatment can enhance the yield capacity of soil.

Keywords: Soil nutrients, Land suitability, Rule based decision tree, Profit margin, and Break even analysis

THE RELATIONSHIP OF THE ROLE OF JUMANTIK CADRE TO THE FREE LARVA RATE (ABJ) THROUGH THE 1 HOUSE 1 JUMANTIK MOVEMENT DURING THE COVID-19 PANDEMIC IN THE WORK AREA OF THE BALLAPARANG HEALTH CENTER

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ABSTRACT

The role of jumantik cadres is very important in increasing ABJ, one example is the implementation of PSN and outreach in the community. Community involvement in preventing dengue transmission was one of the reasons for the formation of the Jumantik 1 House 1 Movement (G1R1J). Several cities in Indonesia have implemented G1R1J such as Samarinda and Jambi. The purpose of this study was to analyze the relationship between the role of jumantik cadres based on PSN and counseling on increasing the larva free rate through the 1 house 1 jumantik movement during the COVID-19 pandemic in the ballaparang health center working area. This research was conducted in January-October 2021 with villages in cross sectional. The population of this research is the jumantik cadres who are actively serving in the working area of the ballaparang health center, totaling 35 jumantik cadres, while the sample is taken using the Exhaustive Sampling Technique. The instrument used was an online questionnaire in the form of a Google Form and larva free number data using secondary data taken from the puskesmas. Data were analyzed in 3 stages, namely univariate, bivariate and multivariate which were presented in tabular form using SPSS. The results showed that of the 35 respondents studied, there were 21 respondents (60%) of ABJ with an increasing category and 14 respondents (40%). = 0.001) and counseling ($p = 0.015$) on ABJ, while for multivariate analysis the variable that was significantly related was PSN (Sig = 0.015). It was concluded that the role of jumantik cadres was very helpful in implementing the eradication of DHF such as PSN and counseling which could significantly increase ABJ, and with the presence of G1R1J it could help ABJ 95%, which means that transmission can be prevented or reduced. It is hoped that cadres and to further maximize the implementation of PSN, as well as the implementation of more varied counseling, such as the use of tools to attract public interest in receiving information.

Keyword: ABJ, G1R1J, Jumantik, COVID-1.

ANTICIPATING CUSTOMER NEEDS AND INCREASING SATISFACTION WITH ZOOS

Dr. Roland SCHMUCK*University of Pécs Faculty of Business and Economics Department of Leadership and Organizational Sciences*ORCID ID: <https://orcid.org/0000-0002-9968-2173>**ABSTRACT**

Zoos have to balance their entertainment role with their educational role. This paper concentrates on the entertainment role and copes with customer satisfaction, which is very important in loyalty. Zoos are entertainment facilities from the view of a visitor, where they can spend a whole day without realizing that time has passed. Based on visitor experiences, five zoos are described with a focus on the management's role to anticipate customer behavior and increase customer satisfaction. The research shows positive and negative examples. As zoos are extensive, visitors spend several hours or even an entire day exploring the different areas.

Overall, zoos' management should put a lot of effort into making the experience enjoyable for visitors, from strategic placement of the souvenir store and food facilities to allowing multiple and preferably wide roads to popular animals, and the availability of food and drinks throughout the area. These measures aimed to maximize the visitor's experience and loyalty. Visitors often spend a considerable amount of money on food, particularly for themselves and their children. Optimizing locations is a well-thought-out strategy by the management of a zoo, resulting in increased profits, more guests, and a better experience, leading to more return visits year after year. Anticipating visitor movements include the way the most favorite animals can be reached and the whole walkability inside the territory of the zoo. The safety of visitors is an important issue that should be always ensured.

Keywords: customer satisfaction, zoo, management

1. Introduction

Quality management is a crucial aspect of zoo operations that directly impacts the safety, well-being, and satisfaction of both visitors and animals. Zoos are complex facilities that require a high level of organization, planning, and management to ensure that they function effectively and efficiently. In recent years, there has been an increased focus on quality management in zoos, driven by concerns over animal welfare, visitor safety, and the overall guest experience.

Quality management should ensure that animal welfare standards are met. Zoos have a responsibility to provide high-quality care for the animals in their care, including appropriate nutrition, housing, and medical attention. Effective quality management systems can help to ensure that these standards are consistently met, by providing clear guidelines and procedures for animal care, regular monitoring and evaluation, and continuous improvement processes. The relationship between keepers and animals is also an important aspect of animal welfare (Carlstead et al, 2019). The fulfillment of zoo canid's freedom can increase the job satisfaction of keepers (Riggio et al, 2020). Another key reason why quality management is important at zoos is to ensure visitor safety. Zoos could be – but should not be – dangerous places, so there should be safety guidelines that visitors should keep. Effective quality management systems can help to mitigate these risks, by providing clear safety protocols and procedures, regular training for staff, clear and understandable regulations for visitors, and thorough inspection and maintenance processes.

Very importantly, zoos should ensure that visitors have a positive and enjoyable entertainment experience. Zoos are popular attractions for families and tourists, and a high-quality visitor experience is essential for the long-term success and viability of the facility. Effective quality management systems can help increase customer satisfaction and loyalty and ensure that visitors have access to a wide range

of activities and amenities, including food and beverage services, interactive exhibits, and educational programs. This latter one is also important for zoos. This is less visible than the entertainment side, but an important task for zoos. Zoos are also places where animals are kept safe and important places for preservation. This decreases the possible loss of biodiversity. (Mellish et al, 2021) Finding the balance between education and entertainment is crucial for all zoos in the world (Kruger & Viljoen, 2022).

From a business point of view, zoos rely on many sources of funding (Agyeman & Asebah, 2022). These include tickets, selling souvenirs, and food, and receiving donations. Many zoos are publicly owned, so they receive funding for their operations. While private zoos need to have profit without external funding, public zoos do not need to fulfill these criteria.

Zoos all over the world have similarities and differences. As visitors see more and more zoos all around the world, their expectations may increase affected by their previous experiences. The higher the customer satisfaction, the zoo and get more visitors in the future.

2. Research and findings

The research looks for answering the research question “What can zoo management do to anticipate customer needs and increase customer satisfaction?”

The research method of this paper used visitor experiences collected through the Quality Management course of the University of Pécs Faculty of Business and Economics between 2019-2022. While learning the management’s role in quality, international master-level students had the possibility to analyze a zoo that they had visited if it meets the customer requirements and what are the facts that the management anticipates the customer needs. Experiences had to be submitted in written form, like a written interview on this topic. Not all of the written interviews were useful and detailed enough to be used in this research. Only some of the most valuable experiences are summarized here in this paper.

Other research on this topic also used customer experience, such as the research of Karanikola et al (2020) who used on-site interviews at the Attala zoological park in Greece (Karanikola et al, 2020). The research by Lee used questionnaires among the visitors of six zoos in South Korea (Lee, 2015). It is possible to use a quality-gap analysis with specialized questions for zoos (Agyeman & Asebah, 2022). A SERVQUAL analysis – which is a kind of gap analysis (Parasuraman et al, 1988) – based on a questionnaire was used in the research of Izzah et al (2020) at Zoo Negara in Kuala Lumpur (Izzah et al, 2020). In the current research zoos are not named, only their country is shown. There are five experiences described here, zoos from Ethiopia, Egypt, United Arab Emirates, South Africa, and Hungary.

There are positive and negative examples. Positive feedback from an Ethiopian zoo includes that the operators of the park seem to know what the visitors need. For instance, most visitors need food, water, hotels, language translators, brochures, and transportation, which were all present for the visitors.

A negative experience is about a zoo in Egypt, that was founded more than 130 years ago. The customers have higher customer expectations that the zoo can hardly fulfill. There was a big difference in the behavior of Egyptian society throughout the century, but the zoo was kept intact. While it is not an issue that the species are the same, the visitor can feel that the management failed to change through the decades. The level of cleaning and the health of some animals gives an impression of a lack of care in the zoo. The visitors can only see the animals in their cages without any further activities. While the zoo can be considered big, there are no signboards to help with navigation. There is no visible sign that the management wants to know the feedback of the visitors and their expectations to increase customer satisfaction with the zoo.

At a zoo in the United Arab Emirates, the expectations of the visitors were met in some aspects and left unmet in other aspects. Animal diversity is a positive point of the zoo. However, there are some areas of improvement that could have enhanced the overall experience. The signs used in the zoo are not placed in proper locations, which made it difficult for visitors to navigate the area efficiently. Despite this, cleanliness is satisfactory throughout the zoo. While some of the territories of the zoo seem to be well managed, there are also drawbacks. The souvenir shops are not placed in the ideal locations and are sometimes far away from the main locations, making it challenging for visitors to find them. The moving of visitors seem incorrectly planned, causing a considerable amount of moving needed by the

visitors, which may cause problems for the elderly and for the disabled. However, one positive aspect of the zoo's planning was the provision of multiple points of sale for cold beverages and iced drinks. As the zoo is located in a hot country (United Arab Emirates), this was a thoughtful addition, enabling visitors to quench their thirst and refresh themselves during the hot weather.

A zoo in South Africa is on a vast expanse of land with an impressive variety of animals, including mammals, exotic birds, reptiles, and many others. Visitors are pleased to find that all the cages were spacious and maintained well. The availability of several cafes, restaurants, and clean restrooms located at various points within the zoo makes it convenient for visitors to take breaks or have a rest. The map of the zoo is available for the visitors, which showed the direction and locations of all the different animals and facilities, making navigation through the zoo easy. The zoo provides visitors with an opportunity to walk freely in a safe environment without the fear of being attacked by any of the animals. The cages had different facilities, such as swings and wooden bars, that the animals could play with, although some of them appear old and need repairing. A few cages have some dangerous areas, showing that there is a lack of attention to detail in some of them. The staff is helpful and friendly, adding much to the positive customer satisfaction. The overall cleanliness of the zoo and the more spacious cages compared to other zoos gives a positive impression.

The experience of a zoo in Hungary showed the strategic placement of stores. The souvenir store at the entrance of the zoo served as both the beginning and end of the adventure for visitors, with the hope that they would spend some time and money there before and after exploring the zoo's animals. The store is strategically located to encourage visitors to purchase souvenirs for their memories. This is a common place for selling souvenirs, found in many other zoos as well. The popularity of certain animals meant that the roads leading to them are wider and more prominent and that the zoo built new side roads leading to these important animals from other areas of the zoo to allow a higher number of visitors. In previous research on this topic, a survey from the UK with a sample of 444 visitors concluded that mammals are the favorite animals in zoos, while the least favorite animals are reptiles and birds (Carr, 2016).

3. Conclusions

The research question of this paper was the following: "What can zoo management do to anticipate customer needs and increase customer satisfaction?". This question was analyzed through five real-world case studies of zoos. The conclusions are drawn and summarized in this chapter.

When one gets the opportunity to visit thematically protected areas such as zoos, their expectations may not be easily met. The quality of service and experience can vary greatly depending on the location. However, in any location, the zoo management should anticipate the behavior and the requirements of the customers. For example, feeding animals in a way that would not hurt them in any way. Some parks even created special events or areas where visitors could feed animals based on specific food quality standards identified by the zoo.

Additionally, there are places in some parks where visitors can pet animals under the supervision of a staff member. This provides a unique opportunity for visitors to interact with the animals in a safe and controlled environment. Overall, while the experience and quality of service at different thematically protected areas such as zoos may vary, visitors can still expect to have enjoyable and memorable experiences.

Customer satisfaction is very important in increasing loyalty in the case of zoos (Ayaji & Tichaawa, 2021, Javed et al, 2020). Overall, zoos' management should put a lot of effort into making the experience enjoyable for visitors, from strategic placement of the souvenir store and food facilities to allowing multiple and preferably wide roads to popular animals, and the availability of food and drinks throughout the area. These measures aimed to maximize the visitor's experience and loyalty.

As zoos are extensive, visitors spend several hours or even an entire day exploring the different areas. To cater to the needs of hungry visitors, food trucks and small shops can be found throughout the area, although the prices are typically high inside the zoos, as there is no outside competition here. Visitors often spend a considerable amount of money on food, particularly for themselves and their children. This approach was a well-thought-out strategy by the management of a zoo, resulting in increased profits, more guests, and a better experience, leading to more return visits year after year.

Many zoos are built in a logical way using circular roads that allow the visitors to move around the zoo in several different ways. Important places can be in at the road crossings. These places are also optimal to have food facilities or souvenir shops. Zoos should have interactive places that increase their entertainment value. As these tasks vary between different age groups, it is important to have activities for all age groups. If a zoo is big, there is commonly a need for resting places. These are business opportunities, where sales can take place.

The quality-gap analysis of Agyeman & Asebah (2022) concluded that visitors, who were mostly families and friends, considered safety and comfort on the footpaths to be crucial to their satisfaction. They also valued guidance, knowledge, conservation, and comfort. However, the delivery of these services still needs management intervention to sustain and improve critical aspects of the zoo, such as social, educational, conservation, physical, recreational, capacity, and knowledge factors that contribute to visitor satisfaction. The management has to understand the target market. With animal welfare and visibility becoming important for the public, the management must balance the educational role of the zoos with the recreational, and entertainment need of visitors to increase satisfaction and revenue. (Agyeman & Asebah, 2022).

The research of Maurice et al (2021) concludes that the destruction of wildlife habitat is making zoos permanent wildlife conservation centers. Mvog-Betsi Zoo in Cameroon has a record of keeping wildlife for longer periods, and adding wildlife tourism is a calculated conservation strategy. However, during the study period, tourists had a low satisfaction rate, indicating a need for in-service training programs for workers. Wildlife relocation programs into the wild should also be considered. (Maurice et al, 2021)

Future research could include more zoos, using structured interviews or questionnaires. These could investigate quality gaps, and take into consideration each zoo's attributes. Consultation with the zoo management could be used to identify future areas that require management attention to enhance visitor satisfaction.

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COMPARATIVE STUDY OF CROSS- AND UNCROSS-LINKED ARABINOXYLANS
EXTRACTED FROM MAIZE BRAN

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ABSTRACT

Maize bran is a milling by-product of maize kernels, used as animal/poultry feed and reported as an abundant source of nutrients and bioactive components. Current research aimed to explore the comparative study of the cross- and uncross linked structure of arabinoxylans (AXs) extracted from maize bran (MB). Initially, MB was evaluated for its proximate composition and dietary fiber profile, after which, extraction of AXs from maize bran was done through alkali extraction method and laccase from (*Termites versicolor*) were used for cross-linking of AXs i.e. AXs based gels. Then, the structural characterization of extracted AXs was taken place through FTIR and SEM. The phenolic compounds and their activity was assessed through three different assays including DPPH, FRAP and ABTS⁺. The results showed that MB majorly composed of moisture, ash, crude fat, fiber, crude protein and nitrogen free extract with 12.27±0.46, 1.04±0.15, 1.76±0.26, 6.53±1.00, 10.67±0.75 and 66.54±0.82. Further, dietary fiber profile of MB showed 6.19±0.5% and 33.11±4.1% soluble and insoluble fractions of dietary fibers respectively. The structural characterization of maize bran through FTIR showed a typical spectra of AXs. Surface morphology of gel through scanning electron microscopy showed micrographs with microparticles, which formed due to laccase activity. Furthermore, total phenolic compounds of both samples showed the results 6.42±0.18 and 5.29±0.02 GAE/g and total flavonoids contents showed 1.84±0.66 and 1.54±0.01 CE/g, and their activity assessed through DPPH (39.52±0.63 and 13.62±0.16 TE/g), FRAP (34.87 ± 0.18 and 10.87 ± 0.08 TE/g) and ABTS⁺ (72.64 ± 0.32 and 14.21 ± 0.18 TE/g) assays which showed the highly significant outcomes. Conclusively, the study showed that uncross-linked AXs are suitable for the immediate release of bioactive moieties whereas, cross-linked AXs (hydrogels) are used for prolonged release of biological molecules, which are highly recommended to combat the lower gastrointestinal disorders specially colorectal cancer.

Keywords: Maize bran, Arabinoxylans, Hydrogels, antioxidant activity, FTIR, Scanning electron microscopy

DIVERSITY OF SPIDER FAUNA IN THE AREA OF JAGODINA (SERBIA)

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ABSTRACT

This paper presents a preliminary list of the spider fauna of the Jagodina area. A total of 163 species were registered, belonging to 102 genera and 26 families. The largest number of species was recorded in five families: Salticidae (28), Lycosidae (21), Theridiidae (19), Araneidae (17) and Thomisidae (13). According to the current knowledge of distribution, the established species are classified into 18 zoogeographical categories (chorotypes), grouped into five chorological complexes: widely distributed species, European, Mediterranean, East and Endemics. Dominant are widely distributed species (52,5 %), followed by European species (33,3 %). Mediterranean (7,4 %), East (5,5 %) and endemics species (1,2 %).

Keywords: Jagodina, Serbia, Araneae, faunistic diversity, zoogeography.

HIGH PERMITTIVITY FOR STORAGE APPLICATION

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ABSTRACT

Dielectric materials with high energy density are promising future materials. The dielectrics with a medium dielectric constant, high breakdown strength, and low polarization hysteresis are the most promising candidates for high-power energy storage applications [1]. In this perspective, we have studied oxide compounds with solid state method. These compounds constitute a class of oxides with remarkable magnetic and electrical properties that make them interesting for the fundamental and technological levels. They are promising in a wide range of applications such as multiferroic devices, spintronics and cathode materials with high energy densities.

The dielectric properties and the ac-conductivity were studied in the frequency range 10-106 Hz and the temperature range 30-400 C. The experimental results indicate that the ac-conductivity $\sigma_{ac}(f)$, the dielectric constant ϵ' and the loss dielectric ϵ'' depend on temperature and frequency. The conductivity σ_{ac} obeyed the power law $\sigma_{ac}(f) \sim f^n$. Impedance data presented in the Nyquist plot exhibits the appearance of both the grain and grain-boundary contributions. The results obtained are compared with the main theories describing the universal dielectric response behavior.

Keywords: Solid state; Impedance; Dielectric spectroscopy; ac-conductivity;

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**PATHOLOGICAL AND FUNCTIONAL ASPECTS OF MULTIORGAN FAILURE IN
ALCOHOL USE DISORDER**

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ABSTRACT

Alcohol use disorder (AUD) also referred to as alcohol abuse, alcohol dependence, alcohol addiction, and the colloquial term, alcoholism is a chronic medical condition characterized by uncontrolled drinking and preoccupation with alcohol use despite adverse social, occupational, or health consequences. AUD can be mild, moderate, or severe and brain problems have been considered major events while other organs may also affect. Globally an estimated 237 million men and 46 million women suffer from alcohol-use disorders with the highest prevalence among men and women in the European region (14.8% and 3.5%) and the Region of Americas (11.5% and 5.1%). With a global prevalence of 1.32%, AUD is an important contributor to global disease burden. Alcohol-use disorders are more common in high-income countries. While evidence-based treatment with behavioral therapies, mutual-support groups, and/or medications can help people with AUD achieve and maintain recovery, there are several million affected worldwide even after treatment. Alcohol misuse is linked to end-organ injury in the brain, lungs, liver, and gut due, in part, to dysregulated immune responses across these tissues. Alcohol-use disorders are more common in high-income countries. While evidence-based treatment with behavioral therapies, mutual-support groups, and/or medications can help people with AUD achieve and maintain recovery, there are several million affected worldwide even after treatment. This may be, in part, due to an incomplete understanding of the pathophysiological and functional consequences of AUD.

Keywords: Alcohol use disorder (AUD), Multiorgan Failure, Pathophysiological

ELECTRICAL ENERGY GENERATION FROM AGRICULTURE WASTE

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ABSTRACT

Electrical energy can be generated from the waste obtained as agriculture residue known as waste incinerator/ waste – to – energy plants. This will help in improving the farmers/rural economy. Agriculture waste such as cotton sticks can be collected from farms and used as fuel in these plants which will generate revenue to farmers. However globally the waste-to-energy plants are running at low efficiency as compared to fossil fuel based plants due to hot corrosion degradation failure of the heat exchanger components. The presence of mainly alkali and heavy metals along-with chlorine in the waste lowers the first melting point (FMT) of deposits on the surfaces, results in accelerated corrosion of the components. This paper presents the methods of enhancement of the efficiency of the agriculture waste based energy generation power plants.

Keywords: Incinerators, Waste to energy plants, Agriculture

Introduction

Agriculture waste based electrical energy generation plants are the need of enhancing the rural economy. The improved efficiency of the incinerator and waste to energy plant especially agriculture based plant will be beneficial for the agriculture dependent farmers and also the rural economy. The corrosive degradation of these power generation waste based incinerator/plants components is a serious problem [1-3]. The hot corrosion of heat resistant alloys, in waste incinerators and other similar environments, accelerates by the presence of mainly chlorine, sulfur and alkali metals in the fuel combustion products or impurities [3]. Therefore, an attempt have been made to study the hot corrosion performance of Ni-based superalloy in the highly corrosive real service environment of waste based incinerator.

Experimental procedure

The specimens of Ni-Cr based superalloy were used as substrate material for the present study and the sample specimens were cut with dimensions of 20x15x3mm. Polishing of specimens was done using SiC emery papers of 100, 220, 400, 600 grit size. All the parameters were kept constant throughout the sample preparation process. After polishing the scanning electron images were analyzed. The hot corrosion study of specimens was carried out in waste incinerator plant, at Amritsar, Punjab, India. The plant operates as per the guidelines of Fifth Amendment in 2008 of Environment Protection Rules of 1986 by Ministry of Environment and Forests, Govt. of India, New Delhi. The gasses going to the atmosphere from the incinerator should be less than or equal to the parameter-specific emission standards. The samples were hanged in the secondary chamber of plant using steel wire through a hole at one of the edges of samples as shown in Fig. 1. The temperature in the plant varies due to heterogeneous nature of fuel and the average temperature at the position of hanged samples was 900°C. The study was conducted for 10 cycles with each cycle consisting of 100h of exposure followed by 1 h of cooling at ambient conditions. The weight of samples was measured after each cycle of study. The samples were visually examined at the end of each cycle for any change in the colour, luster, adherence of scale to the substrate and spalling tendency. After 10 cycles of studies, the corrosion products and their distribution on the surfaces were studied with XRD and SEM/EDX analysis. For

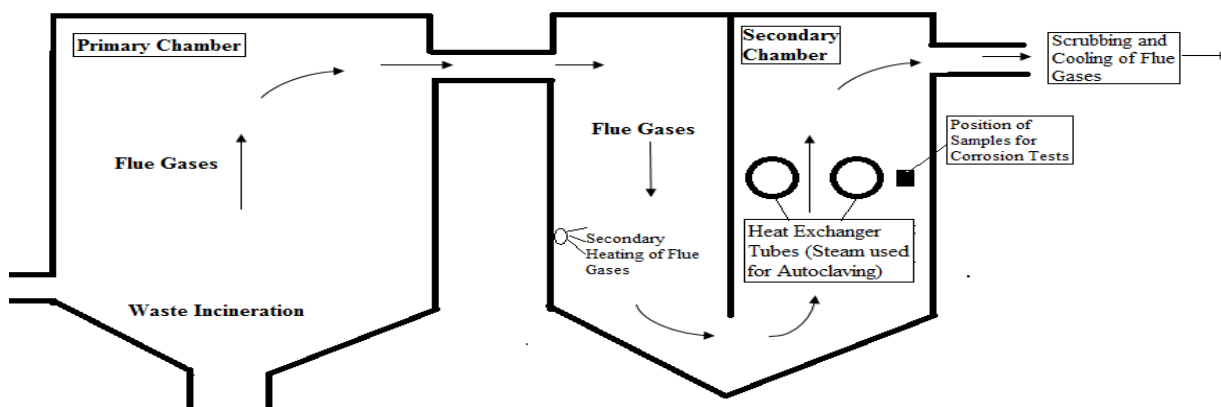
cross-sectional analysis the samples were sectioned and mounted in epoxy along cross-section. The mounted specimens were prepared by polishing, using SiC emery papers of 220, 400, 600 grit and subsequently 1/0, 2/0, 3/0, and 4/0 grades. Fine polishing was carried out using 0.3 μm diamond paste. The prepared specimens were then analyzed by SEM/EDX techniques.

Results

The weight change per unit area (mg/cm^2) for the hot corroded coated superalloy for 1000 h exposure to the waste based incinerator environment follows parabolic law of rate and the parabolic rate constants k_p ($\text{g}^2\text{cm}^{-4}\text{s}^{-1}$) found to be: 22.27. The average scale thickness for found to be: 217 μm and the superalloy showed no indication of internal corrosion attack.

The diffraction patterns for the corroded coated specimen shows the presence of Cr_2O_3 as major phase along with presence of NiO , Fe_2O_3 and Al_2O_3 . The SEM/EDX analysis shows that the oxide scale formed on the surface of the specimens is interacting with the condensed phases of the ash. The scale is uniform and adherent after 1000 h exposure in waste incinerator environment. There is no indication of cracks and EDX analysis indicates that the white phase has composition similar to ash from the surrounding environment. The compact and adherent surface scale has small concentration of Fe and Ni, however, scale is rich in Cr, and oxygen. The presence of Fe in the surface scale can be attributes to the diffusion from the substrate or from deposited ash. There is minor diffusion of the elements from the deposits along the cross section of the scale of specimens. BSEI across the cross-section shows that there is formation of oxide scale layer at top surface, which is directly exposed to the waste incinerator environment. The EDX analysis across section shows mainly the presence Cr and oxygen elements with small concentration of Ni at the topmost scale layer of the specimen. There is diffusion of Mn and Ti in the coating from the superalloy substrate. Despite of the presence of high concentration of Ni compared to Cr there is formation of oxide of chromium during exposure of the coated specimen. Though there are various factors, which influence the scale development, but the preferential formation of oxide of chromium as compared to Ni might be due to higher affinity of Cr for oxygen than Ni, and Cr forms more stable oxide and NiO is less stoichiometric oxide than Cr_2O_3 .

The specimen proves to be effective in imparting the necessary protection to all the Ni-based superni



superalloys, as the weight gain data of specimen follows parabolic rate law. There is no sign of oxidation of substrate superalloy. The SEM micrographs also show the formation of continuous, compact and adherent surface scale though with the presence of embedded ash particles after 1000 h exposure to waste incinerator environment. Therefore, it is conclude that the superalloy is able to provide effective and necessary protection to superalloy in the real service environment of waste incinerator.

Conclusions

1. Agriculture waste based electrical energy generation plants are the need of enhancing the rural economy.
2. The improved efficiency of the incinerator and waste to energy plant especially agriculture based plant will be beneficial for the agriculture dependent farmers and also the rural economy.
3. The superalloy is suitable for application in corrosive environment.

4. The tested sample in this study is able to increase the life of boiler tubes in incinerator and other similar high temperature and corrosive environments.

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INVESTIGATION ON PARASITIC INFECTIONS IN THE ORNAMENTAL FISH FARM IN
BOJNURD, IRAN

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ABSTRACT

The ornamental fish industry is growing rapidly and has resulted in a turnover of US\$ 100 billion in 2016. Protozoans are the most common ectoparasites of ornamental fishes. Guppy (*Poecilia reticulata*) is a beautiful and the most popular viviparous freshwater ornamental fish that belongs to the poeciliid family. These fish are easily reproduced in the aquarium and are well tolerated oxygen levels fluctuations. The purpose of this study was to investigate the cause of heavy losses of guppy in one of the hatcheries in Bojnurd city, Iran. In summer 2022, in an ornamental fish culture and propagation center in Bojnurd city symptoms such as lethargy, anorexia with the high mortality were observed in guppy fish. In clinical studies, severe no macroscopic parasitic infestations were observed. About one month before the onset of symptoms, a number of new guppies were added to the hatchery. To determine the cause of mortality, 20 live guppy fish with clinical signs transferred to Ornamental Fish Clinic in Faculty of Veterinary Medicine of University of Tehran. Then wet smear was prepared from skin and fins of foresaid fish and examined under a light microscope. Then, fish were euthanized and necropsied. No macroscopic parasites were isolated from skin and fins under a stereo microscope and light microscope. Internal organs such as intestines were examined for parasitic infections. Severe parasitic infestation was seen in examining the internal organs. Microscopic scrutiny leads to definitive diagnosis of severe infection with *Capillaria sp.* a nematode parasite. For the rest of the sick fish, treatments were done with levamisole. After several days, mortality was ended. Infection with *Capillaria sp.* had a relatively high intensity, and most likely the main factor of the fish problem was involvement with this parasite.

Key words: Parasite, *Capillaria sp.*, guppy.

HYDROLOGY AND NUTRIENT ENRICHMENT IN PISCICULTURE - A REVIEW

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ABSTRACT

Eutrophication is typically a result of human activity and can originate from a variety of sources, including untreated sewage, factories and farming processes. The growth of aquaculture, which leads to the generation of biomass and an increase in the amount of nutrients present in the water, may speed up the output of algae and alter the dynamics of aquatic ecosystems. Additionally, the pathogens that are transferred from soil, plant debris, decomposed substance, and other significant sources of biowaste in some farming systems may pose a risk to human health. Different planktonic organisms with short breeding cycle and adapted to the shifts inherent in these ecosystems can emerge in significant concentrations depending on the trophic level of fish farms, which are dynamic habitats. The quality of water in fish farming systems depends on a number of variables, including the water supply, maintenance (weeding, enriching, cleansing), cultivated varieties, and the volume and make-up of extraneous food. Applying management practices will yield satisfactory results because there are ways to increase the water quality in fish farming systems while minimizing environmental effects. This research is a review that aims to give an overview of the changes in water quality brought about by freshwater fish cultivation in India. Studies also recommend managerial best practices as a way to lessen the negative environmental effects of the activity.

Keywords: Eutrophication; biomass; pisciculture; aquaculture; weeding

**EXPLORING THE ROLE OF EXTENSION SERVICES ON THE IMPROVEMENT OF
FOOD SECURITY IN RURAL AREAS**

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ABSTRACTS

Agriculture extension is an extremely important component needed in supplying adequate knowledge to the farmer especially in rural areas . This paper evaluates the role of extension services on the improvement of food security in rural areas. Agriculture extension service are rendered by different organization including government; Federal Ministry of Agriculture and Rural Development , National Agricultural Extension and Research Services (NAERSS) ,National Agricultural Extension and Research Liaison Services (NAERLS), National Agriculture Extension and Research Institute (NAERI) ,National Agricultural Extension and Research Development (NAERD) ,National Agricultural Extension and Research Services (NAERS) and many others including Non Government Organization . Food insecurity has pose huge threat on the rural areas. This work enumerates the factor responsible for food insecurity. Food insecurity is traceable to factors like poverty, climate change ,natural disaster conflicts and war,poor agricultural practices ,lack of societal safety nets ,poor infrastructure. It also enumerates the roles played by agriculture extension services in fighting the food insecurity by supplying the required knowledge which give the farmer access to new technology, financial resources, facilities needed to improve food security.

Keywords; Agriculture extension ,food security ,Organization ,Threat ,Technology.

IMPROVING ANIMAL HEALTH THROUGH FEED HYGIENE

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ABSTRACT

Animal health is the principal factor for food production as a slight deviation in the normal function of the farm animal can reduce the feed intake, lead to change in digestion and metabolism, increase morbidity and mortality which leads to drastic loss in animal productivity, increase food insecurity and affect the Country economy especially the developing Country. This review gives an outline on the significant of feed hygiene on improving animal health and discuss the parameters to put in place to ensure feed safety. Non trained farmers show less concern on the quality of feed given to the livestock. Feed supply to the animal should be healthy, safe and suitable for their need, otherwise, huge loss will be recorded. Food is one of the basic necessities of life, it contains nutrients essential to put the animal system in good working order both physically and mentally. Feed hygiene is key for a profitable and sustainable livestock production and the principal key for improving the animal health and it is defined as the practice guaranteeing that feed product are void of deadly bacteria and other contaminant that could cause disease in the animals.

Keywords: Feed hygiene, Animal Health, Livestock, Contaminant, Productivity, Safety

SEVERE MORTALITY IN CULTURED BALZANII CICHLID (*GYMNOGEOPHAGUS
BALZANII*) DUE TO NEMATODE INFECTION

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ABSTRACT

Balzanii cichlid (*Gymnogeophagus balzanii*) is one of the most popular freshwater ornamental fish from Cichlidae family that its breeding has recently become popular among breeders in Iran. This fish is an imported aquarium fish, which often imported as fry that reared and supplied by breeders in Iran. Nowadays this fish is propagated in Iran. The purpose of this study was to investigate the causes of mortality of Balzanii Argentine Humphead Eartheater Cichlid in an ornamental fish farming center in Tehran. In November of 2022 in aquarium fish farming in Tehran city, symptoms like lethargy, anorexia and seclusion were observed in cultured Balzanii cichlid (*G. balzanii*) fish. To determinate the agents of this event, 3 live fish were referred to ornamental fish clinic in Faculty of Veterinary Medicine of University of Tehran. Then wet smears were prepared from the skin, fins and gills of the fish were examined under a light microscope (Nikon, E600). Internal organs such as intestine were examined for parasitic infections. No parasites were seen in microscopic examination of the skin and gills of fish. In examining the internal organ, *Camalanus* sp. (Nematoda) was observed. Infection intensity with *Camalanus* sp. was a relatively high and the main factor of the fish problem was involvement with this parasite. The rest of the sick fish, treated twice with antiparasitic drug. Then 1 and 2 weeks after second treatment, the number of fish were randomly necropsied and investigation of parasites was done. After treatment, microscopic studies showed that parasitic infections were completely resolved and no parasitic infection in the intestine were observed. After a week of starting treatment, mortality was completely cut off.

Keywords: parasitic contamination, *Camalanus* sp., Balzanii cichlid

**EFFECTS OF *CITRUS MAXIMA* JUICE ON MATERNAL HIGH FAT-DIET INDUCED
CHANGES ON FOETAL MORPHOLOGY, HAEMATOLOGY AND SERUM
BIOCHEMISTRY PROFILES IN FEMALE ALBINO RATS**

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ABSTRACT

The study was designed to evaluate the effect of *Citrus maxima* juice on maternal high-fat diet (HFD) induced changes in morphology of the foetus and maternal metabolism in female Albino rats. Thirty-two apparently healthy Albino rats (24 females nulliparous and 8 males) of 12 weeks old were used for the study. The rats were randomised and assigned into four groups. Group A: feed + *C. maxima* juice (10 ml/kg). Group B: feed + butter in the ratio of 3: 7 (HFD). Group C: HFD + *C. maxima* juice. Group D: feed only (Control). There were significant increases ($P<0.05$) in the activities of AST, ALP, ALT and, total bilirubin and total protein levels of HFD pregnant rats of groups B and C when compared with the control. There was a significant increase ($P<0.05$) in the percentage resorption in group B, with concurrent decreases in foetal weight and progesterone level when compared with other groups. There were no significant changes in the erythrocytic indices of the experimental groups when compared with the control. However, WBC count of the experimental groups decreased significantly ($P<0.05$) when compared with the control. There were significant increases ($P<0.05$) in the serum total cholesterol, triglycerides, high-density lipoprotein cholesterol when compared with the control. In conclusion, our study reveals that the supplementation of *C. maxima* juice could not prevent the detrimental effect of high-fat diet on blood lipid profile and hepatocytes of pregnant animals, but was able to protect foetal development and maintained normal glucose and progesterone level from high fat diet induced changes.

Keywords: *Citrus maxima*, high-fat diet, pregnancy, haematology, lipid profile, rat.

ANTI-ULCER EFFECT OF ALGERIAN *FICUS CARICA* L. FRUITS EXTRACT AGAINST
HCL-ETHANOL INDUCED GASTRIC MUCOSAL INJURY IN MICE “VALORIZATION
OF A LOCAL VARIETY”

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ABSTRACT

The objective of this study is to valorize an Algerian local variety of *Ficus carica* L. fruits knowing as “Taamriouth” and evaluate the antiulcer activity of its aqueous extract against HCl-ethanol induced gastric mucosal injury in mice. Our work was started by a chemical screening to highlight the presence of various secondary metabolites responsible for the antiulcer effect by a colorimetric detection of flavonoids, tannins and reducing compounds using magnesium cup and HCl; 2% Fe Cl_3 ; and Fehling's liquor respectively. For the *in vivo* activity, five groups of NMRI mice were pretreated respectively with: distilled water (for the 1st and the 2nd group); Omeprazole 20 mg/kg; and 350, and 500 mg/kg *F. carica* fruits extract for 7 days and 1h before an oral administration of HCl-EtOH to all groups except the first one to generate gastric mucosal injury. 3 hours after ulcer induction, the mice were sacrificed and the ulcer areas of the gastric walls were determined. The findings demonstrated the significant presence of the main chemical classes (flavonoids, tannins, and anthocyanes) that are crucial for the biological activities of fruits colorimetrically. According to mucosal surfaces, the negative control mice showed extensive mucosal damage, whereas pre-treatment with *F. carica* fruits extract led to noticeably less damage to the gastric mucosa and flattening of the mucosal folds. This effect is dose-dependent. There was noticeable gastric protection, as well as a decrease or inhibition of edema and leucocyte infiltration of the submucosa, in histological studies of the stomach wall that had been pre-treated with *F. carica* fruits extract.

Keywords: *Ficus carica* L., ulceration, *in vivo*, bioactive compounds.

**DIAGNOSTICS OF THE EROSION STATE OF ARVABLE LANDS UING DRONE AND
VERIFYCATION WITH DATA ON THE GRANULOMETRIK COMPOSITION OF THE
SOIL**

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ABSTRACT

One of the types of operational erosion remote diagnostics and distribution on arable land is aerial photography by drones, but methodological issues use of it are not sufficiently disclosed today. Research methods: remote (aerial photography by drone in different geomorphological conditions of Kharkiv region, Ukraine), analytical (chemical and instrumental determination of soil parameters), cameral (processing of orthophotos in GIS Mapinfo). We have established the optimal routes of the drone and favorable time of aerial photography onto the lands with varying degrees of erosion risk; checked the settings of aerial photography equipment in different cloudiness; estimated results of aerial photography and identified differences in the images. Verification of remote sensing results were supplemented by soil sampling. Points of sampling was located on areas with diagnosed erosion and without it. Granulometrik composition was measured on a Mastersizer 3000E laser particle size analyzer, after removal of carbonates with hydrochloric acid and disaggregation of the subsample with sodium hydroxide. Laboratory studies revealed differences of particle size distribution and organic matter content in accordance with the aerial photography results. They depend on the intensity of erosion processes, the slope shape and the location of sampling points. The erosion network version map was created based on the results of aerial photography.

Key words: aerial photography, laser diffractometry, GIS, drones, erosion.

SPATIOTEMPORAL ANALYSIS OF THE SOIL PARAMETERS ON THE SPECTRAL
REFLECTANCE OF THE MAIZE AT DIFFERENT PHENOLOGICAL PHASES USING
MACHINE LEARNING

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ABSTRACT

The Random Forest (RF) algorithm has established a machine learning technique capable of high accuracy and efficiency in various agricultural applications. However, the extent to which a ranking-based approach could improve the Random Forest (RF) algorithm's ability to assess the significance of soil chemical and physical characteristics' contributions to maize NDVI value remains unknown, as this can be highly dependent on specific environmental conditions. In this study, we propose to use a ranking-based strategy to improve the Random Forest (RF) algorithm's accuracy in identifying the main soil elements that regulate maize NDVI values at three different growth phases.

The dataset includes soil parameters and NDVI measurements gathered during three stages of maize growth from March to August 2022. The model employed 100 trees, each with its individual leaf size and tree depth parameters. For each tree, three variables were chosen at random. 80% of the available data was used for training, with the remaining 10% used for validation. Out-of-bag errors and R-squared values were used to assess the model's performance. At growth phases 1, 2, and 3, the model explained 81 %, 74%, and 75% of the variation, respectively. The R-squared values for training data were high but significantly lower for validation data.

The R-squared values for the training data were 0.96, 0.94, and 0.95, respectively, whereas those for the validation data were 0.84, 0.79, and 0.79. The Random Forest algorithm-based variable importance ranking shows that K, Mn, pF, N, pH, BD, and Ca are the most significant soil elements contributing to maize NDVI values at different growth stages. The results of this study suggest that the Random Forest method can be used to forecast the contribution of soil constituents to maize NDVI values. This data can be utilized to make informed decisions about soil management and fertilizer applications, increasing crop yields and lowering production costs.

The research presented in the article was carried out within the framework of the Hungarian National Research, Development and Innovation Office with the support of the TKP2021-NKTA-32 project.

Keywords: Random forest, maize, soil parameters, machine learning

DEVELOPMENT OF A STOCHASTIC WORKFLOW FOR CONTROLLING PRECISION IRRIGATION UNDER UNCERTAINTY

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ABSTRACT

Precision farming needs the integration of various datasets to improve the efficiency of agricultural decisions. Among them, static and real-time in-situ soil properties are required for evaluating current hydrological conditions of the soil's root zone, thus controlling precision irrigation and fertigation more efficiently.

The current study aims to present the method of construction and application possibilities of a stochastic geodatabase built for an agricultural field in Nyírbátor, Hungary. The database contains 25 physical and nine chemical soil parameters, as well as 11 microelements measured using X-Ray Spectrophotogrammetry. The samples were taken from 105 boreholes on an 85 Ha corn field at five different depth levels, using a regular sampling design on a 100 x 100 m grid.

Understanding the spatial pattern of various soil parameters is critical in modeling environmental processes. However, because our ability to observe environmental parameters is limited and will never be complete, each decision contains a specific degree of uncertainty. Complex environmental and numerical models typically ignore estimation uncertainty by using optimal spatial estimates (such as some interpolated surface) of the input parameters. However a two-level iteration of randomized sampling structures implemented in the current study, the sequential Gaussian simulation can overcome this limit.

In the current study, each soil parameter was estimated as follows: (1) data organization, exploratory statistics and outlier detection; (2) normal score transformation; (3) exploratory variography; (4) sequential Gaussian simulation by constructing a sufficient number of alternative, equally probable realization; (5) estimation of the medians and the 95% confidence intervals.

For demonstration purpose, the results of 100 Hydrus 3D hydrological model with 100 different but equiprobable hydraulic conductivity were evaluated. The differences of the Hydrus model outputs represent the effect the lack of our knowledge on the real spatial pattern of the soil porosity.

The research presented in the article was carried out within the framework of the Széchenyi Plan Plus program with the support of the RRF 2.3.1 21 2022 00008 project.

Keywords: decision uncertainty, precision agriculture, sequential Gaussian simulation, Monte Carlo approach, Hydrus 3D, soil moisture, GIS

ROLE OF INTERNET OF THINGS IN MAKING THE AGRICULTURE SMARTER

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ABSTRACT

Internet of Things (IoT) in Agriculture has come up as a second wave of green revolution. Smart farming based on IoT technologies enables growers and farmers to reduce waste and enhance productivity ranging from the quantity of fertilizer utilized to the number of journeys the farm vehicles have made, and enabling efficient utilization of resources such as water, electricity, etc. Smart farming refers to managing farms using modern Information and communication technologies to increase the quantity and quality of products while optimizing the human labor required. IoT smart farming solutions is a system that is built for monitoring the crop field with the help of sensors (light, humidity, temperature, soil moisture, crop health, etc.) and automating the irrigation system. The farmers can monitor the field conditions from anywhere using the sensors connected to the cloud via cellular/satellite network. They can also select between manual and automated options for taking necessary actions based on this real-time data from the sensors, thus making the decision more effective. IoT-driven smart greenhouses can intelligently monitor as well as control the climate, eliminating the need for manual intervention. Various sensors are deployed to measure the environmental parameters according to the specific requirements of the crop. That data is stored in a cloud-based platform for further processing and control with minimal manual intervention. There are many emerging technologies in agriculture that seem very promising for the future of farming. Farmers can use weeding robots, harvesting robots and drones equipped with sensors and cameras for imaging, data collection and monitoring in agriculture. From the drone data, insights can be drawn regarding crop health, irrigation, spraying, planting, soil and field, plant counting, yield prediction, and much more. The data collected by sensors in terms of humidity, temperature, moisture precipitation, and dew detection help in determining the weather pattern in farms so that cultivation is done for suitable crops. This paper focuses

on the various applications of IoT in making the agriculture smart and more efficient as compared to the conventional approach.

Keywords: IoT, Smart agriculture, Sensors.

**DEVELOPING EFFICIENT ENVIRONMENTALLY FRIENDLY
BIOFERTILIZERS****Konul Gahramanova¹**

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ABSTRACT

A promising direction in the development of the modern agricultural sector in many countries is the use of environmentally friendly fertilizers. Obtaining drugs using new biotechnology compares favorably with chemical fertilizers that destroy beneficial soil microflora, similar to the effects of antibiotics. Biofertilizers are preparations that contain soil microorganisms useful for agricultural plants. When they are introduced into the soil, biochemical processes increase and the root nutrition of plants improves. In addition, their use will help reduce the consumption of mineral fertilizers, suppress phytopathogenic microflora and increase the yield of agricultural crops.

The paper describes studies on the development of methods for obtaining microbial preparations based on naturally isolated microorganisms useful for plants, capable of effectively restoring soil fertility. These are highly productive strains of soil microorganisms-destroyers associated with individual stages of the transformation of organic and inorganic substances involved in the processes of nitrogen fixation, nitrification, cellulose destruction, etc.

To isolate and account for groups of microorganisms, special environmental methods were used. They differ depending on the biochemical characteristics of the isolated microorganisms. The number of different groups of microorganisms cells/ml was determined: hydrocarbon-oxidizing bacteria (50·10⁴), aerobic nitrogen-fixers (14·10³), anaerobic nitrogen-fixers (17·10³), aerobic cellulose-decomposing (2·10⁵), nitrifying (15·10³), denitrifying (15·10³), actinomycetes (25·10⁵).

It follows from the results of the experiment that aerobic nitrogen fixers (60%) and nitrifying bacteria (52%) most actively utilized oil. The optimal composition of active strains, consisting of 3-5 strains, was selected. The effectiveness of strain associations has been studied individually and together with components that enrich the soil with nutrients and promote good aeration.

In the course of the study, new effective bioorganic fertilizers were developed using an association of selected hydrocarbon-oxidizing microorganisms together with additives that stimulate their activity and improve soil quality.

Keywords: biofertilizer, microorganisms-destroyers, hydrocarbon-oxidizing microorganisms

**ON THE PROBLEMS OF PREPARING RAW MATERIAL AND METROLOGICAL
CERTIFICATION OF STANDARD SAMPLES OF SOIL CONTAMINATED WITH HEAVY
METAL IMPURITIES**

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ABSTRACT

Standard soil samples, certified by the content of trace elements serve as secondary standards in the chain of transmission of the correct physical units in the review process and are designed to ensure a high level of reliability of measurement results. It should be noted that their creation and qualification are a serious chemical-analytical and metrological problem.

The specificity and the difficulties of creating a metrologically correct standard samples of soil and obtain duly substantiated their certified metrological characteristics due to the fact that the soil is a very heterogeneous system as a component of a complex and mineralogical composition.

Real farming practices characteristic of the soil is not gross her part, and that part of its components, which interact in the process of vegetation growing in this soil plants such components and elements and their concentrations are referred to as "available" or "mobile". Often the concept of "movable" and "available plants" are treated as synonyms. It is known that most trace lung minerals most soils include not lattice lung minerals and covering their films that trace elements are accumulated in clay minerals soil so that the proportion of microelements clay fraction reaches one-half or more of the total content and concentration, e.g. , Mn in the composition of the films themselves lighter minerals 4-15 times, and Cu in the ferrous oxide films almost twice the concentration of elements in the lattice of these minerals.

In terms of content in the soils of mobile connections is set as the lack of trace elements, and the excess of their plants, and is also characterized by the ecological state of soils.

Keywords: reference material, soil, trace elements.

**RECYCLING OF WASTE AND GARBAGE IS THE MAIN DIRECTION OF ECOLOGY IN
THE FIGHT FOR THE CLEANLINESS OF THE PLANET**

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ABSTRACT

A comprehensive natural resource and waste management system is needed. Only an integrated approach to the problem on the part of the state, local governments, as well as each individual inhabitant of the planet can minimize the risks of the harmful effects of waste on the ecosystem.

The problem of waste disposal has always been on the agenda. But today this issue has become so relevant that the question of whether our planet exists or not is in question. There are 2 answers to this question: either people will not remain indifferent to this problem, or our beautiful Earth will be destroyed under a pile of garbage.

Usually, all the surpluses left after production or human activities are called "reusable". However, it is a mistake to consider it completely true. In fact, it is not practical to include all wastes in this group. For example, there is waste that is only suitable for recycling as an energy source. For this reason, we cannot call them secondary raw materials. We can call this type of waste, i.e. products that can be processed into energy, "secondary energy raw materials". This group includes materials that become economically useful only after undergoing prescribed procedures (for example, cans). It is no longer suitable for food storage. However, the material obtained from the smelting process can be used to make a new tin can or other metal object. Waste disposal is a problem. We also want to draw your attention to the fact that in our laboratory, oil-contaminated water, soil and soil are treated with pesticides with microorganisms. The conducted studies give a satisfactory result.

Key words: Waste, recycling, ecology, burial.

ANTIOXIDANTS: A NEW QUALITY PARAMETER FOR PROCESSED FOODS

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ABSTRACT

Food quality is the characteristics of food that is acceptable to consumers. The quality parameters include a wide range starting from physical characteristics (appearance, taste, flavor) to the nutritional value and shelf-life of foods. Major emphasis is given on the macro-molecules of foods during processing while often micro-molecules are neglected. Literature proved that there is an association between an increased level of fruit and vegetables in the diet and a reduced risk of some life-threatening diseases such as cardiovascular disease and cancer. There is also growing acceptance that many antioxidants present in plant-derived foods exert beneficial effects in the prevention of these degenerative diseases. Indeed, most of antioxidants are heat-sensitive components and easily degraded during conventional heat processing. I will present various bibliographic reviews to describe how we can reduce these losses during processing using the combination of conventional and novel technologies. Among novel technologies, non-thermal processing techniques like ultrasound are more promising in achieving the desired goals. The ultrasound-assisted processing is considered as green, sustainable, low energy, and high yield producing technique. The aim of talk will be to emphasis on including antioxidants as one of the important quality parameters during the processing of raw food and how we can ensure its maximum retention using ultrasound technology.

Keywords: Antioxidant, Quality Parameter, Processing, Ultrasound.

**REVIEW OF THE MECHANICAL CHARACTERISTICS OF NATURAL FIBER
REINFORCED EPOXY COMPOSITES**

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ABSTRACT

Natural fibers have recently caught the attention of researchers who are looking into whether they could be used as reinforcing agents in composites due to their low cost, availability, ease of manufacturing, and potential environmental friendliness. Numerous studies are being conducted all over the world to improve the thermal, tribological, and mechanical characteristics of these engineered biocomposites, and they have already shown promise in a variety of bio-medical and biotechnological fields. In this review, the mechanical properties of the composite that were obtained after natural fiber reinforcement and the various factors that affect the mechanical properties of natural fiber composites are discussed (NFCs). It also emphasizes the use of natural fibers as an alternative to synthetic fibers in a wide range of application areas.

Keywords: natural fibercomposites; tensile strength; thermal diffusivity; tribological properties; flexural strength; impact property.

**ON THE PROBLEMS OF PREPARING RAW MATERIAL AND METROLOGICAL
CERTIFICATION OF STANDARD SAMPLES OF SOIL CONTAMINATED WITH HEAVY
METAL IMPURITIES**

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ABSTRACT

Standard soil samples, certified by the content of trace elements serve as secondary standards in the chain of transmission of the correct physical units in the review process and are designed to ensure a high level of reliability of measurement results. It should be noted that their creation and qualification are a serious chemical-analytical and metrological problem.

The specificity and the difficulties of creating a metrologically correct standard samples of soil and obtain duly substantiated their certified metrological characteristics due to the fact that the soil is a very heterogeneous system as a component of a complex and mineralogical composition.

Real farming practices characteristic of the soil is not gross her part, and that part of its components, which interact in the process of vegetation growing in this soil plants such components and elements and their concentrations are referred to as "available" or "mobile". Often the concept of "movable" and "available plants" are treated as synonyms. It is known that most trace lung minerals most soils include not lattice lung minerals and covering their films that trace elements are accumulated in clay minerals soil so that the proportion of microelements clay fraction reaches one-half or more of the total content and concentration, e.g. , Mn in the composition of the films themselves lighter minerals 4-15 times, and Cu in the ferrous oxide films almost twice the concentration of elements in the lattice of these minerals.

In terms of content in the soils of mobile connections is set as the lack of trace elements, and the excess of their plants, and is also characterized by the ecological state of soils.

**EFFECT OF DIETARY SUPPLEMENTATION OF FENUGREEK SEEDS ON NUTRIENT
DIGESTIBILITY, SOME RUMEN AND BLOOD PARAMETERS OF LAMBS**

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ABSTRACT

This study was conducted through two parts to evaluate the effect of supplementation of fenugreek seeds (FS) on nutrient digestibility, some rumen and blood biochemical parameters of ewe lambs. In the first part, in a Latin square design, four ewe lambs were kept and fed individually at a rate of 3% of their live body weight as follow: the first control (C) contained no FS, the second (T1), third (T2) and fourth (T3) were supplemented with fenugreek seeds (FS) at levels of 5, 10 and 15% respectively. Each lamb was fed 10 days as preliminary period and 5 days for the samples collection, and then the lamb was switched over another experimental ration. In part two of the study, two cannulated Karadi ram lambs of one year old weighing 32 Kg were used to estimate *in Sacco* dry matter and crude protein degradability of the experimental rations via polyester bags technique. The cannulated rams were fed on the control diet, the degradability was measured at 1, 2, 4 and 6hrs of incubation time in triplicate samples. Results obtained indicated that supplementing FS did not affect the nutrient digestibility coefficients and ruminal pH and ammonia-nitrogen concentration (NH₃-N). Fenugreek seeds significantly ($P<0.05$) lowered serum glucose (Glu) and cholesterol (Cho) levels, while serum total protein (TP), albumin (Al), globulin (Glo) and triglyceride (Tgl) were not affected. There was a significant effect of interaction between time and treatment on increasing the *in Sacco* degradability of the treatment after one hour of incubation in the rumen. It can be concluded that FS supplementation to lambs' diet did not affect nutrient digestibility and ruminal fermentation. Fenugreek seeds significantly ($P<0.05$) affected serum glucose and cholesterol and had no effect on other blood biochemicals. It can be concluded that the addition of FS to lambs diet up to 10% significantly raised the *in Sacco* degradability of DM upon measured time of 6 hours of incubation in rumen.

Keywords: Fenugreek, digestibility, fermentation, blood parameters, *in Sacco*, degradability

DIESEL ENGINE EMITTED CARBON MONOXIDE EMISSIONS FOR COMPLETE OXIDATION USING HOPCALITE CATALYSTS AND ITS APPLICATIONS: A REVIEW*Subhashish Dey**Civil Engineering Department, Seshadri Rao Gudlavalleru Engineering College, Gudlavalleru, A.P. India***ABSTRACT**

Most of diesel vehicles produce emissions containing hydrocarbons(HC), nitrogen oxides (NO_x), carbon monoxide (CO), and particulates (PM), which all affect environment as well as humans. The emissions are regulated by EU Emission Standards, where the latest standard for heavy-duty vehicles is called Euro VI. The proposed date for the entry into force of the Euro 7 regulation is 1 July 2025 for new light-duty vehicles, and 1 July 2027 for new heavy-duty vehicles. The catalytic oxidation of carbon monoxide is an important reaction in heterogeneous catalysis. Copper manganese mixed oxides in the form of Hopcalite, CuMn₂O₄, is used as a catalyst for the oxidation at ambient temperature and is important in respiratory protection, particularly in mining industries. These types of catalysts are prepared by various methods and advantages, disadvantages are discussed. The synthetic processes of CuMnOx catalyst for getting best catalytic activity are optimization of the parameters like pH values, rotation speed and rotation time and shake up temperature, Copper/Manganese (Cu:Mn) molar ratios, drying temperature, drying time, calcination temperature and calcination time, etc. discussed. Among the various metal oxide catalysts, hopcalite (CuMnOx) is one of the most efficient catalysts for low-temperature CO oxidation. It is a low-cost, easily available, and highly stable catalyst. The deactivation was done by the different types poisoning, thermal degradation, fouling etc are discussed. Finally, systematic compilation of the concerned newer literature on catalytic oxidation of CO in a well conceivable tabular form is given.

Keywords: Carbon monoxide, Hopcalite, Preparation methods and applications, Catalyst Deactivation

JUICING UP NEUROPROTECTION: EXPLORING PUNICALAGIN'S POTENTIAL AS A THERAPEUTIC AGENT FOR MITOCHONDRIAL BIOGENESIS IN PARKINSON'S AND OTHER NEURODEGENERATIVE DISEASES

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ABSTRACT

Mitochondrial dysfunction has been implicated in the pathogenesis of several neurodegenerative diseases, including idiopathic Parkinson's disease (PD). Mitochondrial biogenesis, the process of generating new mitochondria, has emerged as a potential therapeutic target for these diseases. Punicalagin, a bioactive compound found in pomegranate, has shown promising neuroprotective effects through its ability to induce mitochondrial biogenesis. This research discusses the therapeutic implications of mitochondrial biogenesis in neurodegenerative diseases, with a focus on PD, and the potential use of Punicalagin as a therapeutic agent. We review the current literature on Punicalagin and its effects on mitochondrial biogenesis and neuroprotection. Furthermore, Punicalagin has been shown to exert anti-inflammatory and anti-apoptotic effects in animal models of neurodegeneration. In addition to its neuroprotective effects, Punicalagin has been shown to improve motor and cognitive functions in animal models of PD. Punicalagin has been shown to exert neuroprotective effects in cellular and animal models of neurodegeneration, including PD. These findings suggest that Punicalagin may have potential as a therapeutic agent for PD and other neurodegenerative diseases through its ability to induce mitochondrial biogenesis and improve mitochondrial function. Preliminary Biochemical assays and *in vitro* studies have been done through pomegranate extract which is having a high content of Punicalagin along with standard Punicalagin. Further research is needed to fully understand the therapeutic potential of Punicalagin and its mechanisms of action in neurodegenerative diseases.

Keywords: Mitochondrial Biogenesis, Parkinson's disease, Punicalagin

BULGUR: NUTRITIONAL AND THERAPEUTIC PERSPECTIVES

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ABSTRACT

Bulgur is a cereal-based whole-wheat product and an important food source in many countries around the world. Bulgur is a parboiled wheat product that is cooked, dried, cracked, debranned, ready to eat, and semi-ready to eat with high nutrient content. Bulgur, a non-paste durum wheat product, is frequently used in most cuisines or offered as the main course. Currently, it is a well-known wheat product all over the world (including the United States, Europe, Australia, Japan, China, and Russia). Three different methods of cooking are used to make bulgur: conventional, autoclave, and microwave. However, the traditional methods used to make bulgur are still used. Bulgur is a perfect food for a vegetarian diet because of its nutritional richness and adaptability. Bulgur is a flavorful, low-fat food used in pilaf, soup, and baked goods and other food products as an ingredient. Bulgur has a long shelf life and is a very healthy, nutritious food. Due to its contents, including B vitamins, dietary fiber, minerals, unsaturated fatty acids, and folate, bulgur is commonly regarded as a nutritious food. Bulgur has nutritional and therapeutic qualities in biological systems as a result of the increase in phytochemical levels. Due to its high mineral content specifically, phosphorus, zinc, magnesium, and selenium as well as cellulose fiber content, bulgur promotes nutrient absorption and lowers the risk of colon cancer and avoids constipation. Additionally, bulgur has a positive impact on satiety and glycemic index. Bulgur contains a lot of protein while containing very little fat. Moreover, bulgur's high mineral content (phosphorus, zinc, magnesium, and selenium) and cellulose fiber have been linked to the prevention of constipation and colon cancer. Due to its high folate/folic acid content, bulgur is a healthy meal option for expecting mothers and newborns. Bulgur is a vegetarian friendly food that falls under the functional food category. It is also reasonably priced and adaptable because it may be used in meats, soups, fast breads, sweets, and breads. Bulgur is a main ingredient in almost 250 different types of meals.

Keywords: Bulgur, parboiled, nutritious, ready to eat, phytochemical, vegetarian friendly.

**REGIONAL SUPERFOODS AS POTENTIAL OF REGIONAL INDUSTRY OF
HOSPITALITY**

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ABSTRACT

The authors have examined the factors that had caused the growth of consumers choosing balanced, healthy, ecologically clean and safe food. Thus, the food service sector must commit to improving its approach to the food system and operations at all levels and take a clear stand on the pressing issues of our time, such as waste reduction, improved nutrition, food quality and safety, and overall sustainability. Several factors, namely availability, cost, nutritional value and hedonic preferences, and provision of food biodiversity that includes both locally cultivated and wild food species, play an important role in the implementation of domestic superfoods in restaurant production technology. Such strategy supports economically the domestic producer, developing farms engaged in the cultivation of vegetable and fruit crops, as well as "niche" crops that have biological and physiological value, providing the population with useful food products, creating short food chains reducing the cost of production, improving export the potential of the country, the advancement of the hospitality industry, namely, tourism, the hotel and restaurant industry, the restoration of related local crafts. The phenomenon realizes several positive aspects: expanding the range of products with high biological and physiological value to meet the needs of consumers who choose balanced, healthy, ecologically clean, and safe food, ensuring the accessibility of wider segments of the population to superfoods thanks to the offer of products at an acceptable price, the possibility for the consumer to monitor the entire food chain due to its locality for the purpose of obtaining information about the product, assessing its quality; familiarization with the traditions of local cuisine, technologies of preparation and consumption of local products, the area itself with its historical and cultural heritage, and culinary traditions.

Keywords: superfoods, consumers, balanced nutrition, regional producers, communication and marketing strategies

3D FOOD PRINTING TECHNOLOGY

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ABSTRACT

3D food printing technology is a rapidly evolving field that offers new possibilities for food customization and personalization. This technology involves the use of 3D printers to create edible food products by layering food materials in a precise manner. The 3D printing process can be customized to suit the needs of different types of food, allowing for the creation of unique shapes, textures, and flavors. This technology has the potential to revolutionize the food industry, enabling chefs and home cooks to create intricate food designs, personalized meals, and complex structures that would be difficult or impossible to achieve through traditional cooking methods. However, there are also challenges to overcome, such as the need to develop food-safe printing materials, optimize printing parameters, and ensure that the resulting food products meet nutritional and sensory requirements. Despite these challenges, 3D food printing technology shows great promise in enabling new culinary experiences and pushing the boundaries of food design and innovation.

PHOTOCATALYTIC AND BACTERICIDAL PROPERTIES AND MOLECULAR DOCKING
ANALYSIS OF TiO₂ NANOPARTICLES CONJUGATED WITH ZR FOR
ENVIRONMENTAL REMEDIATION

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ABSTRACT

Despite implementing several methodologies including a combination of physical, chemical and biological techniques, aquatic and microbial pollution remains a challenge to this day. Recently, nanomaterials have attracted considerable attention due to their extraordinary prospective for utilization toward environmental remediation. Among several probable candidates, TiO₂ stands out due to its potential for use in multifaceted applications. One way to improve the catalytic and antimicrobial potential of TiO₂ is to dope it with certain elements. In this study, Zr-doped TiO₂ was synthesized through a sol-gel chemical method using various dopant concentrations (2, 4, 6, and 8 wt%). Surface morphological, microstructural and elemental analysis was carried out using FESEM and HR-TEM along with EDS to confirm the formation of Zr-TiO₂. XRD spectra showed a linear shift of the (101) anatase peak to lower diffraction angles (from 25.4 to 25.08) with increasing Zr⁴⁺ concentration. Functional groups were examined via FTIR, an ample absorption band appearing between 400 and 700 cm⁻¹ in the acquired spectrum was attributed to the vibration modes of the Ti-O-Ti linkage present within TiO₂ nanoparticles, which denotes the formation of TiO₂. Experimental results indicated that with increasing dopant concentrations, photocatalytic potential was enhanced significantly. In this respect, TiO₂ doped with 8 wt% Zr (sample 0.08 : 1) exhibited outstanding performance by realizing 98% elimination of synthetic MB in 100 minutes. This is thought to be due to a decreased rate of electron-hole pair recombination that transpires upon doping. Therefore, it is proposed that Zr-doped TiO₂ can be used as an effective photocatalyst material for various environmental and wastewater treatment applications. The good docking scores and binding confirmation of Zr-doped TiO₂ suggested doped nanoparticles as a potential inhibitor against selected targets of both *E. coli* and *S. aureus*. Hence, enzyme inhibition studies of Zr-doped TiO₂ NPs are suggested for further confirmation of these in silico predictions. Publishes in RSC Advances.

Keywords: TiO₂, docking, Photocatalytic, Bactericidal, Nanomaterials

DATE SYRUP, A REMEDY TO MALNUTRITION AND MICRONUTRIENT DEFICIENCY

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ABSTRACT

Date syrup offers several advantages and is high in micronutrient. Date syrup contains natural iron, which can help replenish and grow red blood cells. Date syrup includes proteins, natural sugars, minerals, and vitamins including B3, B2, B1, B5, A1, and C. If you consume date syrup, you won't need multivitamins anymore. Date syrup includes natural sugars such as glucose, sucrose, and fructose. Hence, it might be a nice choice for a snack. Date syrup gives the body its essential energy. Date syrup can help youngsters and students study better. Since date syrup contains iron and folic acid, it can aid in the treatment of anemia. Date syrup's natural iron boosts the body's red blood cells. Date syrup has a high sugar content. The magnesium and phosphorus in date syrup help boost neural cells and "keep the skull alive". Iranian date syrup might help you gain weight if you are underweight. Date syrup is abundant in calories, and taking it daily might contribute to weight gain. Because it includes calcium and magnesium, date syrup can help build bones. Date syrup contains anti-inflammatory effects, making it beneficial for patients with arthritis and excellent for relieving joint and rheumatic problems. Date syrup is abundant in proteins, which can help maintain healthy muscles. If you often work out, consume date syrup before you begin. Potassium and magnesium are abundant in date syrup. Date syrup is heart-healthy. Date syrup helps to cleanse the kidneys. Date syrup can be used to cure a sore throat, fever, or cold. Date syrup has found applications because of the health advantages it provides. It is used as a spread on cereals and snacks.

Keywords: Osteoporosis, Phosphorus, Iron, Magnesium, keep the head alive, optimum weight.

**CHITOSAN/STARCH-DOPED MnO_2 NANO COMPOSITE SERVED AS DYE
DEGRADATION, BACTERIAL ACTIVITY, AND IN SILICO MOLECULAR DOCKING
STUDY (PUBLISHED IN MATERIALS TODAY NANO IN 2022)**

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ABSTRACT

In this study, the impacts of polymer doping on a metal oxide nano composite (MnO_2) were investigated. The polymers tested were starch (St) and chitosan (CS). The co-precipitation approach was used to dope St- MnO_2 with CS at a range of different concentrations, including 0%, 2%, 4%, and 6% by weight. The ternary system was subjected to a number of different characterization approaches so that the structural, optical, and morphological analyses could be determined. The purpose of this research was to investigate the impact of doping-dependent MnO_2 on the degradation of methylene blue dye and the killing of bacteria. The morphology of the nano composite was observed by a transmission electron microscope, which verified the development of nano rods of MnO_2 . The degradation of methylene blue dye was examined in a number of different pH settings, and the antibacterial activity was determined using *Staphylococcus aureus* and *Escherichia coli* as test organisms. It is reported in the literature that a binary blend of CS and MnO_2 gives degradation of methylene blue up to 95% in 90 min; however, our ternary system enables sharp dye degradation up to 97.4% in just 5 min in the presence of NaBH_4 . It was revealed that substantial degradation and higher antibacterial efficiency were obtained after doping. Furthermore, in silico docking analysis revealed the secret behind microbicidal efficiency of CS/St- MnO_2 nano composite and suggested β -lactamase inhibition mechanism for in vitro findings. For β -lactamase enzyme against *E. coli*, the best-docked conformation perceived for St- MnO_2 exhibited H-bonding interactions with Ser236, Asp242, and Gln235, yielding a binding score of 2.27, whereas CS/St- MnO_2 showed metal contact interaction with Asp242, Gln235, Ala230, Glu228, Arg232, and Gly36 with overall binding score 5.32. A similar fashion was seen for St/ MnO_2 and CS/St- MnO_2 NCs binding into the active pocket of the β -lactamase *S. aureus* enzyme with general binding energy 3.30 and 6.49, respectively. The H-bond interactions with Tyr519, Asp73, Thr600, Glu602, Gln521, Ser403, Ser598, Lys597, and Asn464 were particularly notable.

Keywords: Metal oxide, Chitosan, Starch, Co-precipitation, Catalysis, Molecular docking

**A SYSTEMIC REVIEW OF HOW VITAMIN D SUPPLEMENTS CURE THE DEPRESSION
SYMPTOMS IN ADULTS**

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ABSTRACT

Major depressive disorder and anxiety disorder are common and disabling conditions that effect millions of people worldwide. Despite being different disorders, symptoms of depression and anxiety frequently overlap in individuals, making them difficult to diagnose and treat adequately. Therefore, compounds capable of exerting beneficial effects against both disorders are of special interest. Note worthily, vitamin D deficiency has been associated with an increased risk developing depression and anxiety, and individuals with these psychiatric conditions have low serum levels of this vitamin. Indeed, in the last few years, vitamin D has gained attention for its many functions that go beyond its effects on calcium-phosphorus metabolism. Particularly, antioxidants, anti-inflammatory, pro-neurogenic, and neuromodulatory properties seem to contribute to its antidepressant and anxiolytic effects. Therefore, in this review, we highlight the main mechanism that may underline the potential depressant and anxiolytic effects of vitamin D. In addition, we discuss preclinical and clinical studies that support the therapeutic potential of this vitamin for the management of these disorders.

Key words: Vitamin D, Depression, Anxiety, Antidepressants, Unipolar and bipolar depression.

THIAZINES: SYNTHESIS AND ANTIVIRAL ACTIVITY

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ABSTRACT

A series of benzothiazine derivatives were synthesized and evaluated for their anti-viral activities and cytotoxic activities. The synthesis was carried out through conventional organic chemistry reactions using multistep approach. The structure assignments was done by using advanced spectroscopic techniques. Among the synthesized derivatives, many were found as good inhibitors of virus. The structure-activity relationship (SAR) performed on these active compounds would be helpful for the synthesis of novel antiviral agents.

Keywords: Pyrazolobenzothiazine, Anti-viral activity, cytotoxic activity.

EFFECTS OF INTERCROPPING WITH MAIZE ON THE GROWTH AND TOLERANCE
TO DROUGHT AND SALINITY OF TOMATO PLANTS (*Solanum lycopersicum* L.)

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ABSTRACT

Climate change is contributing substantially to food insecurity by increasing the frequencies and severity of abiotic stresses such as drought and salinity, especially in the arid and semi-arid regions where soil salinity poses a severe threat to food security. Intercropping is an alternative food production systems to combat many biotic and abiotic stresses and prevent soil degradation and environmental deterioration. Intercropping is a farming practice involving two or more crop species, or genotypes, growing at same time on the same piece of land. Intercropping **promotes biodiversity and enhances crop resilience to extreme environmental changes. Here we evaluated drought and salinity tolerance of three tomato cultivars** co-cultivated with maize or grown in monoculture by analyzing growth parameters such as plant biomass and yield and growth biochemical parameters such as chlorophylls and carotenoids. The results found here show that plants grown in an intercropping system are more tolerant to salinity and water stress. Therefore, intercropping is a very good alternative to monoculture, because the intercropping system brings advantages in terms of optimizing the agricultural area used, allows mitigation of losses and misuse of irrigation water, improves resistance to salinity and increases farm productivity. Therefore, obtaining shade-tolerant varieties that can be grown in intercropping systems is a climate change adaptation strategy. The latter is the cause of the loss of arable land area due to the amplification of drought episodes and increased soil salinity.

Keywords: Intercropping, drought, salinity, tomato, maize.

**SUBCHRONIC AND CHRONIC EXPOSURE TO HEXACONAZOLE INDUCED
OXIDATIVE STRESS AND HISTOPATHOLOGICAL CHANGES IN THE LIVER OF
ALBINO RATS****Mariam Jalal¹**

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ABSTRACT

Hexaconazole (HEX), a triazole fungicide, exhibits exceptional efficacy against diverse diseases. Its broad-spectrum action and preventive, curative, and systemic properties make it a valuable complement to the repertoire of fungicides available in the market. A subacute (1 month), subchronic (3 months), and chronic (6 months) toxicity study was conducted on 30 Wistar Albino rats treated with HEX orally via their diet at a single dose of 100 mg/kg/day. The results of this study showed a considerable decrease in the body weight of the rats and a highly significant increase in the absolute and relative weight of the liver after 6 months of exposure. Additionally, histopathological observations of the liver revealed severe histopathological alterations, including congestion of the centrilobular veins, infiltration of immune cells, and microvesicular and macrovesicular steatosis in rats treated for 3 and 6 months. Moderate alterations were also noted, including an apparent increase in collagen fibers in the portal and periportal zone. Identifying oxidative stress is a crucial result that provides relevant information on toxicity. Analysis of oxidative stress biomarkers showed a highly significant increase in the levels of malondialdehyde (MDA) and reduced glutathione (GSH), particularly after 6 months of treatment. This was accompanied by a significant decrease in certain antioxidant enzymes, including catalase (CAT) and glutathione-S-transferase (GST), in rats treated in a duration-dependent manner. From our results, it can be concluded that HEX induced lipid peroxidation, oxidative stress, and liver injury in rats. These pathophysiological changes in liver tissues could be due to the toxic effect of HEX that is associated with a generation of free radicals.

Keywords: Hexaconazole; Toxicité; Oxidative stress; Histopathology; Liver; Rats.

IRRIGATION AS A FACTOR OF ECOLOGICAL-AGROMELIORATIVE STATE OF IRRIGATED SOILS**Ludmila Vorotyntseva¹**

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ABSTRACT

Irrigation is the main way to increase the productivity of water-deficient soils and ensuring the country's food security. In the period from 1900 to 2010, the rate of increase in the area of irrigated land exceeded the rate of growth of the global population [1].

Irrigation affects the physical, chemical, biochemical and biological processes occurring in the soil and its microclimatic conditions. It changes the temperature, humidity, heat capacity, particle size composition, porosity, water permeability and water-holding capacity, the strength of soil particle adhesion, the content and distribution of chemical elements and compounds in the soil, the level and of groundwater and its mineralization [2].

Entering the soil together with used water of nitrogen, potassium, phosphorus replenishes the supply of nutrients. But at the same time, if the water is contaminated with heavy metals or other toxicants, it will lead to soil pollution and deterioration of the quality of agricultural products.

Irrigated lands are characterized by the following degradation processes, many of which can be caused by irrigation with low-quality water [3]:

1. The increasing of the groundwater level and the development of the processes of flooding and secondary irrigation hygromorphism of soils. Areas of land with groundwater level up to 3 m occupy 17-20% of the total irrigated area.
2. Secondary salinization of irrigated soils. Land areas with varying degrees of salinity reach 40-50% of the total irrigated area.
3. Alkalization of soils, increase in their alkaline reserve and indicators of total toxic alkalinity, pH value.
4. Dehumification of irrigated soils, reducing their humus content.
5. Agrophysical degradation of irrigated soils. It manifests itself in the destructuring and compaction of the arable layer.
6. Anthropogenic pollution – accumulation of heavy metals, fluorine, pesticides, nitrates and other pollutants in soil, water (irrigation, soil and drainage) and plants.

Nowadays, due to the increase of anthropogenic pressure on irrigated soils, researching on monitoring and studying the directions of their agrogenic transformation according to the main diagnostic indicators is highly relevant.

Keywords: soil, irrigation, fertility, degradation.

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**BIOCHEMICAL INVESTIGATION OF CRUDE EXTRACTS PREPARED FROM THE
MEDICINAL PLANT *ERINACEA ANTHYLLIS***

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ABSTRACT

The genus *Erinacea* belonging to the subfamily Papilionoideae of the family Fabaceae and the tribe Genisteae, is represented by a single species named *Erinacea anthyllis* Link or *Erinacea pungen*. *E. anthyllis* is a shrub with purplish blue flowers that is found mainly in the Pyrenees Orientales in France, Spain, Algeria, Tunisia and Corsica. In Algeria, this species is used in traditional medicine to treat rheumatic diseases. The present work describes the isolation and structural elucidation of two new prenylated isoflavonoids namely: Erinasone A (**1**) and Erinasone B (**2**), together with **10** known compounds from the EtOAc extract of *E. anthyllis*. Structures of all the isolated metabolites **1-12** were established mainly by spectroscopic analysis, measurement of optical rotation $[\alpha]_D$ and by comparison with the literature data. The total phenolic and flavonoid contents were quantified by Folin-Ciocalteu and trichloroaluminum methods respectively. The antioxidant activity of the EtOAc extract and the isolated compounds was determined by three different methods including trapping of the free radicals DPPH, FRAP and PPM assays. The results of the antioxidant activity revealed that the EtOAc extract and the isolated compounds possess moderate antioxidant activity for all the tested methods. Consequently, *Erinacea anthyllis* is a rich source of polyphenolic compounds particularly isoflavonoids used as chemotaxonomic markers for the subfamily Papilionoideae.

Keywords: *Erinacea anthyllis*, Isoflavonoids, Bioactive contents, Antioxidant activity, Antibacterial activity.

MOLECULAR SURVEY OF THE PARASITIC NEMATODE *CONTRACAEUM* SPP. IN
FISH (*PLANILIZA ABU*) DESTINED FOR HUMAN CONSUMPTION

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ABSTRACT

Contracaecum spp. is a parasitic nematode have potential zoonotic significant effects on different hosts and belonging to the anisakidae family. Consumption raw infected or undercooked seafood which contain larvae of this nematode causing anisakiasis in humans. The specimens of *Planiliza abu* have been purchased from the local market, Karbala city, Iraq and the source of fish was Razzaza Lake. The prevalence on nematodes of *Contracaecum* spp. was done over eight months from Jun 2022 to January 2023. Morphological and molecular examination on the nematodes *Contracaecum* spp. The total prevalence was 133(32%) of 416 fish were infected by *Contracaecum* spp. larval type (L3) in the viscera. In parasitology lab of veterinary medicine college Kerbala University's was confirmed the morphological and molecular as *Contracaecum* spp. The result showed the infection rates in September and November was greater than in October 2022. The molecular diagnosis of *Contracaecum* spp. Using the COX2 gene in *P. abu* to confirm it and for studying their population biology. The factors of length, months, genders, and No. of infected fish have been significantly at the level $P \leq 0.01$, version 23 by chi-square. This study detected that the presence of *Contracaecum* spp. using mitochondrial cytochrome c oxidase II COX2. This molecular report detecting *Contracaecum* spp. in Razzaza Lake, Karbala province, Iraq. In conclusion, molecular genotyping may be an effective method for detecting the *Contracaecum* L3 larval species, biology of the life-cycles, population structure transmission methods, and intermediate hosts types.

Keywords: Fish; Food safety; Foodborne pathogens; zoonosis.

RELATIVISTIC ELASTIC SCATTERING OF HYDROGEN ATOM (2S-2S) BY ELECTRON IMPACT IN THE PRESENCE OF A LINEARLY POLARIZED LASER FIELD

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ABSTRACT

In this paper, we study the ($2s_{1/2}$ - $2s_{1/2}$) elastic scattering of the hydrogen atom by the electron in the presence of a linearly polarized laser field. In the framework of the first Born approximation, using the Dirac-Volkov wave functions for the incident and scattered electron, and the exact relativistic function is used to describe the atomic electron in the $2s_{1/2}$ state. Spin effects and the interaction with the laser field are taken into account. The effect of the atomic number Z on the cross section is examined.

Keywords: laser-assisted, QED calculations, differential cross section,

**PHYTOCHEMICAL ANALYSIS AND IN VITRO ANTHELMINTIC ACTIVITY OF
METHANOLIC AND ETHYL ACETATE EXTRACTS OF AZADIRACHTA INDICA
(NEEM)**

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ABSTRACT

Neem is an important medicinal plant containing diverse phytochemicals. In the current scenario of emerging drug resistance. There is need of plant derived compounds to counter infectious problem including helminths. Present research was conducted to evaluate the phytochemical composition, ovicidal and adulticidal activity of methanolic and ethyl acetate extracts of Azadirachta Indica (Neem). The leaves of Neem were used for preparations of extracts and their composition was determined through High-performance liquid chromatography (HPLC). Results showed that the methanolic extract had higher quercetin compounds than the ethyl acetate extract. The effect of these extracts on egg hatch and larval motility were tested in in vitro environment. The results indicated that these were found effective to reduce the hatchability of eggs and kill the worms at the concentration of 25 mg/mL at 6 hrs post exposure. Results were in dose-dependent manner. However, the methanolic extract of Neem had higher effectiveness than the ethyl acetate extract. This research concludes that extraction solvent greatly affects the phytochemical composition and anthelmintic activities of Neem and Neem is effective to control the helminths.

Keywords: Anthelmintic activity, Azadirachta Indica, In vitro trial, Adult motility assay, Egg hatch assay

**CORRELATION BETWEEN CYSTIC OVARIAN DISEASE AND HORMONAL
IMBALANCES**

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ABSTRACT

Cystic ovarian disease COD in cows is traditionally defined as the presence of a large follicle-like structure on one of the ovaries, having a diameter of 2.5 cm or greater, persists for at least 10 days, in the absence of luteal tissue or two follicle-like structures on one of the ovaries, having 1.7 and more than 1 cm diameter simultaneously. The cystic structure arises from a failure to ovulate and results in a pathological expression of estrus, ranging from anoestrus most common to nymphomania. Chronic increased androgen levels may cause disturbed feedback mechanisms in the brain leading to suprabasal LH levels and a mistimed LH surge, causing a failure to ovulate and finally ending in the formation of a cystlike structure on the ovary. Moreover, the lactational incidence rate of COD in dairy cows ranges from 6 to 23%. Cows with COD tend to have extended calving intervals and an increased number of inseminations per conception, and are at a greater risk of being culled. COD is more common in the early postpartum period, especially in cows that are less than 60 days in milk, the time period cows are under great metabolic stress. A variety of factors that has been associated with COD including: high milk production, a severe negative energy balance and ketosis, twinning and periparturient problems, genetic predisposition, season, higher parity and nutritional disorders. Nevertheless, influence of many metabolic and endocrinological hormones such as insulin and insulin-like growth factors has been suggested and recently demonstrated. Epidemiological studies clearly illustrate a relationship between the stressed metabolism during the postpartal period in high yielding dairy cows and the development of COD. Cows overconditioned at dry off and experiencing a severe negative energy balance after calving were stated to be significantly more at risk of developing COD.

Keywords: Cystic ovarian disease, Insulin, Dry cow, Endocrinology

**PASTORALISTS SOURCES OF INFORMATION ON MANAGEMENT PRACTICES OF
CATTLE DISEASES AND PARASITES IN NORTH EAST, NIGERIA**

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ABSTRACT

The study assessed pastoralists' sources of information on management practices of cattle diseases and parasites in North East, Nigeria. Specifically, the study, identified pastoralists sources of information on management practices of cattle diseases and parasites. Multi stage sampling techniques were used to select four hundred and twenty pastoralists for the study. The pastoralists comprised 126, 105, 84 and 105 from Adamawa, Bauchi, Gombe and Taraba states in Nigeria. Frequency, percentage, mean, rating scale and logit regression were used to analyse the data at 5% level of significant. Result shows that pastoralists admitted that family members and association with a mean score of 3.93 and 3.92 were their major sources of information. Result of logit regression analysis of relationship between pastoralists sources of information and management practices of cattle diseases and parasites revealed that the coefficient of community meeting (0.0008), Extension agents (0.0033) and friends (0.0042) had statistically significance relationship with the use of management practice of cattle diseases and parasites. It is therefore recommended that Agricultural messages meant for the pastoralists should be packaged, using both audio-visuals translated to local languages, as it is evidenced that most of the pastoralist could not communicate effectively in Hausa the perceived common language of the people.

Key word: Pastoralists, Sources Of Information, Management Practices, Cattle Diseases And Parasites, North East Nigeria

**TAXONOMIC REINVESTIGATION OF ENDEMIC PLANT SPECIES FROM KARS
PROVINCE VIA PHYLOGENETIC ANALYSIS**

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ABSTRACT

The continuity of life on earth depends on protecting species and populations that perform basic ecosystem services and shape biodiversity. Biodiversity, which keeps ecosystems in balance and makes them habitable, is significantly reduced due to anthropogenic threats and natural changes. Endemic plant species which need stable and constant environments are usually more vulnerable to changing environmental conditions. Conservation of endemic species has become a major concern to avoid the risk of extinction worldwide. To protect endemic species, changes in their populations should be monitored at the ecological and molecular level. The genetic diversity that provides evolutionary potential for species that find themselves in vulnerable ecosystems needs to be uncovered and protected. Despite having 16% of Turkey's floristic diversity, there is no comprehensive genetic study related to endemic plant species spreading in Kars. In this study, phylogenetic identification of seven endemic plant species (*Corydalis oppositifolia*, *Tragopogon aureus*, *Onosma nigricaulis*, *Onosma isaurica*, *Lamium galactophyllum*, *Salvia rosifolia*, *Fritillaria michailovskyi*, and *Rosa psiformis*) distributed in Kars province was performed by using 26SrDNA gene region to uncovering intra- and inter-species phylogenetic relationships for the first time. High level of polymorphism was found for the studied endemic species. The obtained preliminary results from the current study will contribute to future genetic studies to conserve these endemic species and biodiversity of the region. By using the preliminary genetic data, DNA barcoding of these species could be performed for DNA-based identification system which has the potential to be a resource for the studies to be carried out to protect our biodiversity in the national and international arena.

Keywords: Endemic, biodiversity, phylogenetic, polymorphism.

İZMİR BÖLGESİNDEN ÖRNEKLENEN KENELERDE KOYUN ÇİÇEĞİ VİRUSU'NUN TESPİTİ

DETECTION OF SHEEPPOX VIRUS IN TICKS SAMPLED FROM IZMIR REGION

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ÖZET

Koyun çiçeği virusu (Sheeppox virus (SPPV)), *Poxviridae* ailesindeki *Capripoxvirus* genusunda yer alan zarflı ve çift iplikçikli bir DNA virusudur. SPPV, koyun ve keçilerde deride jeneralize papül, nodül, püstül, vezikül ve son aşamada kabuk ile karakterize olan bulaşıcı koyun çiçeği hastalığına neden olmaktadır. Son yıllarda yapılan çalışmalar, *Capripoxvirus* ve *Parapoxvirus* genusunda yer alan virusların kenelerdeki varlığını ortaya koymuştur. Bu durum *Poxviridae* ailesindeki virusların biyolojisinde artropodların (mekanik veya biyolojik vektörlük) etkinliğinin araştırılmasını gündeme getirmiştir.

Bu çalışmada, İzmir bölgesinde koyun ve keçiler üzerinden toplanmış arşiv materyali 500 adet kenenin vektör olabilme potansiyeli *Capripoxvirus*'lar yönünden incelenmiştir. Bu keneler *Rhipicephalus bursa* (450 adet; %90), *Dermacentor marginatus* (25 adet; %5) ve *Hyalomma excavatum* (25 adet; %5) türü olarak gruplandırılmıştır. Tür ayırımından sonra her biri farklı sayılarda kene içeren 40 adet *R.bursa*, 5 adet *D.marginatus* ve 5 adet *H.excavatum* türünden olmak üzere toplamda 50 adet kene havuzu oluşturulmuştur. *Capripoxvirus* genusundaki virusların tespiti amacıyla oluşturulan havuzlar homojenizasyon ve ekstraksiyon işlemlerini takiben polimeraz zincir reaksiyonu (PZR) ile taranmış ve 2 adet *R.bursa* havuzunda *Capripoxvirus* pozitifliği tespit edilmiştir. Daha sonrasında yapılan dizi analizi ile bu iki havuzdaki virusun SPPV olduğu ortaya konulmuş ve yapılan filogenetik analiz sonucunda da bu SPPV'lerin Türkiye'de tespit edilen diğer SPPV'ler ile aynı grupta yer aldığı görülmüştür.

Türkiye'de SPPV'nin kenelerdeki varlığı ilk defa bu çalışma ile ortaya konulmuştur. Kenelerdeki SPPV varlığının düzenli sürveyans çalışmaları aracılığıyla araştırılması, kenelerde SPPV'nin hayvanlara aktarılmadan önce tespit edilmesine yardımcı olup SPPV'nin oluşturduğu koyun çiçeği hastalığının bölgedeki erken teşhis, kontrol ve eradikasyonuna ciddi katkılar sağlayacaktır.

Anahtar Kelimeler: Koyun Çiçeği Virus, Keneler, PZR, Dizi Analizi, Filogenetik Analiz.

ABSTRACT

Sheeppox virus (SPPV) is an enveloped and double-stranded DNA virus in the *Capripoxvirus* genus in the *Poxviridae* family. SPPV causes infectious sheeppox disease in sheep and goats, which is characterized by generalized papules, nodules, pustules, vesicles and finally crusts on the skin. Studies conducted in recent years have revealed the presence of viruses in the *Capripoxvirus* and *Parapoxvirus* genus in ticks. This situation has brought up the investigation of the effectiveness of arthropods (mechanical or biological vectoring) in the biology of viruses in the *Poxviridae* family.

In this study, the potential of 500 archive ticks collected from sheep and goats in the Izmir region to be vector was examined in terms of *Capripoxviruses*. These ticks are grouped as *Rhipicephalus bursa* (450; 90%), *Dermacentor marginatus* (25; 5%) and *Hyalomma excavatum* (25; 5%). After species separation, a total of 50 tick pools were created, including 40 *R.bursa*, 5 *D.marginatus* and 5 *H.excavatum* species, each containing different numbers of ticks. The pools created for the detection of viruses in the *Capripoxvirus* genus were scanned by polymerase chain reaction (PCR) after homogenization and extraction processes and *Capripoxvirus* positivity was detected in 2 *R.bursa* pools. After the sequence analysis, it was revealed that the virus in these two pools was SPPV, and as a result of the phylogenetic analysis, it was seen that these SPPVs were in the same group as the other SPPVs detected in Turkey.

The presence of SPPV in ticks in Turkey was revealed for the first time with this study. Investigating the presence of SPPV in ticks through regular surveillance studies will help detect SPPV in ticks before they are transmitted to animals, and will make serious contributions to the early diagnosis, control and eradication of sheeppox disease caused by SPPV in the region.

Keywords: Sheeppox Virus, Ticks, PCR, Sequence Analysis, Phylogenetic Analysis.

INVESTIGATION OF CRIMEAN-CONGO HEMORRHAGIC FEVER VIRUS (CCHFV)
SEROPREVALENCE IN SHEEP

KOYUNLARDA KIRIM-KONGO KANAMALI ATEŞİ VİRUSU (KKKAV)
SEROPREVALANSININ ARAŞTIRILMASI

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ABSTRACT

The Crimean Congo Hemorrhagic Fever Virus (CCHFV) is a viral pathogen that is mainly transmitted by Hyalomma ticks and causes a fatal hemorrhagic fever in humans. CCHF, which is a tick-vertebrate-tick disease with a widespread distribution in Africa, Asia, and Europe, is also seen in Turkey. This deadly pathogen maintains its existence in nature with its tick-rabab-ken cycle, which contains many domestic and wild animals. There is no clinical symptom in domestic animals infected with the CCHFV, but the presence of antibodies in the serums of these animals is the most important proof of active exposure. The discovery of exposure to the CCHFV in farm animals will provide an advantage against the CCHF, which threatens human health. This study was carried out to obtain up-to-date information about the spread of CCHF in sheep in the Western Mediterranean region of Türkiye. For this purpose, the presence of CCHF-specific antibodies in the blood serum of 395 sheep was tested by the double antigen sandwich ELISA assay. The diagnostic sensitivity and specificity values of the ELISA kit used were 96.8–99.8% and 99.8–100%, respectively. In a 95% confidence interval, the seroprevalence of the CCHF in sheep was determined to be 18.98% (75/395). The ELISA test results were found significantly affected by age ($\chi^2=9.545$ $P<0.002$), acaricide using status ($\chi^2=21.088$ $P<0.000$), keeping of poultry ($\chi^2=3.951$ $P<0.047$), type of barn ($\chi^2=23.363$ $P<0.000$), cleaning frequency of barn floor ($\chi^2=4.674$ $P<0.031$). Rhipicephalus spp. ticks were frequently found on sheep, from which blood serum was taken. In this study, the first seroepidemiological data in the region of the CCHF seroprevalence detected in sheep in the Western Mediterranean Region were revealed. As a result, due to the fact that this agent has spread to new locations in Türkiye, it is recommended that the comprehensive monitoring strategies for the CCHFV be implemented.

Keywords: Tick, CCHF, Nairovirus, Seroprevalence

ÖZET

Kırım Kongo Kanamalı Ateşi Virüsü (KKKAV) ağırlıklı olarak Hyalomma keneleriyle bulaşan, insanlarda ölümcül seyreden, şiddetli hemorajik ateşe yol açan viral bir patojendir. Afrika, Asya ve Avrupa'da yaygın bir dağılıma sahip kene kaynaklı bir hastalık olan KKKA Türkiye'de de görülmektedir. Bu ölümcül patojen birçok evcil ve yabani hayvanı içeren kene-omurgalı-kene döngüsüyle doğadaki varlığını sürdürmektedir. KKKA ile enfekte olan evcil hayvanlarda klinik belirti görülmez ancak bu hayvanların serumlarındaki antikor varlığı etkene maruziyetin en önemli kanıtıdır. Çiftlik hayvanlarında KKKA'ya maruziyetin ortaya konması insan sağlığını tehdit eden KKKA'ya karşı avantaj sağlayacaktır. Bu çalışma, Türkiye'nin Batı Akdeniz bölgesindeki koyunlarda KKKA'nın yayılımı hakkında güncel bilgiler elde edilmesi amacı ile gerçekleştirildi. Bu amaçla 395 adet koyun kan serumunda KKKA'ya özgü antikor varlığı çift antijenli sandviç ELISA yöntemiyle test edildi. Kullanılan ELISA kitinin tanısal sensitivite ve spesifivite değerleri sırasıyla %96,8-99,8 ve %99,8-100

oranlarına sahipti. Koyunlarda KKKAV enfeksiyon seroprevalansı %95 güven aralığında %18,98 (75/395) olarak belirlendi. Test sonuçlarının yaş ($\chi^2=9,545$ $P<0,002$), akarisit kullanımı ($\chi^2=21,088$ $P<0,000$), kanatlı hayvan bulundurma ($\chi^2=3,951$ $P<0,047$), ağıl yapısı ($\chi^2=23,363$ $P<0,000$), ağıl zemini temizleme sıklığı ($\chi^2=4,674$ $P<0,031$)’nden etkilendiği tespit edildi. Örneklerin alındığı koyunların üzerinde daha çok *Rhipicephalus* spp. kenelerin olduğu gözlemlendi. Bu çalışmada Batı Akdeniz bölgesindeki koyunlarda tespit edilen KKKA seroprevalansına dair bölgedeki ilk sero-epidemiolojik veriler ortaya konmuştur. Sonuç olarak, bu etkenin Türkiye’de yeni lokasyonlara yayılmış olması nedeniyle, KKKA için kapsamlı izleme stratejilerinin uygulanması önerilmektedir.

Anahtar kelimeler: Kene, KKKA, Nairovirus, Seroprevalans

TÜRKİYE’DE COVID-19 SONRASI DÖNEMDE BAL TÜKETİM DAVRANIŞLARI
HONEY CONSUMPTION BEHAVIORS IN TURKEY IN THE PERIOD AFTER COVID-19

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ÖZET

Arı yetiştiriciliği bitkisel kaynakların arı ve emek ile bir arada kullanılması suretiyle arı ürünleri çıktısı sağlayan tarımsal ve hayvansal faaliyettir. Türkiye ekolojik özellikleri nedeniyle arıcılık faaliyetleri için yüksek bir potansiyele sahiptir. Özellikle dört mevsimin belirgin olarak yaşandığı ülkemiz arı ırklarında çeşitliliğe imkân sağlamaktadır. Dünyadaki kovan sayısı 2019 yılında bir önceki yıla göre %0,6 oranında artarak 90,1 milyon adete ulaşmış olup, 8,1 milyon kovan ile %9,0 paya sahip olan Türkiye üçüncü sırada yer almaktadır. Bu araştırma, Covid-19 sonrası tüketicilerin bala ilişkin bilgi düzeylerinin ölçülmesi ve güven düzeyleri ile satın alma davranışlarının araştırılması amacı ile yapılmıştır. Bu kapsam dahilinde 475 adet tüketici anketi uygulanmıştır. Elde edilen veriler SPSS paket program ile analiz edilmiştir. Bal kalitesi ile bal satın alımı arasında anlamlı, güvenilir ve geçerli bir ilişki tespit edilmiştir. Aylık gelir ve bal tüketim sıklığı arasında istatistiki olarak anlamlı bir ilişki söz konusudur. Bal alırken medyadan ve diğer kaynaklardan etkilenenlerin, etkilenmeyenlere kıyasla, bal satın alımında sertifika ve resmi onaylı olmasına dikkat etme olasılığı 2,91 kat daha fazladır. Balın sağlıklı ve katkısız olmasına dikkat edenlerin, dikkat etmeyenlere göre sertifikalı ve resmi onaylı olmasına dikkat etme olasılığı 7,45 kat daha fazladır. Tüketicilerin arı ürünleri hakkındaki bilgi düzeyleri ve tüketicilerin arı ürünlerini satın alma yerlerine güven duyma düzeyleri ile cinsiyet, yaş ve eğitim arasında farklılık olduğu görülmüştür.

Anahtar Kelimeler: Arıcılık, bal tüketimi, Türkiye, bal pazarlaması

ABSTRACT

Beekeeping is an agricultural and animal activity that provides bee products output by using plant resources together with bees and labor. Turkey has a high potential for beekeeping activities due to its ecological characteristics. Turkey, where four seasons are experienced, provides an opportunity for diversity in bee races. The number of hives in the world increased by 0.6% in 2019 compared to the previous year and reached 90.1 million, and Turkey, which has a share of 9.0% with 8.1 million hives, ranks third. This study aims to measure the knowledge level of consumers about honey after Covid-19 and investigating their levels of trust and purchasing behaviors. Within this scope, 475 consumer questionnaires were conducted. The obtained data were analyzed with the SPSS package program. A significant, reliable, and valid relationship was found between honey quality and honey purchase. There is a statistically significant relationship between monthly income and honey consumption frequency. Those who are influenced by the media and other sources while buying honey are 2.91 times more likely to pay attention to the certification and official approval of their honey purchase, compared to those who are not. Those who pay attention to the fact that honey is healthy and additive-free are 7.45 times more likely to pay attention to the fact that it is certified and officially approved than those who do not. Observations revealed a difference between the level of knowledge of the consumers about bee products, the level of trust of consumers in purchasing bee products, and gender, age, and education.

Keywords: Beekeeping, honey consumption, Turkey, honey marketing

ETLİK PİLİÇLERDE GÖRÜLEN ET HATALARI (MYOPATİ) VE AZALTIMASINA YÖNELİK UYGULAMALAR

MEAT DEFECTS (MYOPATHY) IN BROILERS AND PRACTICES FOR REDUCING

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ÖZET

Kanatlı endüstrisinde piliçlerin hızlı büyütülmesi sonucunda Pectoralis majör kasını etkileyen kas anomalileri ortaya çıkmaya başlamıştır. Bunun üzerine araştırmalar, oluşan et kusurlarının çıkış nedeni, et kalitesine etkileri, et hatalarının oluşumunu azaltma ve hayvan refahına ilişkin olumsuz algıyı önlemek üzerine odaklanmıştır.

Bu miyopatiler Beyaz Çizgili (WS), Tahta Göğüs (WB) ve Spagetti Et (SM) olmak üzere kendine özgü ve ayırt edici özelliklerine göre isimlendirilmişlerdir. Miyopatilerden WS, P. Majör kasının yüzeyinde kas liflerine paralel olarak uzanan beyaz çizgilerin ortaya çıkmasıyla karakterize edilir, WB ise pektoral kasta ciddi bir sertleşme olarak ortaya çıkar, SM ise göğüs kasını oluşturan kas lifi demetlerinin bütünlüğünün kaybı ile spagetti görünümü olarak kendini göstermektedir. Miyopatili etlerin sahip oldukları yapısal özelliklerden dolayı etin tüketilmesi, beslenme ve teknolojik özellikleri üzerine olumsuz etkileri mevcuttur. Et miyopatilerine sahip göğüs etleri görünümünden dolayı tüketiciler tarafından tercih edilmemektedir. Bunun yanında bu hatalara sahip etlerde protein oranı azalmakta yağ oranı artmakta ve böylece besleyici özelliklerinde değişimler meydana gelmektedir. Yapısal ve bileşimde meydana gelen değişiklikler ileri işlenmiş ürünlerde yapı kusurlarına sebep olurken etin su tutma kapasitesinin ve marine ürünlerde marinyasyon kapasitesinin düşmesine neden olmaktadır. Et miyopatilerine sahip göğüs etlerinin taze tüketimlerinde pazar problemlerinin yaşanması ve ileri işlenmiş ürünlerde teknolojik problemler yaratması ekonomik kayıplara neden olmaktadır. Sektörde et hatalarının görülme sıklığının yüksek olmasından dolayı dünyada milyonlarca dolar kayıba sebep olduğu tahmin edilmektedir.

Bu çalışmada bu et hatalarının tarihsel geçmişi, hataları oluşturan genetik ve çevresel faktörler ile bu etlerin fiziksel ve kimyasal özellikleri ile bunların azaltılma stratejilerinin neler olduğu üzerinde durulacaktır.

Anahtar Kelimeler: Etlik piliç, et hatası, tahtamsı göğüs, beyaz şeritler, spagetti et, tekstür.

ABSTRACT

As a result of the rapid growth of chickens in the poultry industry, muscle anomalies affecting the pectoralis major muscle have begun to emerge. Research has focused on the etiology of meat defects, their effects on meat quality, reducing the occurrence of meat defects, and preventing negative perceptions of animal welfare.

These myopathies are defined according to their unique and distinctive features, namely White Striped (WS), Wooden Chest (WB), and Spaghetti Meat (SM). Among these defects, WS is characterized by the appearance of white lines running parallel to the muscle fibers on the surface of the P. major muscle, WB appears as a severe hardening of the pectoral muscle, and SM also manifests itself as a spaghetti appearance with loss of integrity of the muscle fiber bundles that make up the pectoral muscle. Myopathies in meat have negatory effects on meat consumption by consumers and nutritional and technological properties due to their structural attributes. Breast meats with myopathies are generally not preferred by consumers because of their appearance. In addition, the protein content decreases, and the fat content increases in meats with these defects, and thus the changes in their nutritional properties

occur. The structural and compositional changes cause textural defects in the further processed products also, the water-holding and marination capacity of defective meat decrease. Market problems in the fresh consumption of breast meats with meat myopathy and technological troubles in further processed products cause economic losses. Due to the high incidence of meat myopathies in the poultry industry, it is estimated cause millions of dollars to be lost in the world.

The historical background of these meat myopathies, the genetic and environmental factors that cause these defects, the physical and chemical properties of these meats, and their reduction strategies will be emphasized in the study.

Keywords: Broiler, meat myopathy, woody breast, white striped, spaghetti meat, texture.

NATURAL MODULATION OF THE GUT MICROBIOTA IN DOGS WITH SPINAL CORD INJURY

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ABSTRACT

Background The metabolites produced by microbiota metabolism can modulate gut bacterial composition and brain biochemistry acting as neurotransmitters in the central nervous system. Polyphenols are usually hydrolysed by intestinal enzymes or by gut microbiota. In this form they reach blood, tissues and brain where exert biological activities. The dysbiosis is thought to impair recovery by decreasing the production of short-chain fatty acids which play a role in suppressing inflammation within the central nervous system. The gut microbiota can synthesise neurotransmitters or regulate their levels acting on their precursors. Alteration in the homeostasis of gut-brain axis has been associated also to spinal cord injury.

Objective To order to show that polyphenols could increase the levels of neurotransmitters in situations of spinal injury where there is an urgent need to generate new neurons. To arrive at these observations, the authors examined how Polenoplasmin and diet solve paralysis in dogs.

Materials and methods Dysbiosis could have significant therapeutic value in the management of spinal cord injury.

Results In fact, some polyphenol metabolites can modulate directly neuronal receptors. Metabolites from dietary polyphenols exert neuroprotective effects after reaching the brain by crossing blood-brain barrier. Polyphenols indirect actions involve mechanisms that improve the peripheral cerebrovascular health.

Conclusion Dietary polyphenols improve vasodilatory response and increase levels of circulating nitric oxide (NO) species that are essential in the control of vascular tone; vasodilation and blood flow in the body and in cerebral circulation. Gut microbiota are able to synthesize neurotransmitters thus microbiota homeostasis can impact on spinal cord injury.

Keywords: gut microbiota, polyphenol metabolites, neurotransmitters, spinal cord injury, Polenoplasmin

**MACAR FİĞİNDE (*VICIA PANNONICA* CRANTZ) OT VERİMİ VE KALİTE AÇISINDAN
UYGUN HASAT ZAMANININ BELİRLENMESİ**

**DETERMINATION OF SUITABLE MOWING TIME FOR HERBAGE YIELD AND
QUALITY IN HUNGARIAN VETCH (*VICIA PANNONICA* CRANTZ)**

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ÖZET

Kışlık ekilen fiğlerin ekim nöbetine girmesinde en önemli noktalardan birisi tarlayı erken terk etmesidir. Bu araştırmada Macar fiği (*Vicia pannonica* Crantz.) Tarm Beyazı-98 çeşidi farklı gelişme döneminde hasat edilerek kuru ot verimi, kalite ve erken hasat açısından uygun hasat zamanının belirlenmesi amaçlanmıştır.

Bu çalışma Ankara Tarla Bitkileri Merkez Araştırma Enstitüsünün İkizce lokasyonunda 2010-2013 yılları arasında, tesadüf blokları deneme deseninde dört tekerrürlü olarak yürütülmüştür. Farklı hasat zamanları 1) çiçeklenme başlangıcı, 2) %50 çiçeklenme dönemi, 3) tam çiçeklenme dönemi ve 4) alt baklalarda tanelerin tam şeklini aldığı dönem, olarak uygulanmıştır. Araştırmada yatma durumu, hasat gün sayısı, doğal bitki boyu, ana sap uzunluğu, ana sap kalınlığı, ana sap sayısı, yeşil ve kuru ot verimi, ham protein oranı, ham protein verimi, ADF ve NDF oranı, sindirilebilir kuru madde oranı, nisbi yem değeri incelenmiştir.

Araştırma sonucunda, hasat zamanlarına göre sırasıyla yatma durumları 1.0, 2.0, 2.6, 3.3; hasat gün sayıları 210.7, 217.0, 222.0, 236.7 gün; doğal bitki boyları 46.4, 45.6, 49.6, 55.9 cm; ana sap uzunlukları 50.0, 60.9, 69.7, 99.4 cm; yeşil ot verimleri 1436.2, 1785.4, 1858.6, 1081.8 kg/da; kuru ot verimleri 254.1, 312.9, 331.2, 300.9 kg/da, olarak bulunmuştur. Aynı hasat zamanlarına göre, ham protein oranları %19.2, 17.6, 16.8, 15.6; ham protein verimleri 49.4, 54.7, 53.7, 47.0 kg/da; ADF oranları %38.2, 39.6, 40.7, 40.8; NDF oranları %47.8, 50.7, 53.1, 54.0; sindirilebilir kuru madde oranları %59.2, 58.0, 57.2, 57.1; nisbi yem değerleri 116.9, 108.0, 101.9, 100.7 olarak tespit edilmiştir.

Üç yıllık araştırma neticesinde, verim ve kalitenin yüksek olduğu, tarlanın da erken terk edildiği % 50 çiçeklenme döneminde hasat yapmanın uygun olduğu, sonucuna varılmıştır.

Anahtar Kelimeler: Macar Fiği (*Vicia pannonica* Crantz.)(1), ot verimi(2), ham protein verimi(3), kalite(4), nisbi yem değeri(5)

ABSTRACT

The early leaving of the field is one of the most important points in the entry of the winter sown vetch into the crop rotation. In this study, it was aimed to determine the appropriate harvest time in terms of hay yield, quality and early harvest by harvesting the Hungarian vetch (*Vicia pannonica* Crantz.) Tarm Beyazı-98 variety in different growing periods.

This study was carried out at the İkizce location of the Ankara Field Crops Central Research Institute between 2010 and 2013 in a randomized block design with four replications. Different harvest times were applied as 1) the beginning of flowering, 2) the 50% flowering period, 3) the full flowering period, and 4) the period when the grains took their full shape in the bottom pods. In this study, prostrate status, number of harvest days, natural plant height, main stem length, main stem thickness, main stem number, green forage and hay yield, crude protein ratio, crude protein yield, ADF and NDF ratio, digestible dry matter ratio, relative feed value were investigated.

As a result of the research, the prostrate status, harvesting days, natural plant heights, main stem lengths, green forage yields, and hay yields were found such as 1.0, 2.0, 2.6, 3.3; 210.7, 217.0, 222.0, 236.7 days; 46.4, 45.6, 49.6, 55.9 cm; 50.0, 60.9, 69.7, 99.4 cm; 1436.2, 1785.4, 1858.6, 1081.8 kg/da; 254.1, 312.9, 331.2, 300.9 kg/da in the harvest times, respectively. According to the same harvest times, crude protein ratios, crude protein yields, ADF ratios, NDF rates, digestible dry matter ratios, and relative feed values were measured such as 19.2, 17.6, 16.8, 15.6%; 38.2, 39.6 40.7, 40.8 49.4, 54.7, 53.7, 47.0 kg/da; 38.2, 39.6 40.7, 42.0%; 47.8, 50.7, 53.1, 54.0%; 59.2, 58.0, 57.2, 57.1% ; 116.9, 108.0, 101.9, 100.7, respectively.

As a result of three years of research, it has been concluded that it is appropriate to harvest during the 50% flowering period when the yield and quality are high and the field is abandoned early.

Keywords: Hungarian Vetch (*Vicia pannonica* Crantz.)(1), forage yield (2), crude protein yield(3), quality (4), relative feed value(5)

BESLENMENİN DÜZENLENMESİ VE NÖROENDOKRİN KONTROL
NEUROENDOCRINE CONTROL OF FOOD INTAKE AND REGULATION

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ÖZET

Şişmanlık küresel bir halk sağlığı sorunudur. Bunun doğal bir sonucu olarak da beslenme davranışlarını düzenleyen nöroendokrin mekanizmaların araştırılması konusunda araştırmacıların yoğun bir ilgisi vardır. Merkezi ve periferik sinyaller, beslenme davranışlarının düzenlenmesinde önemli bir rol oynamaktadır. Çok sayıda deneysel çalışma, beslenme davranışlarını düzenleyen sinirsel merkezlerin hipotalamusta yer aldığını göstermiştir. Lateral hipotalamustaki sinir hücrelerinin elektriksel olarak uyarılması, açlık hissini ortaya çıkarır. Bu bölgeye beslenme veya açlık merkezi denir. Diğer bir merkez ise hipotalamusun ventromedial çekirdeklerinde yer alan ve tokluk merkezi olarak bilinen sinir hücreleri grubudur. Bu bölgedeki sinir hücrelerinin elektriksel olarak uyarılması da tokluk hissine yol açar. Beyin sapı ve limbik sistemin de açlık ve tokluk işlevlerinde rol oynayabileceği tahmin edilmektedir. Buna paralel olarak deney hayvanlarında beslenme merkezinin haraplanması iştah kaybına yol açarak ölüme kadar gidebilen süreçleri tetiklerken, tokluk merkezinin bozulması ise hiperfajiye ve nihayetinde şişmanlık gelişimine neden olmaktadır. Prensipte olarak, açlık merkezi sürekli bir aktiviteye sahiptir. Ancak gıda alımı ile birlikte tokluk merkezinin faaliyet kazandığı ve açlık merkezinin faaliyetini durdurduğu kabul edilmektedir. Sonuç olarak beslenme tek bir faktörün etkisi altında olmayıp çeşitli faktörlerin kontrolünde olmaktadır. Normal erişkinlerde enerji tüketimi ve beslenme dengelidir. Büyüme çağına beslenme hakimdir. Ağır hastalıkların iyileşme döneminde ve egzersiz sırasında besin alımı artar. Beslenmenin nöroendokrin kontrolünü sağlayan mekanizmaların tüm ayrıntılarıyla ortaya konması, küresel bir halk sağlığı sorunu olan obezitenin önlenmesinde kritik öneme sahip olabilir. Açlık ve tokluk merkezlerini uyaran veya engelleyen çeşitli kontrol mekanizmaları vardır. Bu derlemenin amacı da beslenmenin nöroendokrin kontrolü ve besin alımının düzenlenmesinde etkili olan faktörler hakkında bilgi vermektir.

Anahtar kelimeler: Beslenmenin düzenlenmesi, Hipotalamus, NPY, Leptin, Nöroendokrin Kontrol

ABSTRACT

Obesity is a global public health problem. As a natural consequence of this, there is an increasing interest in investigating the neuroendocrine mechanisms that regulate feeding behaviors. Central and peripheral signals play an important role in the regulation of feeding behaviors. Numerous experimental studies have shown that the neural centers that regulate feeding behaviors are located in the hypothalamus. Electrical stimulation of nerve cells in the lateral hypothalamus elicits the feeling of hunger. This area is called the nutrition or hunger center. Another center is the group of neurons located in the ventromedial nuclei of the hypothalamus and known as the satiety center. Electrical stimulation of nerve cells in this region also leads to a feeling of satiety. It is speculated that the brain stem and limbic system may also be involved in hunger and satiety functions. However, the deterioration of the feeding center in experimental animals causes loss of appetite leading to death, but the destruction of the satiety center causes to hyperphagia and ultimately obesity develop. In principle, the hunger center has a constant activity. However, it is accepted that with the food intake, the satiety center gains activity and the hunger

center stops its activity. As a result, nutrition is not under the influence of a single factor, but controlled by various factors. In normal adults, energy consumption and nutrition are in balance. In the growing age, nutrition dominates. Nutritional intake increases during the recovery period of severe diseases and during exercise. Demonstrating the mechanisms that provide neuroendocrine control of nutrition in full detail may be of critical importance in preventing obesity, which is a global public health problem. There are various control mechanisms to stimulate or inhibit the hunger and satiety centers. The aim of this review is to provide information about the neuroendocrine control of nutrition as well as the factors that are effective in the regulation of food intake.

Key words: Regulation of nutrition, Hypothalamus, NPY, Leptin, Neuroendocrine Control

**SİĞİR, KOYUN VE KEÇİ DIŞKILARINDAN İZOLE EDİLEN *E.COLI*'LERİN ALT
TİPLERİNİN, SEROGRUP VE SEROTİPLERİNİN, VİRULENS VE/VEYA TOKSİJENİK
ÖZELLİKLERİNİN MULTIPLEX PCR İLE BELİRLENMESİ**

**DIVERSIFICATION OF VIRULENCE AND / OR TOXIGENIC PROPERTIES OF *E.COLI*
SUBTYPES, SEROGROUPS AND SEROTYPES ISOLATED FROM CATTLE, SHEEP AND
GOAT FECES BY MULTIPLEX PCR**

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ÖZET

Hayvanlarda ve insanlarda önemli enfeksiyonlara neden olan *Escherichia coli* (*E. coli*)'lerin birçok alt tipi bulunmaktadır. Bu projede, özellikle geviş getiren hayvanların dışkılarından, kontaminasyon nedeniyle insanlarda enfeksiyon yapabilen *E. coli* alt tiplerinin ve serotiplerinin ve virülens ve/veya toksijenik özelliklerinin tespit edilerek, insanlarda hastalık oluşturma risklerinin araştırılması amaçlanmıştır. Çalışmada sığır (100), koyun (100) ve keçi (100), gibi geviş getiren 300 hayvandan alınan rektal svaplardan yapılan izolasyon çalışmaları sonucunda, sığırlardan 43 adet, koyunlardan 84 adet ve keçilerden 81 adet *E. coli* izole ve tanımlanmıştır. Tüm hayvan dışkılarından elde edilen 208 adet *E. coli* izolatının PCR analizi sonucunda serotipler ve oranları sırasıyla şu şekilde belirlendi: 47 adet O157 (% 75,8), 45 adet O26 (% 72,6), 38 adet O45 (% 61,3), 31 adet O121 (% 50), 30 adet O111 (% 48,4), 21 adet O103 (% 33,9), 6 adet O145 (% 9,7). Toplamda ise sırasıyla sığır, koyun ve keçi dışkılarından izole ve tanımlanmış *E. coli*'lerin en çok görülen serotipler sırasıyla: O157, O45, O121, O111, O26, O103, O145; O26, O157, O103, 121, O45, O111; O45, O111, O26, O121, O157, O145 olmuştur. İzolatların PCR analizleri sonucunda alt tipleri tespit edildi. Toplamda ise: EAEC % 78, STEC stx2 % 65, STEC stx1 % 49, EPEC EaeA % 35, ETEC Etx % 38, EHEC Etx % 29, ETEC Stx2 % 49, STEC eaeA2 % 25, ETEC Alt % 10, EPEC bfpA % 49. Çalışmamızda sonuç olarak sıklıkla

görülen ilk 5 serotipin dışında da O45 ve O121 gibi serotipler tespit edilmiştir. STEC’lerde ve eaeA tiplerinde diğer ülkesel çalışmalardan daha yüksek oranlar tespit edilmiştir. Ayrıca çalışmamızda EAECVVD alt tipi, çok yüksek oranda saptanmıştır. Bu çalışma, Kırıkkale Üniversitesi, Bilimsel Araştırma Projeleri Koordinasyon Birimi tarafından desteklenmiştir. Proje Numarası: 2021/060’dır.

Anahtar Kelimeler: Alt tipler, dışkı, *E. coli*, keçi, koyun, serotip, sığır.

ABSTRACT

There are many subtypes of *Escherichia coli* (*E. coli*) that cause significant infections in animals and humans. In this project, it was aimed to investigate the risk of disease in humans by determining the virulence and/or toxigenic properties of *E. coli* subtypes and serotypes that can infect humans due to contamination, especially from the feces of ruminant animals. In the study, as a result of isolation studies made from rectal swabs taken from 300 ruminant animals such as cattle (100), sheep (100) and goats (100), 43 *E. coli* from cattle, 84 from sheep and 81 from goats were isolated and identified. As a result of PCR analysis of 208 *E. coli* isolates obtained from all animal feces, the serotypes and ratios were determined as follows: 47 O157 (75.8%), 45 O26 (72.6%), 38 O45 (61.3%) , 31 O121 (50%), 30 O111 (48.4%), 21 O103 (33.9%), 6 O145 (9.7%). In total, the most common serotypes of *E. coli* isolated and identified from cattle, sheep and goat feces are: O157, O45, O121, O111, O26, O103, O145; O26, O157, O103, 121, O45, O111; O45, O111, O26, O121, O157, O145. Subtypes of isolates were determined as a result of PCR analysis. In total: EAECVVD 78%, STEC stx2 65%, STEC stx1 49%, EPEC EaeA 35%, ETEC E1t 38%, EHEC Ehly 29%, ETEC St1a2 49%, STEC eaeA2 25%, ETEC All 10%, EPEC bfpA% 49. In our study, serotypes such as O45 and O121 were detected, apart from the first 5 serotypes that were frequently seen as a result. Higher rates were found in STECs and eaeA types than in other national studies. In addition, EAECVVD subtype was detected at a very high rate in our study. This work was supported by Scientific Research Projects Coordination Unit of Kırıkkale University. Project number is 2021/060.

Keywords: Bovine, *E. coli*, feces, goat, serotype, sheep, subtypes.

**YENİDOĞAN BUZAĞILARI BOVINE ROTAVİRUS VE BOVINE CORONAVİRUS
ENFEKSİYONLARINDAN KORUMADA AŞILAMA STRATEJİSİ**
**VACCINATION STRATEGY FOR PROTECTING NEWBORN CALVES FROM BOVINE
ROTAVIRUS AND BOVINE CORONAVIRUS INFECTIONS**

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ÖZET

Neonatal dönem, buzağılar ve işletmenin geleceği açısından hayati öneme sahiptir. Bu periyot içinde buzağılarda meydana gelebilecek sindirim ve solunum sistemi enfeksiyonları işletmenin devamlılığını, karlılığını ve verimini olumsuz yönde etkilemekte ve geri dönüşümü mümkün olmayan kayıplarla neden olmaktadır. Özellikle buzağılarda yaşamlarının ilk dört haftasında enfeksiyöz ajanların sebep olduğu akut gastroenteritis tablosuna bağlı kayıplar, hayvan yetiştiricilerinin ciddi ekonomik problemler yaşamasına sebep olmaktadır. Yeni doğan buzağıları rotavirus ve coronavirus kaynaklı hastalıklardan korumada birçok farklı metotlar bulunmakla birlikte gebeliğin uygun döneminde annelerin aşılanarak doğum sonrası kolostrum yoluyla yavrulara pasif bağışıklık kazandırılması şeklinde önemli bir stratejide mevcuttur. Bu bağlamda enfeksiyonlardan korumada veya tedavisinde işlevsel olan ve en hızlı sonuç veren yöntemi tercih etmek oldukça önemlidir. Ruminantların plasenta yapısının antikor geçişine izin vermediği düşünüldüğünde, bu süreçte buzağılardan doğduktan sonra alacakları uygun zaman dilimi içerisinde ve yeteri miktarda yüksek kalitedeki kolostrumun hayati önemi bulunmaktadır. Normal süte kıyasla daha fazla protein, kuru madde ve immunoglobulin bulunduran kolostrum aynı zamanda vitamin ve mineral kaynağı olarak da görev görür. Kolostrum yüksek besleyicilik değerinden dolayı buzağıyı yaşamının ilk birkaç gününde hem besler hem de taşıdığı immunoglobulinlere bağlı olarak buzağının immun sisteminin güçlenmesine ve enfeksiyonlardan korunmasına katkı sağlar. Bu dönemde gebe inek ve gebe düvelerin rotavirus ve coronavirus antijenlerini içeren aşılarla uygun zamanda aşılanması sayesinde söz konusu patojen mikroorganizmalara spesifik antikor bakımından zengin kolostrum elde etmek ve bunun yavrular tarafından alınmasını sağlamak önemlidir. Bu sayede buzağılarda bu patojenlere bağlı oluşabilecek enfeksiyonların önüne geçilebilir ve yavru ölümleri en aza indirilerek işletmede ekonomik kayıplar engellenebilir. Bu çalışmada, neonatal buzağıları bovine rotavirus ve bovine coronavirus kaynaklı enfeksiyonlardan korumada gebe sığırların aşılanmasının önemi ve uygun aşılama stratejisinin belirlenmesi hakkında bilgi verilmiştir.

Anahtar Kelimeler: Aşı, Bovine Coronavirus, Bovine Rotavirus, Neonatal Buzağı.

ABSTRACT

The neonatal period is of vital importance for the calves and the future of the enterprise. Digestive and respiratory system infections that may occur in calves during this period adversely affect the continuity, profitability and efficiency of the business and cause irreversible losses. Especially in calves, losses due to acute gastroenteritis caused by infectious agents in the first four weeks of their lives cause serious economic problems for animal breeders. Although there are many different methods to protect newborn calves from rotavirus and coronavirus-related diseases, there is an important strategy to provide passive immunity to the offspring through colostrum after birth by vaccinating the mothers during the

appropriate period of pregnancy. In this context, it is very important to choose the method that is functional and gives the fastest results in the prevention or treatment of infections. Considering that the placental structure of ruminants does not allow the passage of antibodies, in this process, the calves must receive high-quality colostrum within the appropriate time frame after birth. Colostrum, which contains more protein, dry matter and immunoglobulin compared to normal milk, also acts as a source of vitamins and minerals. Due to its high nutritional value, colostrum both nourishes the calf in the first few days of its life and contributes to the strengthening of the calf's immune system and protection from infections due to the immunoglobulins it carries. In this period, it is important to obtain colostrum rich in antibodies specific to the pathogen microorganisms and ensure that it is taken by the offspring by vaccinating pregnant cows and pregnant heifers with vaccines containing rotavirus and coronavirus antigens at the appropriate time. In this way, infections that may occur in calves due to these pathogens can be prevented, and economic losses in the business can be prevented by minimizing calf deaths. In this study, information is given about the importance of vaccination of pregnant cattle and the determination of the appropriate vaccination strategy in protecting neonatal calves from bovine rotavirus and bovine coronavirus-related infections.

Keywords: Neonatal calf, Bovine Coronavirus, Bovine Rotavirus, Vaccine.

**FARKLI SICAKLARDA DEPOLANAN PATATESLERDE MEYDANA GELEN BAZI
KALİTE DEĞİŞİMLERİ**
**SOME QUALITY CHANGES OCCURING IN POTATOES STORED AT DIFFERENT
TEMPERATURES**

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ÖZET

Bu çalışmada, iki farklı depolama sıcaklığının (4°C ve 25°C) taze patateslerin bazı kalite özelliklerine etkisi incelenmiştir. Bu amaçla taze patatesler düşük sıcaklıkta (4°C) ve oda sıcaklığında (25°C) 20 gün süreyle depolanmıştır. 20 günlük depolama süresince her beş günde bir ağırlık kaybı, tekstür, renk, toplam fenolik madde miktarı ve antioksidan aktivite analizleri yapılmıştır. 20 gün boyunca depolama yapılan taze patateslerin ağırlık kaybı değerleri 4°C’de depolananlar için %4.69, 25°C’de depolananlar için ise %5.63 olarak hesaplanmıştır. Taze patateslerin sertlik değeri 3448±0.00 g olarak belirlenmiştir. Depolama süresince sertlik değerlerinde azalma meydana gelmiştir. 25°C’de ölçülen sertlik değerlerindeki azalmanın daha fazla olduğu belirlenmiştir. Örneklerin, iç ve dış yüzeylerinde renk ölçümü yapılmıştır. Renk sonuçları incelendiğinde 4° ve 25°C’de depolanan tüm örneklerin iç yüzeyinde, L* ve hue açısı değerlerinin azaldığı, a*, b*, kroma, ΔE ve kararma indeksinin arttığı belirlenmiştir. Dış yüzey renk değerlerinde ise L* değeri dışındaki tüm değerlerin arttığı saptanmıştır. 4° ve 25°C depolama sonunda örneklerin toplam fenolik madde miktarında sırasıyla %6.23 ve %11.31 oranında kayıp meydana gelmiştir. Antioksidan aktivite değerlerinde, 4°C’de depolanan örneklerde %26.33 25°C’de depolanan örneklerde ise %38.74 oranında kayıp olduğu hesaplanmıştır. Sonuç olarak, patateslerin kalite parametrelerinin daha iyi korunabilmesi için depolamanın 4°C’de en fazla 5-10 gün yapılmasının uygun olacağı düşünülmektedir.

Anahtar Kelimeler: patates, depolama, kalite, renk, tekstür, biyoaktif bileşen, değişim.

ABSTRACT

In this study, the effects of two different storage temperatures (4°C and 25°C) on some quality characteristics of fresh potatoes were investigated. For this purpose, fresh potatoes were stored at low temperature (4°C) and room temperature (25°C) for 20 days. Weight loss, texture, color, total phenolic content and antioxidant activity analyzes were performed every five days during the 20-day storage period. Weight loss values of fresh potatoes stored for 20 days were calculated as 4.69% for those stored at 4°C and 5.63% for those stored at 25°C. The hardness value of fresh potatoes was determined as 3448±0.00 g. Hardness values decreased during storage. It was determined that the decrease in hardness values measured at 25°C was higher. Color measurements were made on the inner and outer surfaces of the samples. When the color results were examined, it was determined that L* and hue angle values decreased, a*, b*, chroma, ΔE and darkening indexes increased on the inner surface of all samples stored at 4° and 25°C. In the outer surface color values, it was determined that all values except the L* value increased. At the end of storage at 4° and 25°C, the total phenolic content of the samples was lost by 6.23% and 11.31%, respectively. In antioxidant activity values, it was calculated that there was a loss of 26.33% in samples stored at 4°C and 38.74% in samples stored at 25°C. As a result, it is thought that

it would be appropriate to store the potatoes at 4°C for a maximum of 5-10 days in order to better preserve the quality parameters.

Keywords: potato, storage, quality, color, texture, bioactive compound, changing.

MORKARAMAN CİNSİ TOKLULARDA GLUTEN İLE BESLEMENİN KESİM VE KARKAS ÖZELLİKLERİ

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ÖZET

Bu çalışma entansif beside rasyondaki protein açığının buğday gluteni ve mısır gluteni ile karşılanmasının Morkaraman cinsi kuzuların kesim ve karkas özelliklerine olan etkisinin tespiti amacıyla yapılmıştır. Çalışmada ortalama 9 aylık yaşta 24 adet Morkaraman cinsi erkek toklu her grupta 8 adet hayvan olacak şekilde 3 grup halinde beslenmiştir. Protein ihtiyacının karşılanması için kontrol grubunda soya küspesi+aspir küspesi, buğday grubunda buğday gluteni ve mısır grubunda ise mısır gluteni kullanılmıştır. Besi süresi 56 gün olup besiye alınan tokluların kesim canlı ağırlıkları sırasıyla 42.43, 41.66 ve 42.63 kg, sıcak karkas ağırlıkları 20.86, 19.84, 21.1 kg ve soğuk karkas ağırlıkları 20.35, 19.38, 20.75 kg olarak tespit edilmiş olup gruplar arasında fark önemsiz bulunmuştur ($P>0.05$). Sıcak karkas randımanları %49,18, 47.63, 49.49, soğuk karkas randımanı ise %47.96, 46.54, 48.65 olarak tespit edildi ($P<0.05$). Mısır gluteni kullanılan grupta sıcak ve soğuk karkas randımanı buğday glutenine oranla önemli derecede yüksek bulunmuştur. Sonuç olarak hayvanların protein ihtiyaçlarının mısır gluteninden karşılanmasının karkas ve kesim parametreleri üzerine olumlu etki yaptığı görülürken, buğday gluteninin aynı etkiyi yapmadığı görülmektedir.

Anahtar Kelimeler: buğday, mısır, gluten, protein, karkas

ABSTRACT

This research was carried out to determine the effect of meeting the protein deficit in the ration with wheat gluten and corn gluten on the slaughter and carcass characteristics of Morkaraman (Red Karaman) lambs. In the study, 24 males of Morkaraman breed at an average age of 9 months were fed in 3 groups with 8 animals in each group. To meet the protein needs, soybean meal + safflower meal in the control group, wheat gluten in the wheat group and corn gluten in the corn group were used. The fattening period was 56 days and the slaughter body weights of the fattened cattle were 42.43, 41.66 and 42.63 kg, respectively, the warm carcass weights were 20.86, 19.84, 21.1 kg and the cold carcass weights were 20.35, 19.38, 20.75 kg, and the difference between the groups was not significant ($P>0.05$). Hot dressing percentage were 49.18%, 47.63, 49.49, and cold dressing percentage were 47.96, 46.54, 48.65 ($P<0.05$). In the corn gluten group, the hot and cold carcass yield was significantly higher than that of wheat gluten. As a result, it is seen that meeting the protein needs of animals from corn gluten has a positive effect on carcass and slaughter parameters, while wheat gluten does not have the same effect.

Keywords: wheat, corn, gluten, protein, carcass

1. GİRİŞ

Ülkemizde Akkaraman, Morkaraman, İvesi ve Karacabey gibi birçok koyun cinsi yetiştirilmektedir (Akçapınar, 2000). Bu hayvanlardan et ve süt verimi yönünden farklı şekillerde veya kombine olarak

faýdalanılmaktadır. Petrokimyasal liflerin kullanımlarının artmasıyla beraber yapağıdan elde edilen doğal lifler önemi zamanla kaybetmiştir (Olfaz, 2015). Bu sayede koyun yetiştiriciliğinde yapağının verim yönünün yerine et verimi öne çıkmıştır. Morkaraman cinsi, Doğu Anadolu bölgesinde en çok tercih edilen koyun ırkıdır. Ancak ırk özelliklerinden dolayı vücut ağırlığı diğer ırklara göre yüksek olmasına rağmen yağ oranının özellikle kuyruk bölgesinde daha çok birikmesiyle et kalitesi ve karkas özelliklerini düşürmektedir (Akçapınar, 1994; Kaymakçı & Sönmez, 1992).

Ülkemizde özellikle yem bitkisi olarak buğday, arpa ve mısır üretim miktarları öne çıkmaktadır. Dünyada ve ülkemizdeki tarımsal üretim verileri incelendiğinde buğday birinci sırayı, mısır ise üçüncü sırayı almaktadır (Cengiz, 2016). Buğday, arpa ve mısır gibi tahılların işlenmesinden sonra nişasta, kabuk ve diğer kısımlarının ayrıştırılması sonucunda kalan kısmı gluten olarak adlandırılmaktadır. Gluten içerisinde yer alan protein değeri birçok faktöre bağlı olarak %55-75 arasında değişkenlik göstermektedir (İmİK et al., 2019). Buğday tanesinin yaklaşık %5,4'ünü, mısır tanesinin ise %3-3,5'unu gluten oluşturmaktadır (Schroeder, 1997).

Hayvan ıslahı için yapılan genetik çalışmaların uzun sürmesi ve maliyetler bakımından yüksek olması nedeniyle genellikle melezleme çalışmaları yapılmaktadır. Melezleme yöntemi ile sonuçlar daha kısa sürede alındığından daha avantajlı duruma geçmektedir (Akgündüz et al., 1994). Farklı ırkların melezlenmesi ya da aynı ırka ait yüksek verimli hayvanlar ile melezleme yapılarak verim yönünden artış sağlanmaktadır (Akman, 1997). Ancak besi performansını etkileyen faktörler arasında ırk özelliklerinin etkileri dışında cinsiyet, yaş, kondisyon, sağlık ve beslenme faktörleri de yer almaktadır (Uygur, 2007). Canlı ağırlık artışı ve karkas randımanı hayvanın ırkına ait genetik özellikler ve cinsiyet farkına göre sınırlıdır. Erkek hayvanlarda dişilere oranla kas oranı daha çok gelişmiştir.

Bu çalışma entansif beside yerli koyun ırklarından olan Morkaraman cinsi toklularda beslenmenin kesim ve karkas özelliklerine olan etkisinin belirlenmesi amacıyla yapılmıştır.

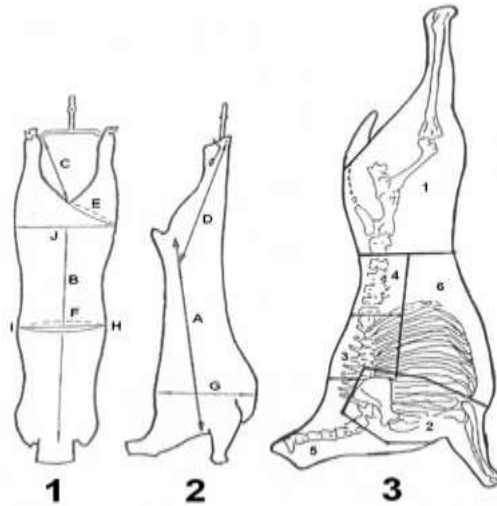
2. MATERYAL – METOT

Çalışma Bayburt iline bağlı özel bir koyunculuk işletmesinde yürütülmüştür. Bu çalışmada ortalama 9 aylık yaşta 24 adet Morkaraman cinsi erkek toklu kullanılmıştır. Hayvanların beslenmesinde kullanılan besi yemi içeriği izokalorik ve izonitrojenik (ME: 2700, HP: %17) olarak hazırlanmış olup özel bir yem firmasından temin edilmiştir. İşletmeye getirilen hayvanlar 4 alt gruba sahip olan 3 farklı gruba ayrılmıştır. Her grupta 8 adet toklu bulunacak şekilde çalışma dizaynı oluşturulmuştur. Entansif besiye alınan toklular işletmeye geldikten sonra iç ve dış parazit uygulamaları ile 21 gün arayla iki kez karma aşıları uygulanmıştır. Hayvanların yemlemesi sabah 8:00 ve akşam 16:00 saatlerinde olmak üzere günde iki kez yapılmıştır. Hayvanların bulunduğu bölmelerde konsantre ve kaba yem tüketimlerinin ayrı yapılabilmesini sağlamak için iki farklı yemlik bölmesi kurulmuştur. Yeme adaptasyon süreci 21 gün sürmüştür. Bu süreçte tüketilecek kaba yem miktarı sürekli azaltılarak konsantre yem miktarı sürekli artırılmıştır. Kaba yem olarak buğday samanı tercih edilmiştir. Yeme adaptasyon süreci sonunda besideki hayvanlara yem ad-libitum olarak verildi ve sürekli temiz su bulunduruldu. Hayvanların beslenmesinde kullanılan besi yemi içeriği Tablo 1'de verilmiştir. Toklular 21 günlük yeme adaptasyon süreci sonunda 56 gün süre ile beslenmişlerdir.

Tablo 1. Farklı gruplarda kullanılan besi yemi içeriği

Hammaddeler	Buğday Gluteni, %	Mısır Gluteni, %	Kontrol, %
Buğday Gluteni	10.3	0	0
Mısır Gluteni	0	14.78	0
Soya Küspesi	0	0	15.93
Aspir Küspesi	0	0	7.47
Buğday	30	0	0
Mısır	0	18.22	0
Pirinç Kepeği	0	0	10
Arpa	52.5	60	60
Melas	3	3	3
Mermer Tozu	1.65	2.35	2.4
DCP 18	1.51	0.96	0
Soya Yağı	0.33	0	0.6
Tuz	0.31	0.3	0.3
Nişadır	0.3	0.28	0.2
Vitamin-Mineral	0.1	0.1	0.1
Toplam	100	100	100
HP %	17	17	17
ME (kcal/kg)	2700	2700	2700

Besi dönemi sonunda hayvanlar Bayburt Belediye Mezbahanesi'nde kesilmiştir. Kesimden 12 saat öncesinde tokluların yemleri toplanmıştır ve sadece su verilmiştir. Kesim sırasında derinin ayrılmasından sonra baş, ayaklar ve iç organlar çıkarılıp sıcak karkas ağırlığı tartılmıştır. Kesim sonrasında mezbahanenin soğuk hava deposunda karkaslar +4 °C'de 24 saat bekletilmesinin ardından soğuk karkas ağırlığı ve karkas parçalarının ağırlıkları tartılmıştır. Karkas parçaları Akçapınar'ın bildirdiği metoda uygun şekilde but, kol, bel, sırt ve diğerleri şeklinde bölünmüştür (Akçapınar, 1981). Çalışmada tokluların canlı ağırlık, kesim ve karkas ağırlıklarının değerlendirilmesinde SPSS 23.0 paket programı kullanılarak grupların istatistiksel olarak karşılaştırılmasında "Tek yönlü varyans analizi (ANOVA)", gruplar arası farklılıkların öneminin tespiti için "Duncan" testi uygulanmıştır (SPSS, 2015).



Şekil 1. Karkasların parçalanması (Yakan, 2008)

3. BULGULAR VE TARTIŞMA

Bu çalışmada Morkaraman toklularına ait elde edilen kesim özelliklerinden kesim ağırlığı, sıcak karkas ağırlığı, soğuk karkas ağırlığı, sıcak karkas randımanı, soğuk karkas randımanı ve soğutma firesi Tablo 2'de verilmiştir. Kesim ağırlığı gruplara göre sırasıyla 42.43 ± 1.16 , 41.66 ± 0.91 ve 42.63 ± 1.36 kg olarak tespit edildi. Gruplara göre sırasıyla sıcak karkas ağırlığı 20.86 ± 0.60 , 19.84 ± 0.44 , 21.1 ± 0.772 kg ve

soğuk karkas ağırlıkları ise 20.35 ± 0.59 , 19.38 ± 0.38 , 20.75 ± 0.78 kg tespit edildi. Kesim canlı ağırlığı, sıcak karkas ağırlığı ve soğuk karkas ağırlığı parametrelerinde gruplar arası istatistiksel olarak fark tespit edilmedi ($P > 0.05$).

Tablo 2. Kesim Özellikleri (kg, %) (Ortalamalar \pm Standart Hata)

Kesim Özellikleri				
Parametreler	Kontrol	BG	MG	Önem
Kesim Ağırlığı (kg)	42.43 ± 1.16	41.66 ± 0.91	42.63 ± 1.36	-
Sıcak Karkas Ağırlığı (kg)	20.86 ± 0.60	19.84 ± 0.44	21.1 ± 0.772	-
Soğuk Karkas Ağırlığı (kg)	20.35 ± 0.59	19.38 ± 0.38	20.75 ± 0.78	-
Sıcak Karkas Randımanı (%)	49.18 ± 0.61^a	47.63 ± 0.30^b	49.49 ± 0.63^a	*
Soğuk Karkas Randımanı (%)	47.96 ± 0.53^{ab}	46.54 ± 0.31^b	48.65 ± 0.66^a	*
Soğutma Firesi (%)	2.46 ± 0.22	2.3 ± 0.36	1.7 ± 0.14	-

*: $P < 0.05$, - : Önemli değil, ^{a, b, ab}: Aynı satırda farklı harfleri taşıyan ortalamalar arası farklılık önemlidir ($P < 0.05$), BG: Buğday Gluteni, MG: Mısır Gluteni

Morkaraman ırkına ait kesim ve karkas parametrelerinin incelendiği birçok çalışma literatürde yer almaktadır. Morkaraman ırk kuzularda yapılan bir çalışmada kesim ağırlığı ortalama 40.1 kg olan 24 adet kuzunun sıcak karkas randımanı ortalama 50.6 ± 0.45 , soğuk karkas randımanı ise 48.9 ± 0.41 bildirilmiştir. Aynı çalışmada kesim ağırlığı 44.8 kg olan 19 adet kuzunun kesimi sonucunda sıcak karkas randımanı 51.3 ± 0.45 , soğuk karkas randımanı ise 50.2 ± 0.41 tespit edilmiştir (Macit, 2002). Morkaraman cinsi kuzuların farklı kesim ağırlıklarında kesim ve karkas özelliklerinin incelendiği bir başka çalışmada; kesim canlı ağırlığı ortalama 39.8 ± 0.46 kg olan grupta sıcak karkas ağırlığı 20.1 ± 0.24 kg, soğuk karkas ağırlığı 19.7 ± 0.22 kg, sıcak karkas randımanı 50.6 ± 0.82 , soğuk karkas randımanı 49.5 ± 0.80 , kesim canlı ağırlığı ortalama 43.6 ± 0.48 kg olan grupta ise sıcak karkas ağırlığı 21.8 ± 0.21 kg, soğuk karkas ağırlığı 21.5 ± 0.20 kg, sıcak karkas randımanı 50.0 ± 0.55 , soğuk karkas randımanı ise 49.3 ± 0.52 olarak bildirilmiştir (Aksoy, 1995). Merada beslenen Morkaraman, Tuj ve bunların melezlemeleri ile elde edilen erkek toklularda kesim ve karkas özelliklerinin incelendiği bir çalışmada Morkaraman ırkı hayvanlarda sıcak karkas randımanı ortalama 39.3 ± 0.97 , soğuk karkas randımanı 37.8 ± 0.80 bildirilmiştir (Karabulak & Laçın, 1996). Morkaraman ve Kıvırcık x Morkaraman melezi kuzularda kesim ve karkas kompozisyonunun incelendiği bir çalışmada Morkaraman cinsi kuzulara ait kesim öncesi canlı ağırlık 43.85 ± 1.07 kg, sıcak karkas ağırlığı 20.25 ± 0.67 kg, sıcak karkas randımanı 46.15 ± 0.63 , soğuk karkas ağırlığı 19.77 ± 0.67 kg, soğuk karkas randımanı ise 45.03 ± 0.63 olarak bildirilmiştir (Küçük et al., 2002). Saf Morkaraman ve Morkaraman x Romanov ırkı kuzularda yapılan bir çalışmada hayvanlar ortalama kesim ağırlığı 36.60 ± 1.30 kg, sıcak karkas randımanı 45.45 ± 0.73 , soğuk karkas randımanı 44.25 ± 0.74 , soğutma kaybı ise 2.63 ± 0.04 olarak bildirilmiştir (Türkyılmaz, 2014). Yarı entansif şartlar altında Morkaraman ve Kıvırcık cinsi kuzularda büyüme, kesim ve karkas parametrelerinin değerlendirilmesinin yapıldığı bir çalışmada Morkaraman kuzularda ortalama kesim ağırlığı 39.83 ± 1.61 kg, sıcak karkas ağırlığı 19.68 ± 0.84 kg, soğuk karkas ağırlığı 19.32 ± 0.85 kg, sıcak karkas randımanı 49.41 ± 0.51 , soğuk karkas ağırlığı 19.32 ± 0.85 kg, soğuk karkas randımanı ise 48.49 ± 0.52 bildirilmiştir (Öztürk et al., 2012). Morkaraman ırkının Sakız ve Kıvırcık koyun ırkları ile melezleme yapıldığı bir çalışmada Morkaraman ırkının kesim ağırlığı 45.64 ± 1.12 kg, sıcak karkas ağırlığı 23.18 ± 0.48 kg, soğuk karkas ağırlığı 23.05 ± 0.49 kg, soğuk karkas randımanı ise 50.52 ± 0.49 olarak bildirilmiştir (Özbey & Akcan, 2003).

Literatürde yer alan çalışmaların bazılarında ise farklı yem içerikleri ile beslemenin karkas ve kesim özelliklerine etkisi araştırılmıştır. Kuzuların rasyonunda mısır, arpa ve çeşitli oranlarda soya küspesi (%7.5, %15) ve mısır gluteninin (%10, %20) kullanıldığı bir çalışmada sıcak karkas ağırlığı ve sıcak karkas randımanlarında gruplar arası fark olmadığı bildirilmiştir (Papachristos et al., 2005). Ruminantların beslenmesinde yonca samanı ve soya küspesinin yerine farklı oranlarda mısır gluteni (%0, 40, 68) konulan bir çalışmada rasyona mısır gluteni eklenmesinin sıcak karkas ağırlığı ve sıcak karkas randımanını etkilemediği bildirilmiştir (Montgomery et al., 2003). Keçilerde farklı yan ürün yemlerinin sindirilebilirlik ve karkas parametrelere etkisini değerlendirmek için yapılan bir çalışmada

keçiler mısır gluteni unu, buğday kepeği, soya kabuğu ve soya unu olmak üzere 4 farklı şekilde beslenmişlerdir. Araştırma sonunda karkas ağırlıkları sırasıyla mısır gluteni unu grubunda 15.3 kg, buğday kepeği grubunda 15.6 kg, soya kabuğu grubunda 16.0 ve soya unu grubunda 14.5 kg, karkas randımanı ise aynı sırayla %48.3, %48.8, %48.3, %46.4 olarak bildirilmiştir (Moore et al., 2002).

Yaptığımız bu çalışmada sıcak karkas randımanı ve soğuk karkas randımanı bakımından gruplar arasındaki farklar önemli bulundu ($P<0.05$). Gruplara göre sırasıyla ortalama sıcak karkas randımanı 49.18 ± 0.61 , 47.63 ± 0.30 , 49.49 ± 0.63 , soğuk karkas randımanı ise 47.96 ± 0.53 , 46.54 ± 0.31 , 48.65 ± 0.66 gözlemlendi ($P<0.05$). Sıcak karkas randımanı mısır gluteni ve kontrol grubunda eşit olduğu, en düşük ise buğday gluteni grubunda gözlemlendi ($P<0.05$). Soğuk karkas randımanı en yüksek mısır gluteni grubunda, en düşük ise buğday gluteni grubunda olduğu gözlemlendi ($P<0.05$). Elde edilen sıcak ve soğuk karkas randımanlarının Morkaraman ırkına özgü değerler ile farklılıklar (düşük, yüksek, benzer) gösterdiği anlaşılmaktadır. Aynı zamanda farklı protein kaynakları ile beslemenin bu parametrelerde değişkenlik gösterdiği ve soya küspesi ile mısır gluteninin beslenmede karkas randımanına etkisinin benzer olduğu literatür bilgilerle de desteklenmektedir. Buğday gluteni daha çok gıda sanayisinde kullanılmakta olup hayvan beslemede çok fazla tercih edilmemektedir. Bu sebeple karkas parametrelerine ilişkin literatür bilgisine rastlanmamasına karşın bu çalışmada sıcak ve soğuk karkas randımanını olumsuz etkilemiştir. Karkaslardan elde edilen verilere göre soğutma firesinde gruplar arasında istatistiksel fark tespit edilmedi ($P>0.05$). Beslenmenin et ve et ürünlerinde oluşan su kaybı ile meydana gelen ağırlık kaybına etkisinin olmadığı görülmektedir.

Tablo 3. Karkas Özellikleri (kg) (Ortalamalar \pm Standart Hata)

	Karkas Değerleri (kg)			Önem
	Kontrol	BG	MG	
But	6.2 \pm 0.24	5.82 \pm 0.11	6.05 \pm 0.21	-
Kol	3.07 \pm 0.09	2.96 \pm 0.07	3.14 \pm 0.11	-
Bel	1.27 \pm 0.06 ^a	1.1 \pm 0.01 ^b	1.2 \pm 0.06 ^{ab}	*
Kaburga	4.67 \pm 0.16	4.7 \pm 0.09	5.1 \pm 0.27	-
Boyun	1.73 \pm 0.06	1.67 \pm 0.09	1.77 \pm 0.08	-
Kuyruk	3 \pm 0.35	2.82 \pm 0.19	3.15 \pm 0.32	-
Bonfile	0.37 \pm 0.06	0.29 \pm 0.01	0.32 \pm 0.02	-

*: $P<0.05$, - : Önemli değil, ^{a, b, ab}: Aynı satırda farklı harfleri taşıyan ortalamalar arası farklılık önemlidir ($P<0.05$), BG: Buğday Gluteni, MG: Mısır Gluteni

Tablo 4. Karkas Özellikleri (%) (Ortalamalar \pm Standart Hata)

	Karkas Değerleri (%)			Önem
	Kontrol	BG	MG	
But	30.5 \pm 0.75	30.07 \pm 0.47	29.23 \pm 0.92	-
Kol	15.14 \pm 0.43	15.28 \pm 0.26	15.15 \pm 0.26	-
Bel	6.27 \pm 0.33	5.68 \pm 0.09	5.77 \pm 0.20	-
Kaburga	22.99 \pm 0.64	24.28 \pm 0.31	24.55 \pm 0.64	-
Boyun	8.51 \pm 0.18	8.6 \pm 0.32	8.56 \pm 0.28	-
Kuyruk	14.71 \pm 1.59	14.55 \pm 0.96	15.17 \pm 1.39	-
Bonfile	1.86 \pm 0.36	1.5 \pm 0.08	1.54 \pm 0.11	-

*: $P<0.05$, - : Önemli değil, BG: Buğday Gluteni, MG: Mısır Gluteni

Tablo 5. Bazı kesim özellikleri (kg, %) (Ortalamalar±Standart Hata)

	Kesim Özellikleri			Önem
	Kontrol	BG	MG	
Deri, kg	5.3±0.24	5.01±0.27	5.67±0.26	-
Deri, %	12.47±0.37	12.00±0.52	13.35±0.61	-
Organlar ^c , kg	2.49±0.13	2.21±0.09	2.33±0.09	-
Organlar ^c , %	5.92±0.43	5.29±0.16	5.47±0.11	-
Baş ve Ayaklar, kg	3.43±0.05	3.30±0.09	3.37±0.09	-
Baş ve Ayaklar, %	8.1±0.10	7.93±0.22	7.93±0.20	-
Diğerleri, kg	10.85±0.46	11.76±0.42	10.49±0.62	-
Diğerleri, %	25.54±0.55 ^b	28.21±0.79 ^a	24.57±1.07 ^b	*

*: $P<0.05$, - : Önemli değil, ^{a, b}: Aynı satırda farklı harfleri taşıyan ortalamalar arası farklılık önemlidir ($P<0.05$), ^c : Organlar içerisinde kalp, böbrek, karaciğer ve akciğerlerin ağırlıkları ölçülmüştür, BG: Buğday Gluteni, MG: Mısır Gluteni

Karkas parçalarından but, kol ve bel kısımlarının hem kasaplık değerinin daha fazla olması hem de karkas kalitesini belirlemesi açısından önemlidir. Karkasın bel parçasının ağırlığı bakımından en yüksek kontrol grubunda, en düşük ise buğday gluteni grubunda gözlemlendi ($P<0.05$). Çalışmada but ve bonfile oranı kontrol grubunda, kol ve kuyruk oranı buğday gluteni grubunda, kaburga ve kuyruk oranı mısır gluteni grubunda yüksek olduğu görülmüşken gruplar arası farklılıklar önemsiz kalmıştır. Soya küspesi, buğday gluteni ve mısır gluteni ile beslenen Morkaraman cinsi kuzularda farklı protein kaynaklarının bel kısmı dışında karkas parametrelerine etkisinin olmadığı görülmektedir.

Morkaraman ırkı koyunlarda yapılan bir melezleme çalışmasında Morkaraman cinsi kuzuların deri oranı %10.76±0.39, baş ve ayaklar oranı %7.15±0.22 bildirilmiştir (Küçük et al., 2002). Morkaraman ırkı kuzuların başka ırklarla melezlendiği bir başka çalışmada ise kesim ağırlığı 45.64±1.12 kg olan kuzuların deri ağırlığı 7.69±0.34 kg, baş ve ayakların ağırlığı ise 3.36±0.06 kg bildirilmiştir (Özbey & Akcan, 2003). Morkaraman cinsi kuzuların farklı kesim ağırlıklarının karkas ve kesim özelliklerinin incelendiği çalışmada kesim ağırlığı ortalama 38.8±0.48 kg olan grupta deri ağırlığı 3.7±0.25 kg, baş ağırlığı 1.86±0.14 kg, dört ayak ağırlığı 0.89±0.04 kg olarak bildirilirken kesim ağırlığı ortalama 44.6±0.74 kg olan grupta ise deri ağırlığı 5.1±0.28 kg, baş ağırlığı 2.16±0.12 kg, dört ayak ağırlığı ise 0.90±0.03 kg bildirilmiştir (Aksoy, 1995). Bu çalışmada kullanılan Morkaraman cinsi toklulara ait deri, kafa ve ayakların ağırlıkları ve oranlarının literatür çalışmalarına göre düşük ve yüksek değerler göstermektedir. Çalışmada organlar, baş ve ayakların oranı kontrol grubunda, deri oranı ise mısır gluteni grubunda yüksek olduğu görülmüşken gruplar arası farklılıklar önemsiz kalmıştır. Aynı şartlar altında yaşayan ve ırk, cinsiyet gibi özellikler bakımından benzer olan Morkaraman cinsi toklularda farklı protein kaynaklarının kullanılmasının deri, organlar, baş ve ayakların ağırlıklarının değişimi üzerine etkili olmadığı anlaşılmaktadır.

4. SONUÇ

Morkaraman tokluların kesim ve karkas özelliklerinin incelendiği bu çalışmada glutenler ile beslemenin karkas randımanı üzerinde mısır gluteni ile beslenen hayvanların lehine sonuçlar elde edilmiştir. Bir yan ürün olarak elde edilen ve protein oranı yüksek olan buğday gluteni ve mısır gluteni ile Morkaraman toklular beslenmiştir. Hayvan beslemede önemli protein kaynaklarından soya küspesi ile beslenen hayvanlarla kıyaslandığında et verimi yönünden mısır gluteninin daha olumlu ancak buğday gluteninin olumsuz etkilerinin olduğu görülmüştür. Buğday gluteni ve mısır gluteninin küçükbaş hayvanlarda et verimi bakımından etkilerinin daha ayrıntılı araştırılması önerilmektedir. Bu sayede ülkemizdeki üretim miktarı fazla olan mısır gluteninin soya küspesi yerine kullanımı ile ülke ekonomisine katkı sağlayacağı düşünülmektedir.

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SIĞIR TÜBERKÜLOZU FİLYASYON VERİLERİNİN KARŞILAŞTIRILMASI
COMPARISON OF BOVINE TUBERCULOSIS FILIATION DATA

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ÖZET

Sığır tüberkülozu (bTB) öncelikle sığırları, diğer evcil-yabani hayvanları ve insanları etkileyen, önemli ekonomik kayıplara yol açan, kronik enfeksiyöz karakterli ve zoonoz bir hastalıktır. bTB enfeksiyonun işletmeler arasındaki bulaşma dinamiklerini belirlemede sahadan toplanan epidemiyolojik filyasyon verileri önem arz etmektedir. Bu çalışmada, Tarım ve Orman Bakanlığı'nın Veteriner Bilgi Sistemine (VETBİS) resmi veteriner hekimler tarafından sahadan girilen Türkiye geneli filyasyon başlıkları Erzurum ili verileriyle karşılaştırılarak irdelenmiştir. 2017-2021 yılları arasında Türkiye geneli mihrak işletmelerin (6.499/9.026) %72'sinin filyasyonu tespit edilerek VETBİS'e girilmiştir. Bu yıllar arasında Erzurum ilindeki mihrak işletmelerin (496/537) %92,3'ünün filyasyonu belirlenerek VETBİS'e girilmiştir. Türkiye geneli mihrak işletmelerdeki filyasyon başlıklarının dağılımına bakıldığında, (3.041/6.499) %46,8'i işletmede latent/subklinik enfeksiyon, (1.030/6.499) %15,8'i enfekte hayvan alımı ve (595/6.499) %9,2'si mahalli mera başlıkları ilk üç sırada yer almaktadır. Erzurum ilindeki mihrak işletmelerden bildirilen filyasyon verileri değerlendirildiğinde ise, ilk üç başlıkta; (261/496) %52,6'lık bir oranla ilk sırada enfekte hayvan alımı, (55/496) %11,1'lik bir oranla ikinci sırada işletmede latent/subklinik enfeksiyon ve (28/496) %5,6'lık bir oranla üçüncü sırada enfekte araç/alet alımı olarak bildirilmiştir. Türkiye geneli tespit edilen filyasyon verisine baktığımızda %46,8'lik bir oranla işletmede latent/subklinik enfeksiyon başlığı öne çıkarken Erzurum ilinde işletmeye enfeksiyonun bulaşmasındaki ana kaynağın %52,6'lık bir oranda satın alınan enfekte hayvan olduğu görülmektedir. Sonuç olarak, Erzurum ilinden bildirilen filyasyon verileri hem yüzde olarak hem de daha önce ülkesel proje kapsamında sahadan toplanan verilere göre yürütülen araştırmadaki işletmeye enfeksiyonun bulaşmasında ana kaynağın satın alınan enfekte hayvan tespitiyle uyduğu görülmektedir. İşletmede ki hayvan hareketlerinin artmasıyla enfeksiyonun işletmeye bulaşma riski doğru orantılı olarak artmaktadır. Dolayısıyla işletmeye bTB enfeksiyonun bulaşmasının büyük oranda enfekte hayvan alımı yoluyla olduğu kanaatine varılmıştır.

Anahtar Kelimeler: Epidemiyoloji, filyasyon, mihrak, sığır tüberkülozu, veteriner bilgi sistemi.

ABSTRACT

Bovine tuberculosis (bTB) is a chronic infectious and zoonotic disease that primarily affects cattle, other domestic-wild animals and humans, leading to significant economic losses. Epidemiological filiation data collected from the field are important in determining the transmission dynamics of bTB infection among premises. In this study, the Türkiye-wide filiation titles entered into the Veterinary Information System (VETBIS) of the Ministry of Agriculture and Forestry by official veterinarians from the field were examined by comparing them with the data of Erzurum provinces. Between 2017 and 2021, filiation of (6.499/9.026) 72% of the outbreak premises Türkiye-wide were identified and entered into VETBIS. Between these years, the filiation of (496/537) 92.3% of the outbreak premises in Erzurum province was determined and the data were entered into VETBIS. The distribution of the filiation heads

in the outbreak premises Türkiye-wide show that (3.041/6.499) 46.8% of the latent/subclinical infection in the premises, (1.030/6.499) 15.8% of the infected animal purchase and (595/6.499) 9.2% of the local pasture titles are in the top three ranks. When the filiation data reported from the outbreak premises in Erzurum province is evaluated, the first three headings are reported the purchase of infected animals in the first place with a rate of (261/496) 52.6%, the latent/subclinical infection in the premises with a rate of (55/496) 11.1% and the purchase of an infected vehicle/tool in the third place with a rate of (28/496) 5.6%. The filiation data determined Türkiye-wide show that while the latent/subclinical infection title stands out in the premises with a rate of 46.8%, the main source of infection transmission to the premises in Erzurum province is the infected animal purchased at a rate of 52.6%. As a result, the filiation data reported from the province of Erzurum is seen to match the determination of the purchase of infected animals in terms of both percentage and the main source of infection transmission to the premises in the research conducted according to the data collected from the field within the scope of the previous national project. With the increase in animal movements in the premises, the spread risk of infection to the premises increases in direct proportion. Therefore, it was concluded that the transmission of bTB infection to the premises was largely through the purchase of infected animals.

Keywords: Bovine tuberculosis, epidemiology, filiation, outbreak, veterinary information system.

RISK ASSESSMENT OF MERCURY CONTENT IN DURUM WHEAT FROM TURKEY

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ABSTRACT

Mercury (Hg) is one of the most harmful metals to human health, found in air, water, and soil; exposure to even small amounts may cause serious health problems for many human organs. As a result of various human activities, soil contamination with this toxic metal is possible, thus its transmission to his food. Traditionally, durum wheat is an essential source of daily human food, especially in West Asia, Southern Europe, and North Africa. It is produced for different types of foods or end-products. Some toxic elements, including mercury, can be accumulated in durum wheat grains. A panel of 130 durum wheat genotypes was selected and evaluated for Hg contents using inductively coupled plasma mass spectrometry (ICP-MS) to ensure food safety, a vital issue and subject of constant human concern. The panel mainly four groups, including local commercial Turkish and foreign cultivars, landraces (ex-situ LDs), and landraces domestically grown (in-situ LDs), 50, 21, 44, and 15 genotypes, respectively. Hg contents varied from 0 – 0.028 mg/kg, averaging 0.0015 mg/kg. According to international standard requirements, 95% of the studied genotypes meet international standards levels for Hg contents and did not exceed (0.010 mg/kg). Among studied genotypes, 78% are safe and entirely free of mercury traces. By comparing the four groups, the number of genotypes free of mercury contents was as follows in-situ > foreign cultivars > ex-situ > Turkish cultivars. Where wholly of the In-situ landraces and foreign cultivars groups were safe and far from the maximum allowed Hg levels. In contrast, only six of the studied genotypes, two from Turkish cultivars and four Ex-situ landraces, showed toxicity higher than the international limits. Results showed it is safe to use those genotypes free of Hg contents for durum wheat breeding programs, their end-product, and therefore promote the health of its consumers.

Keywords: Human health, durum wheat, food safety, Mercury, toxic element.

COMPARISON OF LIVER AND RENAL FUNCTION TESTS IN MALE AND FEMALE
GURCU GOATS

ERKEK VE DIŞİ GÜRCÜ KEÇİLERİNDE KARACİĞER VE BÖBREK FONKSİYON
TESTLERİNİN KARŞILAŞTIRILMASI

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ÖZET

Çalışmada, erkek ve dişi gürcü keçilerinde karaciğer ve böbrek fonksiyon testlerinin karşılaştırılması amaçlanmıştır. Çalışmada 10 erkek, 10 dişi olmak üzere 8 ila 12 aylık yaşlar arasında toplam 20 Gürcü keçisi kullanılmıştır. Çalışmaya dahil edilen keçilerin tamamı Kafkas Üniversitesi Veteriner Fakültesi Eğitim, Araştırma ve Uygulama Çiftliği'nden temin edilmiştir. Tüm keçiler aynı barınma ve beslenme koşullarına sahiptir. Klinik olarak sağlıklı olduğu belirlenen, fiziksel muayene bulgularından dakikadaki solunum, nabız sayıları ve rektal ısıları normal belirlenen keçiler çalışmaya dahil edildi. Hayvanlardan, juguler venden 10 mL kan örneği bir defa jelli serum tüplerine ve tam kan sayımı için K₂EDTA'lı tüplere alındı. Alınan serum örnekleri, otoanalizatörde (Mindray BS120®, Mindray Medikal Teknoloji, İstanbul, Türkiye) ölçüldü. Tam kan sayımı cihazında (VG-MS4e®, Melet Schloesing, Fransa) total lökosit sayısı ve diğer bazı kan parametreleri ölçüldü. Total lökosit sayısı erkek keçilerde $17,99 \times 10^3 /\mu\text{L}$, dişi keçilerde $19,21 \times 10^3 /\mu\text{L}$ olarak bulunmasına rağmen istatistiksel düzeyde anlamlı sonuç bulunamamıştır ($P>0,05$). Ayrıca lenfosit sayısı ve monosit sayısı erkeklerde yüksek bulunmasına rağmen granülosit sayısı dişilerde yüksek bulunmuştur. Diğer hematolojik parametrelerde de dişi erkek keçiler arasında farklılıklar olmasına rağmen istatistiksel düzeyde anlamlı sonuç bulunamamıştır. Karaciğer fonksiyon testlerinden alanin aminotransferaz (ALT) ve aspartat aminotransferaz (AST) enzim düzeylerinde erkeklerde AST yüksek çıkarken dişilerde ALT yüksek bulunmuştur. Böbrek fonksiyonunu değerlendirmede kullanılan üre ve kreatinin seviyelerinde ise erkeklerde üre, dişilerde kreatinin seviyeleri yüksek bulunmuştur. Alkalen fosfataz erkek keçilerde dişilere oranla daha yüksek bulunmuştur. Glikoz seviyelerine bakıldığında ise dişiler erkeklerden daha yüksek seviyelerde olduğu belirlendi. Gama glutamil transferaz seviyesinde ise erkekler dişilerden oldukça yüksek olmasına rağmen istatistiksel düzeyde anlamlılık belirlenmedi ($P>0,05$). Elde edilen verilerin lokal bir ırk olan Gürcü keçilerinde cinsiyet ile farklılık gösterdiği fakat bunun istatistiksel düzeyde anlamlı olmadığı belirlendi.

Sonuç olarak dişi ve erkek Gürcü keçilerin karaciğer ve böbrek fonksiyon testlerinde herhangi anlamlı bir istatistiksel sonuç bulunamamasının cinsiyete bağlı olarak değişkenlik göstermediği sonucuna varıldı.

Anahtar Kelimeler: Böbrek, Gürcü, Karaciğer, Keçi.

ABSTRACT

In this study, it was aimed to compare liver and kidney function tests in male and female Gurcu does. A total of 20 Gurcu does, 10 male and 10 female, aged between 8 and 12 months, were used in the study. All of the does included in the study were obtained from the Education, Research and Practice Farm of the Faculty of Veterinary Medicine of Kafkas University. All does have the same housing and feeding conditions. Does who were determined to be clinically healthy and whose physical examination findings were found to be normal in respirations per minute, pulse rates and rectal temperatures were included in the study. From the animals, 10 mL blood samples were taken once from the jugular vein into gel serum tubes and K₂EDTA tubes for complete blood count. Serum samples were measured in an autoanalyzer (Mindray BS120[®], Mindray Medikal Teknoloji, İstanbul, Türkiye). Total leukocyte count and some other blood parameters were measured in a complete blood count device (VG-MS4e[®], Melet Schloesing, France). Although the total leukocyte count was found to be $17.99 \times 10^3 / \mu\text{L}$ in male does and $19.21 \times 10^3 / \mu\text{L}$ in female does, no statistically significant results were found ($P > 0.05$). In addition, although the lymphocyte count and monocyte count were higher in males, the granulocyte count was higher in females. Although there were differences between male and female does in other hematological parameters, no statistically significant results were found. In liver function tests, alanine aminotransferase (ALT) and aspartate aminotransferase (AST) enzyme levels were found to be high in males, while ALT was higher in females. In the urea and creatinine levels used to evaluate kidney function, urea levels in males and creatinine levels in females were found to be high. Alkaline phosphatase was found to be higher in male does than in females. When the glucose levels were examined, it was determined that females had higher levels than males. Although the gamma glutamyl transferase level was higher in males than females, it was not statistically significant ($P > 0.05$). It was determined that the data obtained differed by gender in Gurcu does, a local breed, but this was not statistically significant.

As a result, it was concluded that the absence of any significant statistical results in the liver and kidney function tests of female and male Gurcu does did not differ depending on gender.

Keywords: Does, Gurcu, Kidney, Liver

1. INTRODUCTION

The Gurcu goat is originally from the Caucasus and is also known as the Tbilisi goat or the Caucasian goat. In our country, it is cultivated in the provinces of Kars and Ardahan in Northern Anatolia, albeit a small number. The Gurcu goat is phenotypically similar to the Abaza goat bred especially in the Artvin region (Kuru et al., 2017; Akyüz et al., 2020a; Akyüz et al., 2020b). The Gurcu goat originates from the auger-horned goat *Capra falconeri* and comes in black, gray and white colors. Gurcu goats can be horned or hornless. The horns of the goats are long and straight and they touch each other at three points. This breed milk type is defined as a local breed. Gurcu goats are one of our local gene resources adapted to the climate and geographical structure of the region in North Anatolia. This breed is in danger of extinction (Sezgin et al., 2010). For this reason, both under protection and breeding are included in the scope of support within the scope of the "Pet Genetic Resources Protection Project" by the Ministry of Food, Agriculture and Livestock. Apart from this, Gurcu Goats were raised within the scope of the TÜBİTAK supported project at the Education Research and Application Farm of the Faculty of Veterinary Medicine of Kafkas University and an elite herd was created (Kulaksız et al., 2016; Kuru et al., 2016a; Kuru et al., 2016b; Kuru et al., 2016c).

Hematological and biochemical parameters measured from blood and blood serum are very important in evaluating the health status of animals (Meyer & Harvey, 2004; Gürgöze & Gökalp, 2018). Biochemical and hematological measurements are frequently used in the diagnosis of diseases, evaluation of the effectiveness of the treatment, follow-up of the patients and evaluation of the prognosis (Akyüz et al., 2020b). Maintenance feed, altitude etc. Hematological and biochemical measurements may differ depending on environmental factors and race. It is very important to determine the differences depending on race, gender, nutrition and environmental factors in order to diagnose the diseases

correctly. Many studies have been done for this purpose (Çelik et al., 2019; Al-Bulushi et al., 2017; Quanwei et al., 2019; Ölmez et al., 2020).

Hemogram is the analytical expression of complete blood count. Hemoglobin (Hb) is found in erythrocytes, it is composed of iron-containing heme molecules and globulin. Important in the evaluation of anemia. Hematocrit (Hct) is the ratio of the volume of red blood cells to the total blood volume. Provides information about anemia and dehydration status. Red blood cells (RBC) are also called erythrocytes. They contain hemoglobin and carry oxygen. The erythrocyte count is important in the interpretation of bone marrow and blood diseases. They give information about anemia and polycythemia. White blood cells (WBC) are called leukocytes or white blood cells. It consists of granular (neutrophils, eosinophils, and basophils) and agranular (lymphocyte and monocytes) cells. Their job is to play a role in the body's defense against pathogenic agents. Platelets (Plt) are involved in blood coagulation (Kaya, 2013; Aydoğdu, 2014; Anonim, 2019).

Biochemical parameters measured in serum creatinine is a non-enzymatic product of normal muscle metabolism. It is removed from the kidneys by glomerular filtration (Braun & Lefebvre, 2008). Urea is formed in the liver during the urea cycle, which detoxifies ammonia. Urea is filtered through the glomeruli and removed in the urine (Roussel & Roussel, 2007). Increased creatinine and blood urea concentrations occur when renal perfusion is reduced (Carlson, 2002). Serum urea and creatinine values are used in the evaluation of kidney functions. Alanineamino transferase (ALT) and aspartataminotransferase (AST) are synthesized in hepatocytes, their levels are used in the evaluation of liver functions. Alkaline phosphatase (ALP) is found in many tissues such as osteoblasts, hepatocytes, biliary epithelium, proximal tubules of the small intestines and kidneys, and placenta. Gamma glutamyl transferase (GGT) is found in hepatocytes and biliary epithelial cells. ALP and GGT are used together, especially in the evaluation of bile duct function (Ersoy, 2012).

Proteins constitute the majority of dissolved solids in blood plasma. Total protein level refers to the sum of albumin and globulin levels in the plasma. Proteins have many functions in the body. These tasks include keeping the oncotic pressure, acid-base balance and viscosity of the blood in balance, transporting many substances in the plasma to the relevant places, meeting the protein needs of the tissues and protecting the organism against pathogens. In addition to their functional duties, proteins can also serve as nutrient sources for tissues. Increases and decreases in serum total protein concentration are called dysproteinemia. In cases of dehydration and chronic infectious conditions, hyperproteinemia is observed due to the increase in immunoglobulins; The amount of protein decreases in circulatory, excretory and digestive system diseases, nutritional deficiency, blood and plasma losses. Albumin is produced only by the liver. Its level decreases in liver diseases, fasting, digestive and urinary system diseases (Gruys et al., 2014). Serum glucose level is important in the evaluation of energy metabolism. Its level varies according to diseases and nutritional status. Generally, in cases where there is fluid loss in the body, in digestive system diseases, hunger, sepsis and in cases where glucose metabolism in the liver is impaired, its level decreases; Its level increases in metabolic diseases such as stress and diabetes (Kayar, 2013).

2. MATERIAL METHOD

A total of 20 Gurcu does, 10 male and 10 female, aged between 8 and 12 months, were used in the study. All of the does included in the study were obtained from the Education, Research and Practice Farm of the Faculty of Veterinary Medicine of Kafkas University. All does have the same housing and feeding conditions. Does who were determined to be clinically healthy and whose physical examination findings were found to be normal in respirations per minute, pulse rates and rectal temperatures were included in the study. From the animals, 10 mL blood samples were taken once from the jugular vein into gel serum tubes and K₂EDTA tubes for complete blood count. Serum samples were measured in an autoanalyzer (Mindray BS120®, Mindray Medikal Teknoloji, İstanbul, Türkiye). Total leukocyte count and some other blood parameters were measured in a complete blood count device (VG-MS4e®, Melet Schloesing, France).

3. RESULTS

Although the total leukocyte count was found to be $17.99 \times 10^3 / \mu\text{L}$ in male does and $19.21 \times 10^3 / \mu\text{L}$ in female does, no statistically significant results were found ($P > 0.05$). In addition, although the

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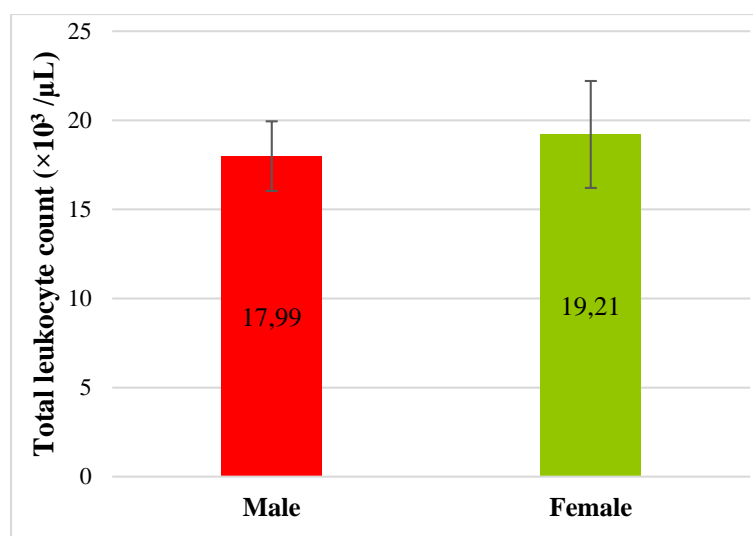


Figure 1. Total leukocyte count in male and female Gurcu goats in the study

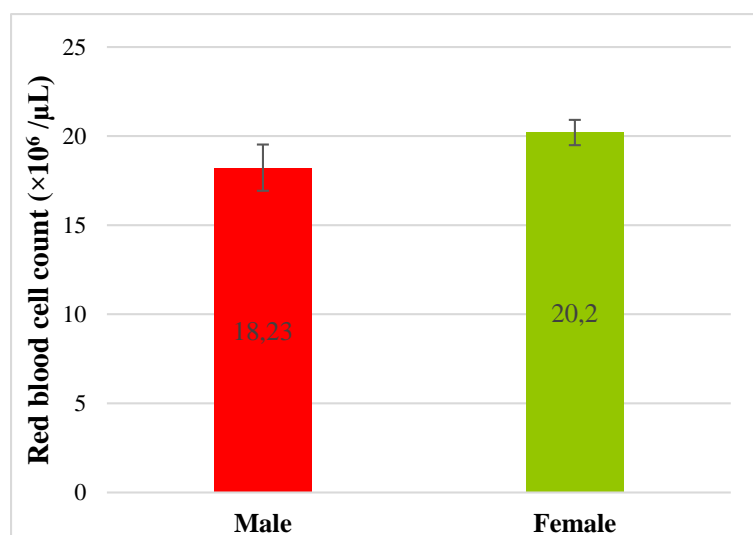


Figure 2. Red blood cell count in male and female Gurcu goats in the study

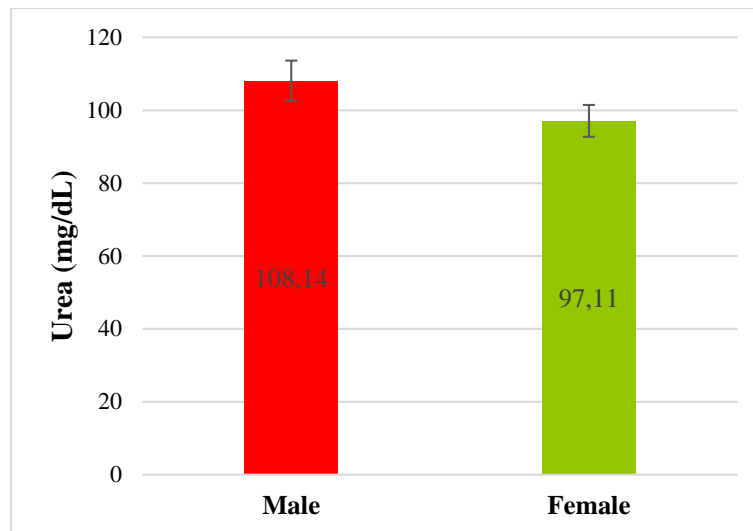


Figure 3. Urea levels in male and female Gurcu goats in the study

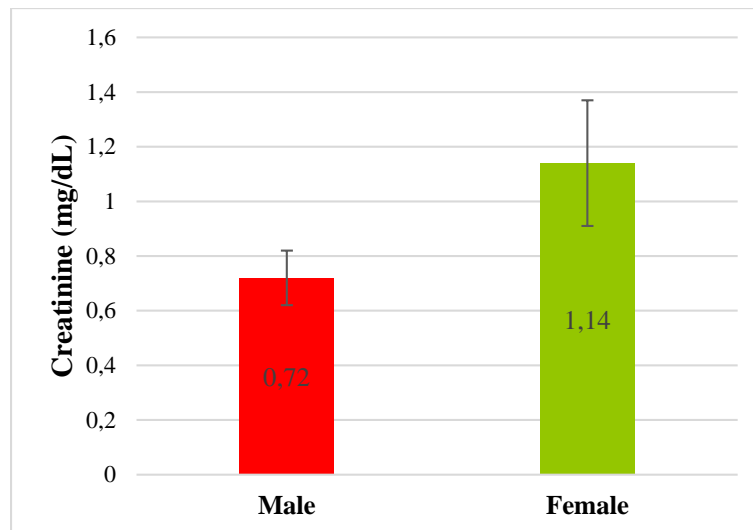


Figure 4. Creatinine levels in male and female Gurcu goats in the study

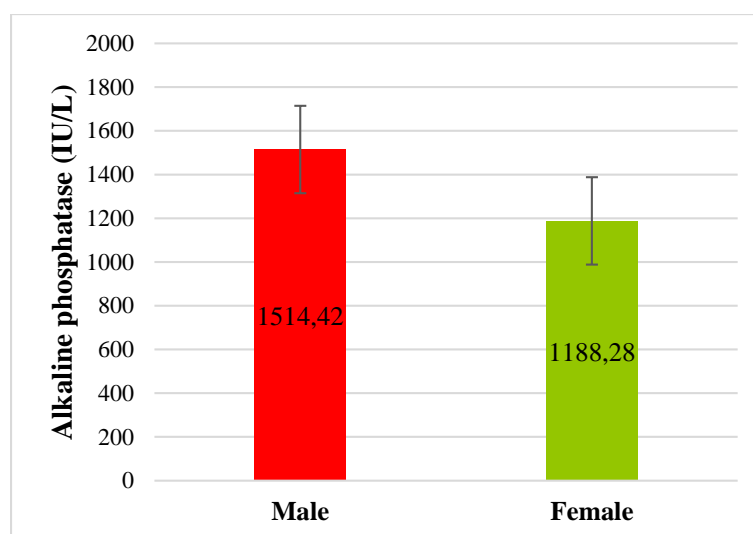


Figure 5. Alkaline phosphatase levels in male and female Gurcu goats in the study

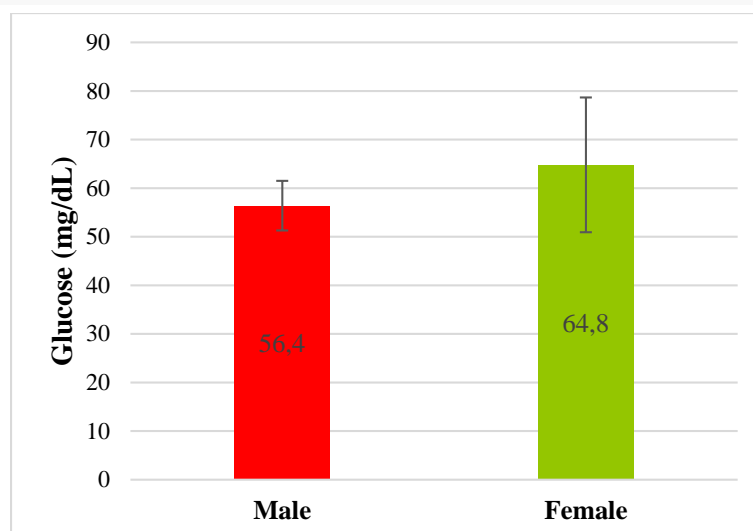


Figure 6. Glucose levels in male and female Gurcu goats in the study

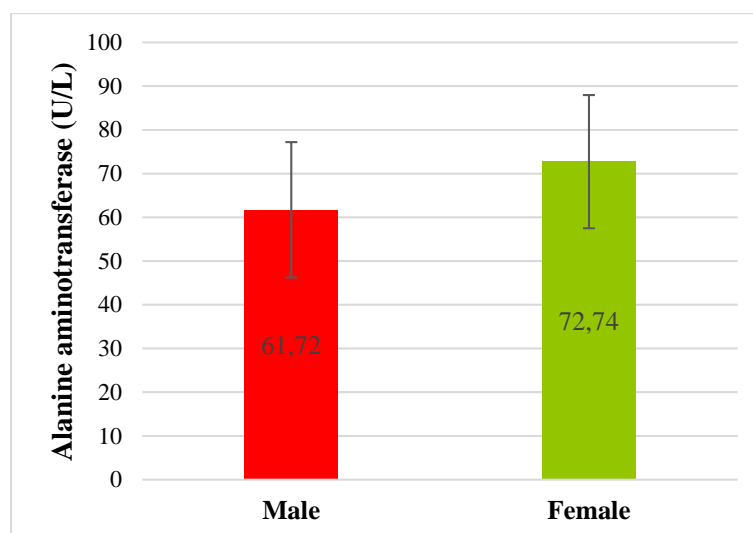


Figure 7. Alanine aminotransferase levels in male and female Gurcu goats in the study

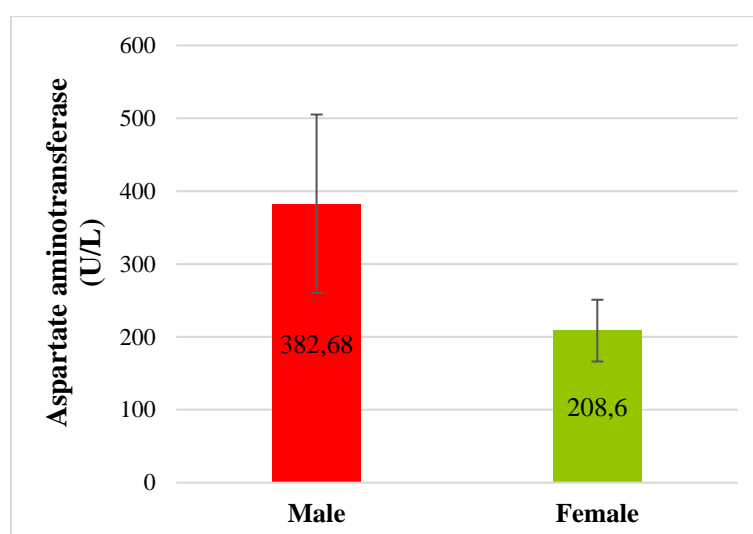


Figure 8. Aspartate aminotransferase levels in male and female Gurcu goats in the study

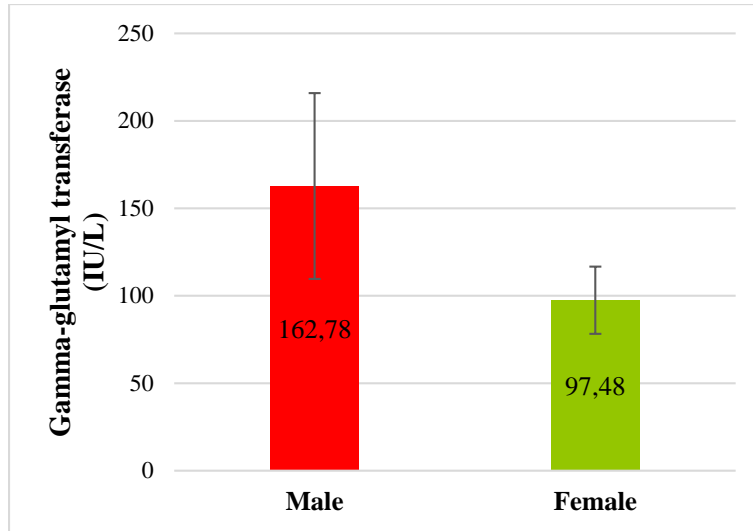


Figure 9. Gamma-glutamyl transferase levels in male and female Gurcu goats in the study

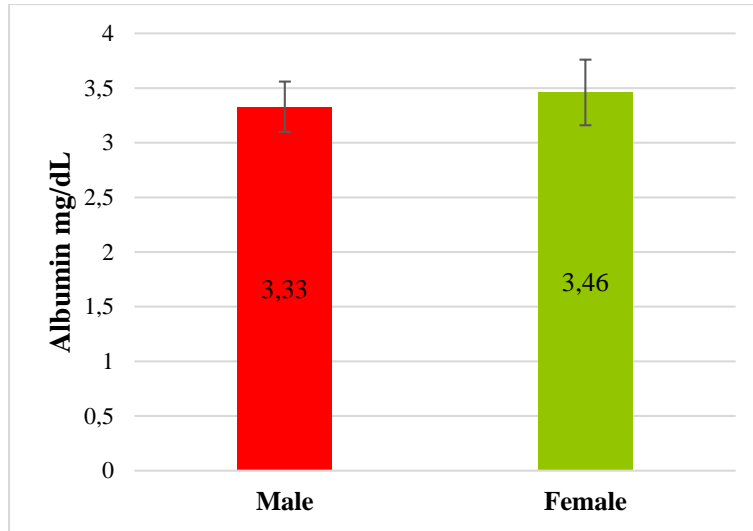


Figure 10. Albumin levels in male and female Gurcu goats in the study

3. CONCLUSION

As a result, no statistically significant results were found in the liver and kidney function tests of female and male Gurcu goats. Gender has little effect on liver and kidney function tests in Gurcu goats.

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**GÖKKUŞAĞI ALABALIKLARINDA *Origanum minutiflorum* O.Schwarz et. P.H. Davis
BİTKİSİNİN ANTİOKSİDAN VE NONSPESİFİK İMMUN SİSTEM ÜZERİNE ETKİLERİ**
**ANTIOXIDANT AND IMMUNOSTIMULANT EFFECTS OF *Origanum minutiflorum*
O.Schwarz et. P.H. Davis ON RAINBOW TROUT**

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ÖZET

Origanum minutiflorum O. Schwarz et P.H. Davis bitkisinin gökkuşığı alabalıklarında nonspesifik immün sisteme yönelik etkileri ve in vivo antioksidan etkinliği incelendi. Bitkinin toz hali, liyofilize tozu ve uçucu yağlarını farklı konsantrasyonlarda içeren yemler gökkuşığı alabalıklarına sekiz hafta boyunca verildi. Beslenme süreci sonunda nonspesifik immün sisteme yönelik etkilerin değerlendirilmesi amacıyla respiratory burst aktivitesi, lizozim aktivitesi, fagositik aktivite incelendi ve canlı ağırlık takip edildi. In-vivo antioksidan aktivitenin değerlendirilmesi amacıyla karaciğer örneklerinde malondialdehit düzeyleri, süperoksit dismutaz, glutatyon-peroksidaz, glutatyon S-transferaz, katalaz enzim aktiviteleri incelendi ayrıca canlı ağırlık artışı ve kondisyon faktörü belirlendi. Nonspesifik immün sisteme ait parametrelerden respiratory burst, lizozim ve fagositik aktivitede en yüksek etkinlik 1000 mg/kg/yem konsantrasyonunda uçucu yağların ilave edildiği yemlerle beslenen alabalıklarda gözlenirken, 500 ve 1000 mg/kg yem konsantrasyonlarında liyofilize ekstrakt içeren yemlerle beslenen gruplarda değişken düzeylerde respiratory burst aktivitesi ve fagositik aktivite artışı tespit edildi. Antioksidan aktivite ile ilgili parametrelerde 1000 mg/kg/yem liyofilize ekstrakt ve 250, 500 ve 1000 mg/kg/yem uçucu yağ içeren yemlerle beslenen gruplarda karaciğer malondialdehit seviyesinde önemli düzeyde düşüş gözlenirken; süperoksit dismutaz aktivitesinde artış 1000 mg/kg/yem uçucu yağ ve liyofilize ekstrakt grubunda, glutatyon peroksidaz artışı uçucu yağ ve liyofilize ekstratları gruplarının tamamında, katalaz aktivitesindeki artış ise 1000 mg/kg/yem uçucu yağ grubunda gözlemlendi.

Çalışmamızın sonucunda elde edilen verilere dayanarak endemik bir bitki türü olan *Origanum minutiflorum*'un özellikle uçucu yağlarının ve liyofilize ekstraktların doza bağlı değişken derecede gökkuşığı alabalıklarında nonspesifik immün sisteme yönelik ve antioksidan etkinlik açısından önemli düzeyde olumlu etkisi olduğu belirlenmiştir.

Anahtar Kelimeler: Antioksidan, Nonspesifik İmmün Sistem, *Origanum minutiflorum*, Rainbow trout

ABSTRACT

The effects of *Origanum minutiflorum* O. Schwarz et P.H. Davis on non-specific immune system and in vivo antioxidant defense are investigated in rainbow trout. Rainbow trout experiment groups are fed with feed containing plant powder form, lyophilized powder and essential oils obtained from plant at different concentrations for a period of eight weeks. In order to evaluate the effects on non-specific immune system, lysozyme activity, respiratory burst activity, phagocytic activity were analyzed and body weight were monitored in the end of the feeding period. For the determination of in-vivo antioxidant capacity, malondialdehyde levels, superoxide dismutase, glutathione peroxidase, glutathione S-transferase, catalase enzyme activities were examined from the liver samples. Non-

specific immune system parameters like respiratory burst, lysozyme and phagocytic activity were found highest in the experiment groups fed with 1000 mg / kg essential oil containing feeds. In the group fed with feed containing 500 and 1000 mg / kg lyophilized extract, respiratory burst activity and phagocytic activity were increased significantly. Through antioxidant activity related parameters, the malondialdehyde levels were decreased significantly in the experiments groups fed with 1000 mg / kg feed lyophilized extract and 250, 500 and 1000 mg / kg feed essential oils. The superoxide dismutase activities in the liver were increased in 1000 mg / kg feed essential oil and 1000 mg / kg feed lyophilized extract group; glutathione peroxidase levels were increased in all essential oils and lyophilized extract groups; the catalase activities were increased 1000 mg / kg essential oil and lyophilized extract group.

Based on the data which are obtained from this study we can conclude that *Origanum minutiflorum* which is an endemic plant for our country could be used in feeds for the rainbow trout considering the plant extracts and especially essential oil of the plant have positive effects on non-specific immun system and antioxidant defenses of the rainbow trout.

Keywords: Antioxidant, Nonspecific Immune System, *Origanum Minutiflorum*, Rainbow Trout

CHARACTERIZATION OF *QUERCUS ILEX* ACORNS AND THEIR ASSOCIATED BIO-
AGGRESSORS

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ABSTRACT

The holm oak acorn is among the most abundant fruits in Algeria, to which researchers pay special attention. It is in this perspective of evaluation and valuation that this research is inscribed. This work focuses on the study of the physico-chemical characteristics of holm oak acorn almond and antioxidant activity.

The chemical analysis showed that the almond has a high titratable acidity (83.33%), the fat content of 8.16%, a PH value of 5.8%, the amount of polysaccharides is around of 13.87g/100g, and a polyphenol content of approximately 9.39g/100g.

The biometric analysis and the weighing of the glands have highlighted the relationship between the biometric characteristics and the sanitary state of the glands studied.

The biological material reared has allowed the emergence of three species of insects that attack the acorn; two species of Lepidoptera which are *Cydia splendana* and *Cydia fagiglandana*, and one species of Coleoptera; *Curculio glandium*.

Keywords: *Querques ilex*, acorns, almond, characteristic, antioxidant.

ASSESSMENT OF FARMERS' ADAPTATION STRATEGIES TO FLOOD RELATED
LOSSES IN ZONE ONE AREA OF EKITI STATE, NIGERIA

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ABSTRACT

This study assesses farmers' adaptation strategies to flood related losses in zone one area of Ekiti State, Nigeria. The objectives were to; examine the perceived effects of flood on the production of farmers, examine the adaptation strategies to flood related losses by farmers, analyze the determinants of the adaptation strategies to flood related losses in the area and examine constraints associated with adaptation strategies to flood in the study area. 4 stage sampling technique was adopted in the selection of 147 crop farmers. Data obtained were analyzed by the use of descriptive statistics and inferential statistics tool (Poisson regression model). The study revealed that respondents strongly perceived flood effects as loss in farm produce, loss in quality of yield and loss of farm infrastructure. The study findings show that common adaptation strategies adopted by the crop farmers include change in planting date, crop rotation, mixed cropping, planting of cover crops and mulching. Furthermore, the Poisson regression result of the determinants of adaptation strategies to flood showed that age, level of education, farming experience, extension visit, credit, compatibility and cost of practice were statistically significant in making decisions. However, constraints perceived by the respondents include: poor access to adaptation strategies information, high cost of improved crop varieties, lack of access to weather forecast technology and government irresponsiveness to risk management. Therefore, it was recommended that Extension agents should provide adequate information on various adaptation strategies to farmers, relevant stakeholders and concerned organization should provide farmers with weather forecast technology, financial institutions should make access to credit facilities to farmers to enable them adopt adaptation strategies.

Keywords: Farmers, Adaptation strategies, Flood and Losses

INTRODUCTION

Agriculture has contributed immensely to the economies of most African countries including Nigeria where it constitutes about 40% of the countries' Gross Domestic Product (GDP) and about 70% of the population depends on it as a source of their livelihood (Food and Agricultural Organization of the United Nations (FAO) 2015). Flood is the most common type of disaster causing serious economic losses in various part of the world (Ramakrishna *et al.*, 2015). Those effects have caused a huge threat to food security and farmers livelihoods around the world compromising the well-being of crop farmers, because majorly crop farmers depend on natural climatic sensitive resources such as agriculture for their livelihood (Ubisi *et al.*, 2017).

METHODOLOGY

This Study was conducted in Ado, Irepodun/Ifelodun, and Ekiti west local government area of Ekiti State, Nigeria. In order to obtain a sample size for this study, a 4-stage multistage sampling technique was adopted for this study area. Descriptive statistics was used to achieve objective 1 and 3, while objective 2 was achieved using Poisson regression.

RESULTS AND DISCUSSIONS The results indicated that crop farmers in the study area have the average age of 43years, dominated by males and were married. Majority about 79.7% of the crop farmers were educated in formal institutions of learning and have a mean household size of 5 people. Also the respondents had the mean of 18years of farming experience and 59.9% owned their land with the mean of 1.4 hectares of land. *Table 1 shows that* Flooding has effects on production activities of farmers. Based on the mean score from table 4.2 it shows that loss in farm produce (4.57), loss in quality of yield

(4.41), loss of farm infrastructure (4.37) has the highest perceived effects. All this lead to reduction of farmers' productivity hence reducing the revenue of the farmers specifically and the nation as a whole. This implies that farmers must find ways of adapting to flood strategies in the zone to sustain their production and socio-economic status. This finding is in agreement with the work of Musah *et al.* (2016). Similarly, the respondents reported that flood eroded their farm produce which in turn resulted in low quality and low harvest, which could further pose a negative impact on the income of the household. This is in line with Ibrahim *et al.* (2018) who reported that flood disasters had impacts on agriculture by destroying crops and all other produce.

Perceived effects	SA	A	U	D	SD	Mean	Rank
Loss of farm produce	93(63.3)	49(33.3)	1(0.7)	4(2.7)	0(0)	4.57	1 st
Loss of yield quality	71(48.3)	70(47.6)	2(1.47)	4(2.7)	0(0)	4.41	2 nd
Loss of farm infrastructure	65(44.2)	75(51.0)	4(2.7)	2(1.4)	1(0.7)	4.37	3 rd
Increased weed growth	60(40.8)	59(40.1)	17(11.6)	7(4.8)	4(2.7)	4.12	5 th
Soil erosion	39(26.5)	75(51.0)	25(17.0)	7(4.8)	1(0.7)	3.98	6 th
Loss of soil nutrients	33(22.4)	82(55.8)	25(17.0)	6(4.7)	1(0.7)	3.95	7 th
Low farm income	50(34.0)	62(42.2)	14(9.5)	16(10.9)	5(3.4)	3.93	8 th

Table 1: perceived effects of flood on crop production

Source: field survey, 2021.

The result in Table 1 shows that the farmers adopted the practice of change in planting date, crop rotation and mixed cropping as the major flood adaptation strategies with the mean (3.22, 3.03, 3.01) respectively. This implies that the various strategies adopted are not expensive to practice and farmers have various crops at their disposal to plant which may be the reason for greater adoption of these strategies. While the use of drainage system (2.49) and change in use of chemicals (2.55) was the least practice the farmers adopted because it is expensive to practice. This finding is in line with Oselebe *et al.* (2016) in the study of strategies employed by rice farmers in south eastern Nigeria in adapting to climate change and Onyeneke (2018) in the study of challenges of adaptation to climate change by farmers Anambra State, Nigeria.

Table 2: Level of the adaptation strategies to flood related losses

Adaptation strategies	NA	AW	I	E	T	A	Mean	Rank
Change in planting date	21(14.3)	11(7.5)	24(16.3)	15(10.2)	11(7.5)	65(44.2)	3.22	1 st
Crop rotation	7(4.8)	30(20.4)	22(15.0)	16(10.9)	36(24.5)	36(24.5)	3.03	2 nd
Mixed cropping	11(7.5)	31(21.1)	26(17.7)	11(7.5)	14(9.5)	54(36.7)	3.01	3 th
Planting of cover crops	12(8.2)	37(25.2)	18(12.2)	8(5.4)	18(12.2)	36(24.5)	2.99	4 th
Mulching	17(11.6)	39(26.5)	10(6.8)	11(7.5)	15(10.2)	55(37.4)	2.90	5 th
Use of farm yard manure	14(9.5)	50(34.0)	11(7.5)	3(2.0)	6(4.1)	63(42.9)	2.86	6 th
Planting of trees	24(16.3)	44(29.9)	7(4.8)	0(0)	3(2.0)	69(46.9)	2.82	7 th
Zero tillage	13(8.8)	36(24.5)	22(15.0)	12(8.2)	28(19.0)	36(24.5)	2.78	8 th
Soil conservation	20(13.6)	41(27.9)	19(12.9)	9(6.1)	21(14.3)	37(25.2)	2.55	9 th
Use of drainage system	10(6.8)	53(36.1)	24(16.3)	7(4.8)	21(14.3)	32(21.8)	2.49	10 th
Change use of chemicals	25(17.0)	50(34.0)	16(10.9)	8(5.4)	15(10.2)	33(22.4)	2.25	11 th

Source: field survey, 2021

The result on Table 2 shows that the age of respondent had negative and significant effect on crop farmers' probability to adopt flood strategies. This implies that younger farmers are likely to adopt strategies than the older farmers indicating that younger farmers have a longer planning ability to cope with flood strategies. The probability of adoption of flood related strategies decreases by 6% increase in the age of crop farmers in the study area. As shown in Table 3 level of education of the crop farmers was significant and positive influenced the adoption of flood related strategies. In other words the level of education of crop farmers increased the probability of adopting strategies related to flood by 0.0214, this implies that the level of education has exposed farmers to different adaptation measures and has

allowed them to have a significant understanding of what flood losses is and the likely things they can do to cushion its effects. This is in line with the study of Fatuase and Ajibefun (2015). Table 3 also indicated that the farming experience of respondents in the study area had a positive and significant effect on crop farmers' probability to adopt to flood adaptation strategies. This probability of adoption of flood related strategies increases by 7%, this implies that the respondents had useful information and experiences of flood with coping strategies as it affects their farming practices. The number of extensions visit, credit and compatibility increased the probability of adopting strategies related to flood by 0.028, 1% and 0.2% respectively. This implies that the more number of contact farmers have with extension personnel and services the more access to adaptation strategies and information and level of their adaptation strategies to flood improves farmers' awareness as well as the better implementation of the strategies. The positivity of credit implies that farmers with access to credit are more likely to use different flood adaptation strategies and allocate the credit for purchasing it. Also the compatibility implies that the crop farmers' existence practices are compatible with the adaptation strategies which made the probability of adopting it positive. Table 3 also indicated that the cost of practice of the strategies by the respondents had a negative and significant effect on crop farmers' probability to adopt flood related strategies. This probability of adoption decreases by 0.099, this implies if the practice is costly there is low probability of adopting it. This finding is in line with the study Arimi (2017).

Table 3; Poisson regression analysis on determinants of adaptation strategies to flood related losses

Explanatory variables	Coef.	Std. Err.	Z value	p> z
Age	-.0066992	.0020003	-3.35***	0.001
Gender	.0389414	.0377567	1.03	0.302
Land ownership	.0972777	.1139436	0.85	0.393
Level of education	.021417	.010472	2.05**	0.041
Farm size	.0129469	.0103532	1.25	0.211
Farm experience	.0073353	.0023398	3.14***	0.002
Household size	-.0073947	.0290937	-0.25	0.799
Extension visit	.028249	.0129293	2.18**	0.029
Farm income	-1.19e-07	9.15e-08	-1.31	0.192
Credit	1.01e-06	2.00e-07	5.04***	0.000
Loss due to flood	-3.97e-08	2.80e-07	-0.14	0.887
Compatibility	.2204492	.0565947	3.90***	0.000
Relative advantage	.0733252	.0484915	1.51	0.131
cost of practice	-.099682	.0335543	-2.97***	0.003
Cons	2.982538	.1120157	26.63***	0.000
Log likelihood	622.99005			
LR chi2(14)	132.27			
Prob> chi2	0.0000***			
Pseudo R2	0.9601			
Number of obs	147			

Source: field survey, 2021. *** and ** significant at 1%, 5% respectively

Table 4 shows that among the crop farmers in the zone, constraints include poor access to adaptation information, poor information on early warning system. In the present information age, problem could pose serious challenges to farmers' adaptation strategies as they may not be aware of recent development regarding flood adaptation and the necessary adjustments needed. Weather forecasts are supposed to guide farmers on flood losses so that they can make informed decisions and useful farm plans. However, the absence of this facility will undoubtedly make the farmers became ignorant of the weather situations and hence become vulnerable to effects of flood and weather. Ozor *et al.* (2016) noted that poor change information and farmers lack of access to weather forecast technologies as major barriers to climate change adaptation among farming households in Southern Nigeria.

Table 4; Constraints associated with the adaptation strategies to flood

Constraints associated with the control of flood	Severe constraint	Not severe constraint	Not constraint	Mean	Rank
Poor access to adaptation strategies information	89(60.5)	46(31.3)	12(8.2)	2.52	1 st
High cost of improved crop varieties and strategies	89(60.5)	44(29.9)	14(9.5)	2.51	2 nd
Lack of access to weather forecast technology by crop farmers	84(57.1)	47(32.0)	16(10.9)	2.46	3 rd
Government irresponsiveness to risk management	77(52.4)	56(38.1)	14(9.5)	2.43	4 th
Tedious nature of adaptation strategies	74(50.3)	57(38.8)	16(10.9)	2.39	5 th
Poor information on early warning system	72(49.0)	54(36.7)	21(14.3)	2.35	6 th
Poor agricultural extension services	62(42.2)	71(48.3)	14(9.5)	2.33	7 th
Lack of collateral to secure loan to support farming	52(35.4)	88(59.9)	7(4.8)	2.31	8 th
High cost of chemicals	60(40.8)	68(46.3)	19(12.9)	2.28	9 th
Lack of access to supporting institutional facilities	44(29.9)	96(65.3)	7(4.8)	2.25	10 th
Low level of education of the farmers	55(37.4)	65(44.9)	26(17.7)	2.20	11 th
Inherited system of land ownership	46(31.3)	65(44.2)	36(24.5)	2.07	12 th
Small-scale production of the farming households	31(21.1)	76(51.7)	40(27.2)	1.94	13 th
Shortage of labour for implementing adaptation strategies	28(19.0)	60(40.8)	59(40.1)	1.79	14 th
Involvement of the farmers in some off farm jobs	22(15.0)	46(31.3)	79(53.7)	1.61	15 th

Source: field survey, 2021

RECOMMENDATIONS

Therefore, it was recommended that Extension agencies should provide adequate information on various adaptation strategies to farmers, which was one of the major constraints they face, relevant stakeholders and concerned organization should provide farmers with weather forecast technology, financial institutions should make access to credit facilities to farmers to enable them adopt adaptation strategies.

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EFFECTS OF *RHIZOCTONIA SOLANI* INFECTION ON CHLOROPHYLL BIOSYNTHESIS
AND CARBOHYDRATE CONTENT OF PEANUT SEEDLING

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ABSTRACT

Peanut (*Arachis hypogaea* L.) is an important food and oilseed crop worldwide. It is susceptible to soilborne pathogens which can severely limit yield and quality of peanuts. Peanut seedlings damping-off caused by soil- and seed-borne pathogen *Rhizoctonia solani* is an economically important disease causing both quantitative and qualitative damage to peanut crops throughout the world. *R. solani* is belonging to class basidiomycete and capable of living free and as a saprophyte in the soil. It has the potential to cause disease in various annual and perennial fruits, vegetables, and industrial and cereal crops. In this study peanut seeds were germinated and grown on soil contaminated with *R. solani* inoculum and disease index, length, weight, protoporphyrin IX (PPLX), Mg-protoporphyrin (MGPP), protochlorophyllide (Pchlde), chlorophyll, and carbohydrates content of seedlings were assessed at 14 days after inoculation when the disease index reached 100%. According to our observations *R. solani* infection significantly affect peanut seedlings biomass (length and weight) as compared to control. A significant reduction in chlorophyll content in companion with lower chlorophyll biosynthesis intermediates (PPLX, MGPP, Pchlde) was observed in plants infected with *R. solani* as compared to control. Moreover, carbohydrate content was highly suppressed by *R. solani* infected seedlings compared to control plants. Photosynthesis is a plant's main metabolic pathway in which sugars are synthesized from CO₂, water, and light energy. These sugars or carbohydrates serve as the origin of energy for a plant's other metabolic procedures. Thus, a low level of photosynthetic activity caused by *R. solani* can decrease carbohydrates directly, causing plant growth to be reduced. These results confirmed that peanut seedlings dependence to carbohydrates from photosynthesis cannot be compensate with seed storage and *R. solani* with interruption of chlorophyll biosynthesis pathway can limit seedling carbohydrate source.

Keywords: Biomass, Carbohydrate, Chlorophyll, Peanut, *Rhizoctonia solani*

BIOACTIVE COMPOUNDS AND ANTIBACTERIAL EFFECTS OF *GOSSYPIUM BARBADENSE* L. LEAVES: AN ETHANOLIC EXTRACT STERILIZED WITH AN AUTOCLAVE AND SYRINGE FILTER

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ABSTRACT

The prominence of the inability of chemotherapeutic agents and the resistance of pathogens to antibiotics has made the screening of plant species an alternative to the treatment and prevention of diseases. The study focuses on the bioactive compounds and antibacterial effects of *Gossypium barbadense* L. (cotton plant leaves) against some selected bacteria. The plant extract was prepared by 72 hrs maceration in 95 % ethanol (v/v) which was further divided into two (2) equal portions, half of which was sterilized using 0.2 µM syringe filter and the other portion with an autoclave at 121 °C for 15 mins. The presence of terpenoids, alkaloids, glycosides, flavonoids, tannins and saponins in the sterilized extracts was determined using standard procedures, where they were found to be highly present in the syringe filtered than in the autoclaved extract. Thus, this was believed to be responsible for the antibacterial activities observed in the extracts. The antibacterial activity of the sterilized extracts was carried out by agar disk diffusion method against *Escherichia coli*, *Pseudomonas aeruginosa*, *Klebsiella pneumoniae* and *Staphylococcus aureus*. The syringe filtered extract showed better antibacterial activities than the autoclaved extract against all the bacterial pathogens with the highest zone of 19 and 16 mm compared to the autoclaved extract with the highest zone of 13 and 11 mm respectively. The study revealed that syringe filter sterilization is the best method of sterilization that exerts least adverse effects on the bioactive compounds and could support the antibacterial activity against the tested bacterial pathogens. Hence, *G. barbadense* leaves could be used as an alternative for the treatment of diseases caused by these organisms.

Keywords: *Gossypium barbadense*, Maceration, Antibacterial, Autoclave, Syringe filter, Pathogens.

**INVESTIGATION OF MINERALS IN FRUIT PEELS POWDER: ULTRASOUND ASSISTED
EXTRACTION FOLLOWED BY FLAME ATOMIC ABSORPTION SPECTROMETRY**

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ABSTRACT

Osteoporosis is a worldwide disease depicted by the reduced bone mass, an adequate supply of minerals are needed to support bone remodeling and their deficiency causes bone-related diseases, osteoporosis in particular, and have osteo-protective effects. The aim of recent research was to quantify the micro (Mn, Fe, Cu, and Zn) and macro elements (Mg, K, and Ca) in the peels powder of some common fruits (pomegranate, orange, lemon, mango, and grapefruit) by flame atomic absorption spectrometer (FAAS). The extraction of micro and macro elements in peels powder was done by using dilute acids in ultrasonic bath. Apple leaves were used as standard reference material (SRM, NIST 1515) to optimize the ultrasound assisted extraction (UAE) method at varied operating parameters. Maximum response was obtained for extracting of minerals in 500 mg SRM at 60 °C temperature, setting a vortexing time of 5 min. while using 5.0 mL extracting agent HNO₃ (0.5 M)-H₂O₂ (10 %) at 90 % sonication amplitude of ultrasound bath for 6 min. While analyzing the SRM, the percentage recovery was obtained in ranged between 96.8-102.7 % to assure the accuracy whereas repeatability (n = 10) study in terms of % RSD yielding ≤ 2.29 well support the precision of proposed method and limits of quantitation (µg/g) were 0.034, 0.061, 0.065, 0.057, 0.017, 0.175 and 0.053 for Mn, Fe, Cu, Zn, Mg, K and Ca respectively. The proposed UAE method was reliable, efficient, and advantageous over the conventionally employed acid digestion method with regards to less consumption of reagents and short analysis time for the determination of micro and macro elements in fruit peels powder.

Keywords: Bone health, Osteoblasts, Osteoclasts, Ultrasound Extraction, Spectrometry

BELGIAN MALİNOİS İRKİ BİR KÖPEKTE NAZAL ARTERİTİS
NASAL ARTERITIS IN A BELGIAN MALINOIS DOG

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ÖZET

Nazal arteritis, nazal arterlerin/kan damarlarının duvarlarının immün aracılı inflamasyonu sonucu köpeklerin nazal planumun merkezinde ülseratif lezyonların şekillendiği bir hastalıktır. Bu vaka raporunun amacı nazal arteritis tanısı konulan Belgian Malinois ırkı bir köpekte klinik, hematolojik ve biyokimyasal bulguları ve başarılı tedavi sürecini bildirmektir. 4,5 yaşında, dişi, kısırlaştırılmamış ve 30 kg canlı ağırlığında olan Belgian Malinois ırkı bir köpek burunda çatlakların oluşması ve kanama şikayeti ile kliniğimize getirildi. Anamnezde burundaki lezyonların yaklaşık 2 ay önce başladığı, travma öyküsü olmadığı, tedavide tetrasiklin ve asiklovir içeren deri merhemleri ve kantoran yağı kullanıldığı ancak lezyonların iyileşmediği bilgisine ulaşıldı. Fiziksel muayenede sol burun kanadında ve nazal filtrumda kabuklu ve ülserli lezyonların olduğu ve dokununca sızıntı şeklinde kanamanın şekillendiği tespit edildi. Rektal sıcaklık 38,5°C, kalp frekansı 140/dk, solunum frekansı 128/dk olarak kaydedildi. Hematolojik ve rutin biyokimyasal analizlerde herhangi bir anormallik saptanmadı. Ayrıca metabolik ve endokrinolojik bir problemin olmadığı biyokimyasal analiz sonuçlarıyla da ortaya konuldu. Tedavide 2 ay boyunca oral yoldan doksisisiklin (Monodoks[®], 5 mg/kg dozda 12 saat arayla), nikotinamid (Solgar No Flush Niacin[®], 500 mg, 12 saat arayla), prednizolon (Deltacortil[®], ilk ay 1mg/kg dozda, ikinci ay 0,5 mg/kg dozda, 24 saat arayla), famotidin (Famodin[®], 1 mg/kg dozda, 24 saat arayla) ve topikal olarak tetrasiklin içeren krem (Terramycin[®] deri merhemi, 12 saat arayla) kullanıldı. 2 ay sonraki kontrolde lezyonların hafif iyileştiği tespit edildi. Tedavi yalnızca 12 saat arayla oral nikotinamid ve topikal olarak tetrasiklin ve takrolimus (Tacrolin %0,1[®]) içeren deri merhemlerinin uygulanması olarak revize edildi. 1 ay sonraki kontrolde ülserasyonda belirgin azalma olduğu ve kanamanın tamamen ortadan kalktığı tespit edildi. Takip eden 9 ay boyunca köpeğin lezyonları remisyonda kaldı. Sonuç olarak nazal arteritisi olan köpekte oral nikotinamid ve topikal takrolimus ve tetrasiklin merhemlerinin kullanılmasının lezyon remisyonunu sağlamada ve sürdürmede etkili olduğu görüldü.

Anahtar Kelimeler: Köpek, Nazal arteritis, Nikotinamid, Takrolimus, Tetrasiklin.

ABSTRACT

Nasal arteritis is a disease in which ulcerative lesions form in the center of the nasal planum of dogs as a result of immune-mediated inflammation of the walls of the nasal arteries/blood vessels. The goal of this case report is to describe the clinical, hematological, and biochemical findings, as well as the successful treatment of a Belgian Malinois dog with nasal arteritis. A 4.5-year-old female, non-neutered Belgian Malinois breed dog weighing 30 kg was brought to our clinic with a complaint of a fissure in the nose and bleeding. According to the anamnesis, the nose lesions first appeared around two months ago, there was no history of trauma, and the lesions did not cure despite therapy with skin ointments containing tetracycline, acyclovir, and cantorian oil. Physical examination revealed crusty and ulcerated lesions on the left nasal wing and nasal philtrum, as well as bleeding in the form of leakage when touched. The rectal temperature was 38.5°C, the heart rate was 140 beats per minute, and the

respiratory frequency was 128 beats per minute. Hematological and routine biochemical analyses revealed no abnormalities. Furthermore, the results of biochemical analysis revealed that there were no metabolic or endocrinological problems. As a 2-month treatment, doxycycline (Monodoks[®], 5 mg/kg, q12h), nicotinamide (Solgar No Flush Niacin[®], 500 mg, q12h), prednisolone (Deltacortil[®], 1mg/kg in the first month, 0.5 mg/kg in the second month, q24h), famotidine (Famodin[®], 1 mg/kg, q24h) was used orally, while tetracycline-containing ointment (Terramycin[®] skin ointment, q12h) was used topically. At the 2-month follow-up, it was observed that the lesions had healed slightly. Treatment was modified to include only oral nicotinamide and topically applied tetracycline and tacrolimus (Tacrolin 0.1%[®]) skin ointments every 12 hours. At the one-month follow-up, there was a significant decrease in ulceration and the bleeding had completely stopped. The dog's lesions remained in remission for the next 9 months. In conclusion, oral nicotinamide, topical tacrolimus, and tetracycline ointments were found to be effective in achieving and maintaining lesion remission in dogs with nasal arteritis.

Keywords: Dog, Nasal arteritis, Nicotinamide, Tacrolimus, Tetracycline.

CİVCİV REFAHI İÇİN MATERNAL BAKIMIN ÖNEMİ
THE IMPORTANCE OF MATERNAL CARE FOR CHICK WELFARE

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ÖZET

Anne tavuk ile birlikte yetiştirilen civcivlerde tavuk ve civciv arasında bir etkileşim bulunmaktadır. Tavuk ve civcivler, civcivler henüz yumurtadan çıkmadan önce, embriyo döneminin sonunda iletişim kurmaya başlarlar. Kuluçkadan çıktıktan sonra tavuklar civcivlere yönelik alarm ve teşvik edici gibi çeşitli sesler çıkarırlar. Ayrıca görsel uyaranlar da tavuk-civciv iletişiminin gelişmesi için önemlidir. Maternal bakım, yumurtadan çıkan civcivlerin annelerinin seslerini ve görüntülerini öğrendiği bir süreç olan evlada bağlanma-damgalama ile kolaylaşır ve 5-12 haftalık yaşlarına kadar devam eder. Anne-civciv bağlanması sonrası civcivler tavuk seslerine ve hareketlerine göre yiyecek arama becerilerini geliştirebilir. Genç civcivler vücut ısılarını düzenleyemedikleri için zamanlarının büyük bir bölümünü karanlık ve sıcak olan annelerinin altında dinlenerek geçirirler. Civcivlerin anneye sürdürdüğü yakınlık, anne bakımının ifade edilmesine ve sosyal bağlarının gelişmesine olanak tanır. Tavuklar civcivlerin bir stres etkenine maruz kalmasına davranışsal ve fizyolojik tepki verir, kuluçka döneminin civciv korkusu üzerinde genel bir tampon etkisi olduğu bilinmektedir. Civcivler bir tehdit altında neyi başaracakları, ne zaman dinlenecekleri ve nasıl davranacakları konusunda annelerinden çok şey öğrenebilmektedirler. Maternal bakımının bu faydalarına rağmen bazı üretim parametreleri üzerinde zararlı etkileri olduğundan kanatlı endüstrisinde doğal kuluçkalama ticari olarak uygun değildir ve civcivler genellikle kuluçka makinelerinde üretilerek yapay olarak yetiştirilirler. Yapay ve doğal kuluçkalanan civcivler üzerinde yapılan araştırmalarda anne tavuk ile yetiştirilen civcivlerin daha aktif olduğunu daha fazla yer gagalama ve toz banyosu yaptığı belirtilmiştir. Ayrıca annesi ile yetiştirilen civcivlerin daha az agresif oldukları ve daha az korktukları bildirilmiştir. Korku, doğuştan gelen bir refah sorunu olmasının yanı sıra panik tepkilere, boğulmaya ve kırık kemiklere de yol açabilir. Anne bakımının sağlanması civcivlerin davranışsal gelişimini güçlü bir şekilde etkiler.

Anahtar Kelimeler: Basımlama, civciv, hayvan davranışı, hayvan refahı, maternal bakım

ABSTRACT

There is an important interaction between the broody hen and the chick. The broody hen and chicks begin to communicate at the end of the embryonic period, before hatching. After hatching, broody hens make a variety of vocalisations, such as alarm and attraction for chicks. In addition, visual stimuli are important for the development of broody hen-chick communication. Maternal care is facilitated by filial imprinting, a process in which hatched chicks learn the calls and sights of their mothers. Maternal care continues for 5-12 weeks. After broody hen-chick bonding, chicks can improve their foraging skills according to chicken calls and movements. Young chicks can not regulate their body temperature. That's why they spend most of their time resting under their mother's wing, which is dark and warm. The closeness that the chicks maintain with the mother allows for the expression of maternal care and the development of social bonds. Broody hen responds behaviorally and physiologically to chicks exposure to a stressor, the incubation period is known to have a general buffering effect on chick fear. Chicks can learn a lot from their mother about what to peck, when to rest, and how to behave when threatened. Despite these benefits of maternal care, natural hatching is not commercially viable in the poultry industry as it has detrimental effects on some production parameters. Chicks are usually produced in hatcheries and reared separately from broody hens. In studies on chicks hatched in incubators and hatched by broody hens, it has been stated that chicks reared with broody hen are more active and have

more floor pecking and dust bathing. It has also been reported that chicks raised with their mother are less aggressive and less afraid. Fear, in addition to being an innate welfare problem, can also lead to panic reactions, smothering, and broken bones. Providing maternal care strongly influences the behavioral development of chicks.

Keywords: Animal welfare, behaviour, chick, imprinting, maternal care

**DALMAÇYA IRKI BİR KÖPEKTE TOTAL İDRAR KESESİ TÜMÖRÜ VE İDRAR KESESİ
TAŞI OLGUSU**

**A CASE OF TOTAL URINARY BLADDER TUMOR AND BLADDER STONES IN A
DALMATIAN DOG**

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ÖZET

Giriş: Bu olgu sunumunda, 12 yaşında, erkek, Dalmatian ırkı köpekte karşılaşılan idrar kesesi tümörü ve eşzamanlı çoklu idrar kesesi taşı konu edildi.

Materyal ve Metot: Köpeğin uzun süredir idrarda aralıklı ve ağrısız kanama ve tekrarlayan kronik sistit öyküsü ile dış merkezlerde çok kere sağaltıma alındığı bildirildi. Yapılan klinik muayene köpeğin, durgun, hareketlerinde isteksizlik, sırtı kambur pozisyonunda tuttuğu, ağrılı idrar çıkışı gözlemlendi. İnguinal ve popliteal lenf yumrularında lenfadenopati saptandı. Tam kan sayımı ve biyokimyasal serum analizleri sonucunda lökosit, üre ve kreatinin düzeylerinde belirgin bir artışı gözlemlendi, yaygın nötrofili bulgusu ile karşılaşıldı. Ayrıca anemi ve azotemi saptandı. Direkt radyografide kese içerisinde 19.950 mm×26.459mm ebatlarında bir alanda kontrast artışı dikkati çekti. Ultrasonografik muayenede; idrar kesesinin total olarak içerisine yerleşmiş 19.3mm X 5.5mm büyüklüğünde, yüzeysel ekojenite artışıyla karakterize şüpheli lezyon tespit edildi. Operasyona alınan hastaya laparotomi yapıldı. Kesenin gergin, kitlesimsi bir görünüm verdiği dikkati çekti. Ureterlerin aşırı genişlediği dikkati çekti. Sistomi yapıldı, kese içerisinde taş ve tümöral yapı görüldü. Taş alındı, kitle kese duvarına yapışkan ve duvarı son derece kırılgan hale getirmişti. Hasta sahibine kesenin total alınması ve ureterlerin kolonlara anostomozu (uretero-koloplasti) önerildi. Hasta sahibi ötenazi istedi. Operasyon sonlandırıldı.

Sonuç: Histopatolojik incelemede kitle yassı hücreli karsinom; idrar taşlarının analizi ise amonyum ürat ve fosfat olarak rapor edildi.

Anahtar kelimeler: İdrar kesesi, idrar kesesi taşı, yassı hücreli tümör, köpek.

ABSTRACT

Introduction: In this report, a case of urinary bladder tumor and concurrent multiple urinary bladder stones encountered in a 12-year-old male Dalmatian dog was presented.

Material and Method: The dog had a history of intermittent and painless hematuria and recurrent chronic cystitis and had been treated multiple times at a veterinary clinic. Clinical examination revealed that the dog was lethargic, showed reluctance in movements, held its back in a hunched position, and had painful urination. Lymphadenopathy was detected in the inguinal and popliteal lymph nodes. A marked increase in leukocyte, urea, and creatinine levels with widespread neutrophilia was observed in the complete blood count and biochemistry serum analysis. Anemia and azotemia were also detected. Direct radiography showed a contrast enhancement in an area measuring 19.950 mm x 26.459 mm in the bladder. Ultrasonography revealed a suspicious lesion characterized by an increase in echogenicity measuring 19.3 mm x 5.5 mm inside the bladder. The dog underwent laparotomy and the bladder was found to be tense and mass-like. The ureters were excessively dilated. A cystotomy was performed, stones and a tumoral structure were found inside the bladder. The stones were removed, and the tumor was adhered to the bladder wall, making it extremely fragile. It was advised to owner completely remove of urinary bladder and the ureters to anastomose to the colon (ureterocoloplasty). The owner not accepted and requested euthanasia. The operation was terminated.

Conclusion: Histopathological examination revealed that the tumor was a well-differentiated squamous cell carcinoma, and analysis of the stones revealed that they were composed of ammonium urate and phosphate.

Keywords: Bladder, bladder stone, squamous cell carcinoma, dog.

METABİYOTİKLER
METABIOTICS

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ÖZET

Metabiyotikler, canlı mikroorganizmalar tarafından salgılanan veya mikroorganizma hücrelerinin parçalanmasından sonra ortama salınan bakteriyel enzimler, organik asitler, bakteriyosinler, hücre duvarı bileşenleri, yüzey katman proteinleri ve hücre içermeyen süpernatantlar gibi geniş yelpazeli biyoaktif bileşenler grubudur. Kendilerine özgü kimyasal yapıları sahip olmaları, uzun raf ömrü ve stabilite göstermeleri, iyi tolere edilebilmeleri, sindirim enzimlerine dirençli olmaları, antibiyotiğe dirençli gen transferi riskinin olmaması ve antienflamatuar, immünomodülatör, antikanser, antihipertansif aktivitelere sahip olmaları nedeniyle probiyotiklere alternatif olarak düşünülmektedir. Metabiyotik maddelerin %95-97 oranında, değişmeden kolona ulaşmaları, aktif olmaları ve uygulamadan hemen sonra etki göstermeleri nedeniyle yüksek biyoyararları oldukları düşünülmektedir. Ayrıca metabiyotiklerin bir üyesi olan psikobiyotikler ile bağırsak mikrobiyotasının değiştirilmesi, kaygı, Alzheimer, uyku bozukluğu, depresyon ve anksiyete gibi zihinsel sağlık sorunlarının tedavisinde umut vaat etmektedir. Metabiyotiklerin gıdaların üretiminde kullanılması durumunda, fonksiyonel gıdaların etkinliğinin artırılabilirliği, biyoaktif gıda katkı maddeleri ve fonksiyonel gıdalar açısından zenginleştirici mikrobiyel bileşenler olarak kullanılacakları yönünde çalışmalar söz konusudur.

Bu derlemede, yukarıda da özetlendiği gibi, son yıllarda metabiyotik bileşenlerin biyolojik aktivitelerinin önemine ve gıdalarda kullanımına yönelik araştırmalara değinilmiştir.

Anahtar Kelimeler: metabiyotik, postbiyotik, probiyotik, fonksiyonel gıda.

ABSTRACT

Metabiotics are a wide range of bioactive components such as bacterial enzymes, organic acids, bacteriocins, cell wall components, surface layer proteins and cell-free supernatants released into the environment after the disintegration of microorganism cells or secreted by living microorganisms. They are considered as alternatives to probiotics because of their unique chemical structures, having long shelf life and stability, being well-tolerated, being resistant to digestive enzymes, having no risk of antibiotic-resistant gene transfer, and their having anti-inflammatory, immunomodulatory, anticancer, antihypertensive activities. Metabiotic substances are thought to have high bioavailability because they reach the colon unchanged at a rate of 95-97%, are active and act immediately after administration. In addition, changing the intestinal microbiota with psychobiotics, a member of metabiotics, shows promise in the treatment of mental health problems such as anxiety, Alzheimer's, sleep disorders, depression and anxiety. There are studies that the effectiveness of functional foods can be increased if metabiotics are used in the production of foods and they can be used as bioactive food additives and microbial components enriching functional foods.

In this review, as summarized above, research on the importance of biological activities of metabiotic components and their use in foods in recent years has been mentioned.

Keywords: metabiotic, postbiotic, probiotic, functional food.

ANOREKSİYA NERVOZANIN MULTİDİSİPLİNER İNCELENMESİ
MULTIDISCIPLINARY INVESTIGATION OF ANOREXIA NERVOSA

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ÖZET

Anoreksiya nervosa (AN), düşük vücut ağırlığına yol açan, kilo almak veya şişmanlamakla ilişkili yoğun bir korkunun duyulduğu, kronik enerji alımı kısıtlamasıyla karakterize, mental bir bozukluktur. Genel anlamda AN dahil yeme bozuklukları psikolojik, davranışsal ve fizyolojik özelliklere dayalı tanı kriterleri olan psikiyatrik bozukluklardır. AN prevalansının %1 olduğu tahmin edilirken, kadın ve erkek arasındaki oran 9:1'dir. AN'lı hastalar genellikle tedaviyi karşı direnç gösterirler. Aynı zamanda yoğun bir şekilde fiziksel ve psikososyal defektlere sahip olmalarına rağmen herhangi bir müdahale alma konusunda da isteksizdirler. Hastalıkta kronikleşme eğiliminin yüksek olması kişinin psikolojik ve sosyal gelişimini ileri derecede etkilemektedir. AN intiharın da dahil olduğu yüksek bir mortalite oranı ile ilişkilidir.

Etiyolojisi çok faktörlüdür. Biyolojik, psikolojik ve kültürel faktörleri içerir. Aile ve ikiz çalışmaları, AN'de güçlü bir genetik bileşen olduğunu göstermektedir. Biyolojik faktörlerin içinde nörokimyasal değişiklikler vardır. Bunlardan en iyi bilineni, serotonin sistemindeki değişikliklerdir. Serotonin düzensizliği hastalardaki depresyon, anksiyete ve obsesif-kompulsif bozukluklarla ilişkilidir. Hastalığa yol açan faktörler arasında psikolojik sorunlar ve aile dinamikleri de vardır. Aile işlevsizliği ile AN arasında bir ilişki olsa da, tedavi protokolleri ebeveynlerin çocuklarının hastalığından sorumlu tutulmamaları ve suçlanmamaları gerektiğine dikkat çekmektedir. Bir diğer faktör kültürel etki olarak söylenebilir. Kültürel etkiler, toplumda medya tarafından şiddetlendirilen zayıflığa yapılan vurgu ile de ilişkilidir. Özellikle zayıf vücut ağırlığına odaklanılan faktörler cinsiyetlere göre farklılıklar gösterir. Erkeklerde vücut imajı kaygıları ön plana çıkarken, kadınlarda bu kaygı daha çok kilo verme odaklıdır. Tüm bu faktörler savunmasız bir ergende AN'nin ortaya çıkmasıyla sonuçlanabilir. Sonuç olarak AN dahil tüm yeme bozuklukları, hem fiziksel sağlıkta, hem de psikososyal fonksiyonlarda baskılanmayla sonuçlanır. Bu sunumun amacı da Anoreksiya Nervosa hastalarına yönelik çeşitli psikososyal tedavi yöntemleri hakkında kısaca bilgi vermektir.

Anahtar Kelimeler: Beslenme, Anoreksiya Nervosa, multidisipliner inceleme, psikososyal yaklaşım.

ABSTRACT

Anorexia nervosa (AN) is a mental disorder characterized by chronic energy intake restriction, associated with an intense fear of gaining weight or gaining weight, leading to low body weight. In general terms, eating disorders, including AN, are psychiatric disorders with diagnostic criteria based on psychological, behavioral and physiological characteristics. The prevalence of AN is estimated to be 1%, while the ratio between men and women is 9:1. Patients with AN usually show resistance to treatment. They are also reluctant to receive any intervention, despite having extensive physical and psychosocial defects. The high tendency to become chronic in the disease affects the psychological and

social development of the person to a high degree. AN is associated with a high mortality rate, including suicide.

Its etiology is multifactorial. It includes biological, psychological and cultural factors. Family and twin studies suggest a strong genetic component in AN. There are neurochemical changes in biological factors. The best known of these are changes in the serotonin system. Serotonin dysregulation is associated with depression, anxiety, and obsessive-compulsive disorders in patients. Psychological problems and family dynamics are among the factors leading to the disease. Although there is a relationship between family dysfunction and AN, treatment protocols point out that parents should not be held responsible and blamed for their child's illness. Another factor can be said as cultural influence. Cultural influences are also associated with the emphasis placed on weakness in society, exacerbated by the media. In particular, the factors that focus on lean body weight differ by gender. While body image concerns come to the fore in men, this concern is more focused on weight loss in women. All these factors can result in the emergence of AN in a vulnerable adolescent. As a result, all eating disorders, including AN, result in suppression of both physical health and psychosocial functions. The aim of this presentation is to give brief information about various psychosocial treatment methods for Anorexia Neurosa patients.

Key words: Nutrition, Anorexia Nervosa, Multidisciplinary Investigation, Psychosocial Approach.

**SYNTHESIS OF NICKEL OXIDE/GRAPHENE OXIDE COMPOSITE FOR THE
DEGRADATION OF CLOTHIANIDIN PESTICIDE**

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ABSTRACT

In the present work, the synthesis of NiO nanoparticles was carried through green synthesis by using extract of peels of green peas (*Pisum Sativum*). Graphene oxide was prepared through modified Hummer's method and the graphene oxide/nickel oxide nanocomposite was synthesized by ultrasonication method. The prepared nanocomposite was characterized by different techniques including XRD, FTIR and SEM. The FTIR analysis confirmed the functional groups in the prepared NiO/GO nanocomposite. Different experimental parameters such as pH, dose of catalyst, agitation rate, initial pesticide concentration and temperature were studied for the maximum degradation of clothianidin in aqueous solution. By adjusting different temperature range from 303 to 353 K, the maximum degradation was observed at 333 K, which is 78.51%. The degradation rate is increased with increase amount of dose of catalyst and maximum degradation of 92% is observed at 1g of catalyst. The maximum degradation was observed at pH 3. However, after pH 3, the degradation was decreased continuously. The concentration of stock solution of 10 ml showed maximum degradation. Furthermore, the synthesized NiO/GO nanocomposite from green route provided best economical alternative for pesticide degradation.

**KISS1 g.2124T>A POLİMORFİZMİ AÇISINDAN İLE DE FRANCE IRKI KOYUNLARDA
GENOTİPİK YAPININ BELİRLENMESİ**

**(DETERMINATION OF GENOTYPIC STRUCTURE IN İLE DE FRANCE SHEEP IN
TERMS OF KISS1 g.2124T>A POLYMOPHISM)**

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ÖZET

G proteinine bağlı reseptör-54'ü aktive eden ve Gonadotropin salgılatıcı hormon (GnRH) salgılanmasının nöroendokrin regülasyonunda önemli rol oynayan KISS1 geninin; kisspeptinler olarak adlandırılan bir nöropeptit ailesini kodladığı bilinmektedir. Eşeyssel olgunluk, yavru gelişimi ve östrus ile ilişkili olduğu düşünülen KISS1 geninin Barki, Ossimi, Rahmani, Small Tail Han, Hu, Texel, Corriedale gibi koyun ırklarında ve farklı keçi ırklarında da çalışılmıştır. Ancak İle De France koyunlarında KISS1 genine ilişkin bilginin ve ayrıntılı çalışmaların literatürde yer almadığı görülmüştür. Bu kapsamda gerçekleştirilen çalışmada; İle De France koyunlarından (n=50) toplanan kan örneklerinden fenol-kloroform yöntemi ile DNA izolasyonu yapılmıştır. KISS1 geni g.2124T>A polimorfizmi açısından incelenen koyunlar PCR-RFLP yöntemi ile genotiplendirilmiştir. 377 bp uzunluğundaki PCR ürünü, XmnI restriksiyon enzimi ile kesilerek; elde edilen RFLP ürünleri agaroz jel elektroforezi sonrası transiluminatör yardımı ile görüntülenmiştir. Sonuç olarak; incelenen koyunların tamamında 256 ve 121 bp'lik iki bant tespit edilmiş ve hedef popülasyonun KISS1 geni g.2124T>A polimorfizmi açısından TT genotipine sahip olduğu belirlenmiştir. Böylelikle İle De France koyunlarında ilk kez çalışıldığı bilinen g.2124T>A polimorfizmi için elde edilen sonuçlar literatüre katkı sağlarken; bu verilerin sonraki çalışmalara kaynak oluşturduğu düşünülmektedir. İleride yapılacak olan çalışmalarda, daha büyük sürüler ve farklı kaynaklardan temin edilecek koyunlar kullanılarak araştırmanın genişletilmesi veya farklı polimorfizmler açısından hedeflenen ırkın incelenmesinin faydalı olacağı düşünülmektedir.

Anahtar Kelimeler: İle De France, KISS1, Koyun, PCR, RFLP

ABSTRACT

The KISS1 gene, which activates G protein-linked receptor-54 and plays a crucial role in the neuroendocrine regulation of Gonadotropin-releasing hormone (GnRH) secretion, is known to encode a family of neuropeptides called kisspeptins. The KISS1 gene, is thought to be associated with sexual maturity, offspring development, and estrus, has been studied in sheep breeds such as Barki, Ossimi, Rahmani, Small Tail Han, Hu, Texel, Corriedale, and in different goat breeds too. However, there is no knowledge of the KISS1 gene in the İle De France sheep breed, and detailed studies are not taking part in the literature. DNA isolation was performed from blood samples which were collected from İle De France sheep (n=50) by the phenol-chloroform method in the study that was carried out within this context. The ewes, which was evaluated for the KISS1 gene g.2124T>A polymorphism, were genotyped by PCR-RFLP method. The 377 bp long PCR products were cut with XmnI restriction enzyme, and the obtained RFLP products were visualized with the help of a transilluminator after agarose gel electrophoresis. In conclusion, two bands with 256 and 121 bp were detected in all ewes, and the target

population genotype was found to be TT for the KISS1 gene g.2124T>A polymorphism. So, these outputs are thought to be a source for future studies, while the results obtained for the g.2124T>A polymorphism, which is known to have been studied for the first time in Ile De France sheep, contribute to the literature. It is thought that it will be useful to enlarged the research by using extensive herds and sheep from different sources or to examine the targeted breed in terms of different polymorphisms in further studies.

Keywords: Ile De France, *KISS1*, PCR, RFLP, Sheep

**SEROPREVALENCE OF EPIZOOTIC HEMORRHAGIC DISEASE VIRUS (EHDV) IN
DOMESTIC RUMINANTS IN BLACK SEA REGION OF TÜRKİYE**

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ABSTRACT

Epizootic Hemorrhagic Disease (EHD) is an arboviral infection transmitted by *Cluoides* biting midges that affects domestic and wild ruminants, particularly white-tailed deer and cattle. This infection is listed as a notifiable disease by the World Organization for Animal Health (WOAH) due to its economic impacts, and the outcome of this disease in ruminants can vary from subclinical infection to acute death according to the species of the host. The disease's causative agent (EHDV) belongs to the *Orbivirus* genus of the *Reoviridae* family, which contains seven serotypes distributed worldwide and shares similar antigenic and genetic features with the same family member, the Bluetongue virus. This study aimed to investigate the seroprevalence of EHDV in the Central Black Sea region's provinces, Samsun, Ordu, Giresun, Amasya, and Tokat in Türkiye. For this purpose, a total of 900 archived serum samples obtained between 2018 – 2021 were employed for the study. From each province, 90 cattle and 90 sheep samples were collected, the animals were aged 1-3 years, unvaccinated, and did not exhibit disease symptoms. The Agar Gel Immunodiffusion (AGID) test technique was used to determine the presence of EHDV antibodies in collected sera. The AGID test was performed following the kit manufacturer's instructions. As stated in the kit, the results were evaluated within 48-72 hours. According to the obtained result, 11 (2.4%) of 450 sheep serum samples were positive, but no positive samples were detected in cattle. All sheep-positive sera were just found in samples of the Samsun province. The concluded data from this study show that EHDV infection has a low seroprevalence in the Central Black Sea Region. The first detection of EHDV in Türkiye was in 1991, and since then, various studies have been carried out. However, more studies are needed to evaluate the epidemiology of the disease in Türkiye and to identify the circulating EHDV serotypes more appropriately.

Keywords: AGID, Black Sea, Epizootic Hemorrhagic Disease

**POTENTIAL OF FOOD-BASED CURCUMIN AS CAPPING AGENTS AND
ANTIOXIDANTS IN COLON CANCER TREATMENT**

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ABSTRACT

This study highlights on development of a novel nano-curcumin food based hybrid with gold nanoparticle/graphene oxide (CR-AuNPs-rGO) that utilising a one-pot green synthesis method. The potential of CR-AuNPs-rGO was then being explore for its use as an anti-cancer agent in two cells. With the use of natural food substances with well-known therapeutic qualities, this strategy is intended to shed further light on cancer nano-therapy techniques. The unique green synthesis process outperformed previous conventional chemical reductants that lacked stabilising action by minimising chemical impurities presence while preserving uniform gold nanoparticles dispersion anchored on graphene sheets. When compared to conventional citrate-rGO-AuNPs nanocomposite, the amplified multi-potent anti-oxidant CAG nanocomposite had an IC50 value that was half as low, showing functional CR on surface. It's interesting to note that at all examined time points, selectivity towards normal human colon (CCD-841) and liver cells (WRL-68) was maintained. Contrary to other nanomaterials employed in the development of nanomedicine, CAG exhibited endocytic absorption and cytoplasmic deposition without compromising the integrity of the cell membrane, which is essential for intracellular mechanisms and the activation of death.

Key words: Graphene; CdS nanowires; Liquid crystals; Spectroscopy, Nanoscale.

PREPARATION OF NANOFORMULATIONS OF *F. VULGARE* WITH ENHANCED
BIOLOGICAL POTENTIAL

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ABSTRACT

Over the last few decades, plant-based natural compounds have been found as potent therapeutic agents against almost all types of ailments. *Foeniculum vulgare* is a promising candidate in view of its good bioactivity but its use is limited due to poor solubility and permeability of phytochemicals. Nanoformulations is one of the most promising strategies to improve the oral bioavailability of these phytochemicals. In the present study *Foeniculum vulgare*/Chitosan nanoparticles and *Foeniculum vulgare* nanosuspensions were developed and evaluated its effective role in promoting the functional recovery of sciatic nerve in a mouse model. Nanoformulations were characterized by using SEM, TEM, EDX, XRD, AFM and FTIR. Doses of *Foeniculum vulgare* nanoparticles (25mg/kg) and nanosuspensions (15mg/mL), (0.5mg/mL) were given orally from the nerve crush day till the end of the experiment. The sciatic functional index, muscle grip strength and muscle weight were performed to assess the motor functional regain. While the hotplate test and pinprick were performed to measure the recovery of sensory functions. Other serological parameters were performed to analyze the effectiveness of *Foeniculum vulgare* nanoformulations on oxidative stress. We noted an early retrieval of sensory and motor functions with statistically significant differences in both treatment groups.

Keywords: Nanosuspensions, Peripheral nerve injury, sensory functions recovery, motor functions recovery, oxidative stress, *Foeniculum vulgare*.

KİLİS IRKI BİR KEÇİ OĞLAĞINDA NADİR RASTLANILAN CEBOCEPHALY VE ARHINIA OLGUSU

A RARE CASE OF CEBOCEPHALY AND ARHINIA IN A KILIS GOAT KID

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ÖZET

Kongenital anomaliler, intrauterin dönemde gelişen ve doğumdan sonra gözlenen morfolojik bozukluklar olarak tanımlanır. Ruminantlarda rastlanılan fetal konjenital anomalilerin en önemli sebebi fötüsün intrauterin hayatta enfeksiyöz etkenlere maruz kalmasıdır. Bunun yanında genetik faktörler, mutasyonlar, kromozom anomalileri, çevresel faktörler ya da bu faktörlerin kombinasyonu da konjenital anomalilere sebep olabilmektedir. Bu olguda bir Kilis keçisi oğlağında rastlanılan anomali olgusunun sunumu amaçlandı. Bu olgunun materyalini Kilis ili Musabeyli ilçesi Gökmusa köyünde hayvancılıkla iştigal eden bir yetiştiricinin Kilis keçisi ırkına ait anomalili doğan bir erkek oğlak oluşturdu. Hayvan sahibinden alınan anamnez bilgisinde kendilerinin böyle bir olguyu gördüğünde oldukça ürperdiğini belirtmiştir. Hayvan sahibi anomalili oğlağın canlı olarak doğduğunu ancak oğlağın annesini bir türlü emmediğini bildirmiştir. Yapılan incelemede birçok bakımdan Siklopiye benzeyen ancak aynı orbita içerisinde normale göre orta çizgide birbirine çok daha yakın ve şiddetli hipoplazik bir çift gözün olduğu Cebocephaly olgusu görüldü. İlave olarak, Arhinia olarak da adlandırılan normal bir burun yapısı mevcut değildi. Kültür hayvancılığının gelişimine rağmen birçok sebebe bağlı olarak evcil hayvanlarda zaman zaman konjenital anomaliler görülebilmektedir. Bu durum çoğunluğu abortus veya güç doğum ile sonuçlanarak önemli ekonomik kayıplara neden olmaktadır. Bunun yanında hayvan yetiştiriciliğiyle uğraşanlar ilk kez böyle bir anomali ile karşılaştıklarında büyük korku yaşamaktadırlar. Konunun önemine dikkat çekmek maksadıyla bu olgunun sunulmuştur.

Anahtar Kelimeler: Kongenital anomali, cebocephaly, arhinia, oğlak.

ABSTRACT

Congenital anomalies are defined as morphological disorders that develop in the intrauterine period and observed after birth. The most important cause of fetal congenital anomalies encountered in ruminants is exposure of the fetus to infectious agents during the intrauterine period. In addition, genetic factors, mutations, chromosomal abnormalities, environmental factors or a combination of these factors can also cause congenital anomalies. In this case, a case of cebocephaly, with arhinia in a Kilis goat kid was presented which has not been reported previously. The material of this case was formed by a male kid that was born with anomaly belonging to Kilis goat breed of a breeder who was engaged in animal husbandry in Gökmusa village of Musabeyli district of Kilis. In the anamnesis information obtained from the owner of the animal, he stated that they shuddered when they saw such a phenomenon. The owner of the animal reported that the goat with anomaly was born alive, but the goat did not suckle its mother. In the examination, a Cebocephaly case was seen that resembled Cyclops in many respects, but had a pair of severely hypoplastic eyes in the same orbit, much closer to each other in the midline than normal. In addition, a normal nose, also called Arhinia, was absent. Despite the development of cultured livestock, congenital anomalies can be seen in domestic animals from time to time due to many reasons. This situation mostly results in abortion or difficult birth and causes significant economic losses. In addition, those who deal with animal husbandry experience great fear when they encounter such an anomaly for the first time. In order to draw attention to the importance of the subject, this phenomenon is presented.

Key Words: Congenital Anomalies, cebocephaly, arhinia, Kilis goat kid

**TARIMIN GELİŞMESİNDE HOLLANDA DENEYİMİNİN ÖNEMİ (XV – XVII.
YÜZYILLAR ÖRNEĞİ TEMELİNDE)**

**THE IMPORTANCE OF EXPERIENCE OF NETHERLANDS IN DEVELOPMENT OF
AGRICULTURE (ON THE BASE OF EXAMPLE OF XV – XVIITH CENTURIES)**

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ÖZET

Su kaynaklarının yönetimi ve geliştirilmesi dünya halkları tarihinde her zaman büyük önem arz etmiştir. Her milletin bu alanda kendi tarihi vardır. Onun öğrenilmesi modern dönemlerde tarımsal kalkınma alanında karşılaşılan çeşitli sorunların çözümüne katkıda bulunabilir. Bu konuda önemli başarılarla imza atan Hollanda'daki su endüstrisinin yönetim modelinin tarihsel gelişimine bakmak gerekmektedir.

Bir zamanlar Hollanda, Almanya'nın kuzeyi, Danimarka ve genel olarak Kuzey Denizi'nin güney kısmı kürü olmuş ve hatta Thames Reyn Nehri'nin bir kolu olarak kabul edilmiştir. Ancak Dünya okyanusunda meydana gelen olaylar coğrafi “manzarayı” değiştirmiştir. Aynı zamanda, Hollanda'da insan “faaliyeti” sonucunda ciddi doğal değişiklikler meydana gelmiştir. Turbanın yerden çıkarılması, oluşan boşlukların su ile dolması vb. olaylar bu topraklarda tarım dahil yaşamın gelişmesini engellemiştir. Bu nedenle Hollanda halkı terp adı verilen özel yükseklikler oluşturmak zorunda kalmıştır. Barajların inşası ve drenaj kanallarının inşası, karayı deniz suyundan korumaya hizmet etmiştir. Bahsedilen bu süreç XV. – XVII. yüzyıllarda daha da gelişmiş ve polder sistemi aracılığıyla hem tarım alanını, hem de zoolojik sistemini oluşturmuştur. Arazi peyzajının restorasyonunda ve tarım alanında dengeli bir yönetim sistemi oluşturmasında için elde edilen başarıların modern çağda kullanılması için tarihsel deneyime dönme ihtiyacı her zaman güncel olarak kalmaktadır.

Su ekonomisinin yapısı ve yönetiminin demokratik ilkelere dayalı organize edilmesi, kendi kendini finanse etme sistemi, benzersiz su yönetiminde Hollanda banka yönetiminin oluşturulması, vb. olayların tarihsel köklerinin önemini anlamak ve modern dönemle ilişkilendirmek gerekir.

Hollanda deneyimi dünya ülkelerinin tarım ve su kaynaklarının yönetiminde oldukça etkilidir. Hollanda sisteminin uygulanması, yalnızca maddi refahın iyileştirilmesine değil, aynı zamanda bölgedeki insan faktörüne de bağlıdır. Bu süreçte oluşan “kuru ayaklar” kavramı, insanın doğa güçlerine karşı verdiği mücadeleyi yansıtır. Polder felsefesi ise bu sorunun yerel veya bölgesel düzeyde değil, ulusal düzeyde çözülmesi gerektiğini ortaya koymaktadır.

Anahtar Kelimeler: tarım, Hollanda, deneyim, doğa güvenliği, çağdaş dönem

ABSTRACT

The controlling of water resources and its development always have the great importance in the history of nations over the world. Each nation has its historical past in this sphere. The investigation of this one can help to realize different problems appeared in the sphere of development of agriculture in modern period. From this point of view, it is necessary to look at the history of development of managing model of water economy of Netherlands which gained the important achievements.

Formerly the territory of modern Netherlands, the north of Germany, Denmark and the whole southern part of the North Sea were land, also the river of Thames was the part of the river of Rhine. Though the events occurred in the World Ocean changed the geographical “landscape”. At the same time as a result of human “activity” some important natural changes occurred in Netherlands. The mining of peat and filling of empty places with water and other things prevented the living and development of agriculture

on this territory. That's why the people of Netherlands had to create the special high lands named as terp. The construction of barriers and providing of drying canals served to defend the land from the sea waters. The indicated process has been developed during XV – XVIITH centuries formed the agrarian sphere, also its zoological system by using of polder system. For to use in the modern period the achievements gained in restoration of landscape and creation of balanced managing system in the sphere of agriculture it is always actual to apply to the historical experience.

The understanding of importance of historical roots of the organization of structure of water economy and managing system on the base of democratic principles, the self-investment system of Dutch banking management in unique water economy and other events, also their connection with modern period are necessary.

The experience of Netherlands is very efficient in managing of agriculture and water resources of the countries over the world. Not only the increasing of material prosperity, also the human factor in the region are connected with the using of system of Netherlands. The conception of “dry feet” formed in this process reflects the struggle of man against the nature forces. The philosophy of Polder creates the necessity of realization of this problem not only on local or regional level, also on national one.

Keywords: agriculture, Netherlands, experience, defense of nature, modern period

**BIOAUGMENTATION AND BIOSTIMULATION OF CRUDE OIL CONTAMINATED
SOIL: PROCESS PARAMETERS INFLUENCE**

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ABSTRACT

In this study, investigation of bioaugmentation and biostimulation process parameters' influence on biodegradation effectiveness of bacteria isolates in a crude oil polluted soil for 60 days was conducted. A native environment of crude oil polluted site was considered for bacteria isolation. Dilution plate technique was used for bacteria culturing under laboratory conditions. Central composite design embedded in design expert software was used for the design of experiment and optimum point prediction. The influence of nitrogen:phosphorus nutrient ratio and bacteria concentration at varying crude oil concentration and soil pH on percentage of total petroleum hydrocarbons (TPH) biodegraded was investigated. Biostimulation was highly significant on the percentage of TPH biodegraded as revealed by experimental results. Degradation efficiency of 93.75% was obtained for a soil pH of 10 contaminated with 100 g/Kg of crude oil using 600 cell/g of bacteria supplemented with 8 g/g of nitrogen-phosphorus ratio. The model developed was effective for future prediction with better correlation between experimental and predicted values. A biodegradation efficiency of 77.42% was achievable at the optimum predicted point by central composite design. Hydrocarbons biodegradation in the crude oil contaminated soil via the action of supplemented bacteria isolates was revealed. Conclusively, bacteria isolates from native polluted site could be applied as effective scavenger for hydrocarbons in crude oil contaminated soil.

Keywords: Process parameters, bacteria isolates, total petroleum hydrocarbon, crude oil, soil

SEA WATER DESALINATION PLANTS BY SWRO FROM ALGERIAN WEST COAST:
CURRENT SITUATION

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ABSTRACT

Around the Mediterranean coast, 79% of the production of fresh water is assured by reverse osmosis (SWRO). T many desalination plants have emerged in Algeria, who chose the desalination of sea water as solution to solve the problems of drinking water shortage. The deficit in drinking water was important in western Algeria, which explains the high number of stations: Macta, Bousfer, Bouzedjar, Chatt el Hillal, Honaine et Ghazaouet. A number which the authorities aims to increase, but much of questions are currently posed on the impact of these installations on the environment. It is in this context that a study has been carried out to determine the quality of the water discharges at sea, resulting from the desalination process. The principal environmental impact associated the processes of desalination comes from the production of the brine (salt concentrations betwin 36750 mg/l and 37800 mg/l). The other environmental impacts are: discharges associated like water coming from cleaning with the filter, harmful effects sound, the emission of gas, or problems of landscape degradation.

Keywords: desalination; sea water; fresh water; reverse osmosis; environmental impacts; brine; Honaine; station; Western Algeria

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BACTERIOLOGICAL QUALITY OF RAW OVINE MILK

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ABSTRACT

The primary purpose of this research was to examine the bacteriological properties of raw ovine milk produced by Merino, Tsigai, Dorper, Lacaune, and British Milk Sheep flocks on four sheep farms located in the eastern part of Hungary. In addition to individual raw milk (IRM) and bulk tank milk (BTM) samples, the udder surface (US) of ewes was also tested for bacteriological quality.

A total of 77 US, 86 IRM, and 10 BTM samples were collected in the early morning during regular milking sessions. The samples, kept cooled at temperatures below 4 °C, were delivered to the microbiological laboratory and were examined immediately.

The relatively low numbers of bacteria in both US and IRM samples reflected good housing conditions of ewes kept on the four farms studied. However, BTM samples had up to 3.5–4.0 log₁₀ CFU/mL higher mean bacterial counts than their IRM counterparts, and the mean levels of bacteria in BTM on two farms even exceeded the regulatory limit of 6.18 log₁₀ CFU/mL.

From the collected samples, a total of 45 staphylococci and 11 lactic acid bacteria isolates identified either by MALDI-TOF MS Biotyper and/or API Staph and/or 16S rRNA genome sequencing were characterized. Characterizations (catalase test, oxidase tests, coagulase test, hemolysis tests, antibiotic resistance, enterotoxin genes) were carried out for all staphylococci.

Eleven (24.4%) of staphylococci isolates were resistant to at least one of the tested antibiotics. Out of 45 staphylococci strains, 26 (57.8%) were able to produce at least one of the 13 tested enterotoxins.

PRODUCTION OF MICROENCAPSULATED CREAM POWDER BY SPRAY DRYING METHOD

PÜSKÜRTMELİ KURUTMA YÖNTEMİYLE MİKROENKAPSÜLE KREMA TOZU ÜRETİMİ

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ABSTRACT

In addition to its high nutritional content, milk, which has an important place in the food sector due to its use as a raw material in the production of products such as yoghurt, cheese, cream and butter, also contains some risks in terms of microorganisms that cause deterioration under inappropriate storage conditions. Milk fat, which is used as the main ingredient in the production of cream, has a very rich structure in terms of essential fatty acids and fat-soluble vitamins, and is considered the most valuable component of milk in terms of cost. By removing the water from the milk, it is ensured that the resistance against spoilage is increased by the production of milk powder, it is preserved for a longer time, and the transportation and storage costs are reduced. In addition to milk powder, various products such as whey powder, buttermilk powder, yoghurt powder and cream powder are also produced, and cream powder is widely preferred in various fields of the food industry (convenience meals, soups, desserts, sauces, etc.) due to its high-fat content. After obtaining the cream from milk, the microencapsulated cream powder is produced by using spray dryers and thus milk fat is protected against environmental factors and deterioration, and some unwanted reactions such as Maillard reaction and lipid oxidation that may occur during production and storage are prevented. The drying process in spray dryers generally varies between 3-10 seconds and the average temperature of the cream powder varies between about 50-70°C. The wall material coated on the core material should have high water solubility, good emulsification, film forming and drying properties, and these materials can be obtained from a variety of sources such as natural gums, proteins, maltodextrins and waxes. With the encapsulation method of oil molecules, the fluidity of the powders is increased, the agglomeration problem is solved, oxidation is prevented during storage, it becomes easier to process industrially and its use as a food additive is increased.

Keywords: cream powder, microencapsulation method, spray drying process.

1. INTRODUCTION

Milk, which is accepted as a basic food item, can be consumed directly as drinking milk as a result of heat treatments, and it has an important place in the food sector because it is used as a raw material in the production of products such as yoghurt, kefir, cheese, cream, butter, cream, ice cream, condensed milk and milk powder (Visioli and Strata, 2014; Górska-Warsewicz et al., 2019). Due to its rich

composition and high water activity, milk creates the nutrient medium needed by microorganisms that cause deterioration, and this situation may pose a risk to consumer health during transportation and storage processes. Transforming milk into powdered milk stands out as an alternative method in order to make it more durable in the process of processing into various products, to store it regularly when necessary and to store it in the longer term, as well as to reduce transportation and storage costs (Er, 2018).

According to Turkish Food Codex Communique on Condensed Milk and Milk Powder (declaration No: 2005/18), it is obtained by removing water from fat, partially or completely skimmed milk, cream or a mixture of these products, and the moisture content in the final product is at most 5% by weight. Milk powder, which is defined as a solid product, is divided into 4 classes as high-fat, full-fat, semi-skimmed and skimmed milk powder in terms of the amount of fat it contains (Anonymous, 2005).

In addition to milk powder, various products such as whey powder, buttermilk powder, yoghurt powder and cream powder are produced, and among these products, the cream powder is shown as the product with the highest fat content (Himmetağaoğlu et al., 2019).

Milk fat, which is the main ingredient in cream production, has an important place in terms of nutrition and health in terms of the essential fatty acids and fat-soluble vitamins it contains, and is accepted as the most valuable component of milk by the food sector in terms of cost. Different methods have been tried in order to preserve the perishable milk fat due to unfavourable storage conditions and to convert it into alternative products (Salum and Erbay, 2018). Cream powder, which is obtained by condensing milk into cream and then drying in dryers and transforming it into powder, is generally used in ready-made meals, soups, desserts, sauces and baby food formulations (Chandan, 2011). The cream powder production flow chart is given in Figure 1.

During the evaluation of cream powder in the food industry, some disadvantages such as clumping, burning and discolouration can be seen. In addition, some undesirable reactions such as the Maillard reaction and lipid oxidation may occur during the production and storage of cream powder. In order to minimize these problems, the microencapsulation method is used by spray dryers in production (Paswan and Park, 2020).

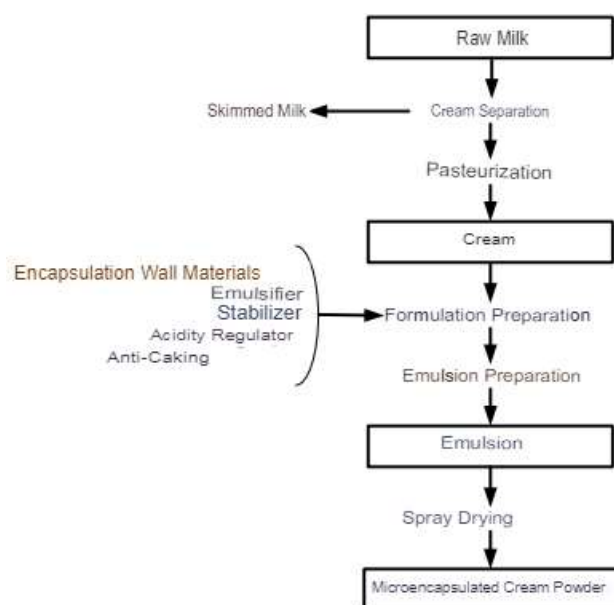


Figure 1. Cream powder production flow chart (Salum and Erbay, 2018)

2. MICROENCAPSULATION METHOD IN THE PRODUCTION OF CREAM POWDER

Microencapsulation; It is based on the principle of confining the active substance with a coating material, also called a barrier or wall material, in order to control its interaction with the environment to which it will be added. In the microencapsulation method, the substance encapsulated with the coating material is defined as the core. The microencapsulation method increases the shelf life of foods sensitive to

adverse environmental conditions (temperature, pH, humidity, etc.) and spoilage by preventing their interaction with the environment and other components (Edebalı et al., 2022).

Depending on the core material and the properties desired in the final product, coating materials can be selected from a wide variety of natural or synthetic polymers. In almost all spray drying processes in the food industry, the wall material must be water soluble to an acceptable level. In addition to high solubility, the wall material must have good emulsification, film-forming and drying properties. While many wall materials have these properties, the number of materials approved for food use is limited. Different biopolymers have been used in the microencapsulation of various food ingredients by spray drying. Biopolymers obtained from various sources such as natural gums (gum arabic, alginates, carrageenan, etc.), proteins (milk or whey proteins, gelatin, etc.), maltodextrins and waxes or their mixtures can be used in the microencapsulation of food ingredients (Sultana et al., 2000; Gharsallaoui et al., 2007; Peker and Arslan, 2011). The structure of the microcapsules is given in Figure 2.

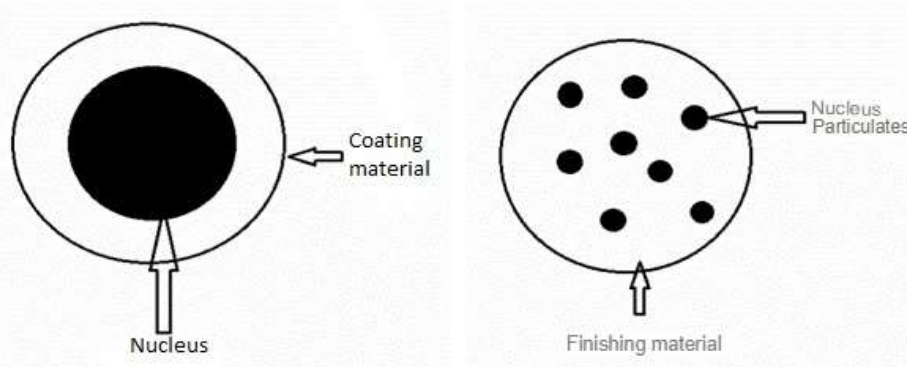


Figure 2. Structure of microcapsules (Peker and Arslan, 2011)

Microencapsulation applications are carried out with different methods such as spray cooling, spray drying, fluidized bed (drying, coating, granulation), solvent evaporation, phase separation, interface polymerization, and spray drying is the most commonly used method among these methods (Sobel et al., 2023). Low cost, enabling the mass production of capsules and using coating materials suitable for food contents are among the important advantages of the spray drying method (Koç et al., 2010).

By using the microencapsulation method in the food industry;

- i. The material to be coated is protected against environmental factors such as temperature, pH and humidity.
- ii. During the heat treatment, some volatile compounds in the product are preserved.
- iii. Liquids are converted into free-flowing solids.
- iv. It can be converted into a form that can be mixed with other powder products by preventing clumping that may occur in the final product.
- v. Controlled release (sustained or delayed release) of active compounds is provided.
- vi. By masking the odour, taste and activity of encapsulated products, the properties of the final product can be improved and new products can be obtained (Dubey et al., 2009; Himmetağaoğlu et al., 2019).

Microencapsulation of milk fat is carried out by encapsulating fat molecules in oily powders. In this way, oily powders, whose fluidity is increased and the agglomeration problem is solved, become easier to process industrially and their use as food additives increases. At the same time, the oxidation problem in the storage process in oily powders can be delayed by the microencapsulation method (Himmetağaoğlu et al., 2019).

3. SPRAY DRYING PROCESS

The spray drying process is defined as a liquid that is suitable for a high-temperature drying environment by spraying it into a solid or semi-solid phase (Dinçel, 2015). Spray dryers, which were first used in the production of milk powder and cleaning products in the 1920s, are now used in various fields such as

food, medicine, agriculture, chemistry and cosmetics. The working principle of spray dryers, which are used for drying powdered foods and have a high drying speed, is based on heat and mass transfer. In this method, the heat is transferred from the air to the droplets and the volatile substances in the solution are allowed to evaporate into the gas phase. Since the water in the droplets evaporates very quickly, the average temperature of the dry product varies between about 50-70°C. The drying process is usually carried out in the range of 3-10 seconds. In the spray drying process, the liquid solution goes through 4 successive processes. These transactions are; It is the transformation of the liquid into small droplets by means of an atomizer, the collision of the droplets with the hot air, the evaporation of the moisture in the droplets, and the collection of the powdery material that hits the wall of the dryer and spills in a suitable container by being carried by gas (Baltacıoğlu et al., 2021). With the spray drying method, the fluidity properties of the cream powder are improved and oxidation that may occur during agglomeration and storage is prevented (Himmetağaoğlu et al., 2019). The working principle of spray dryers is shown in Figure 3.

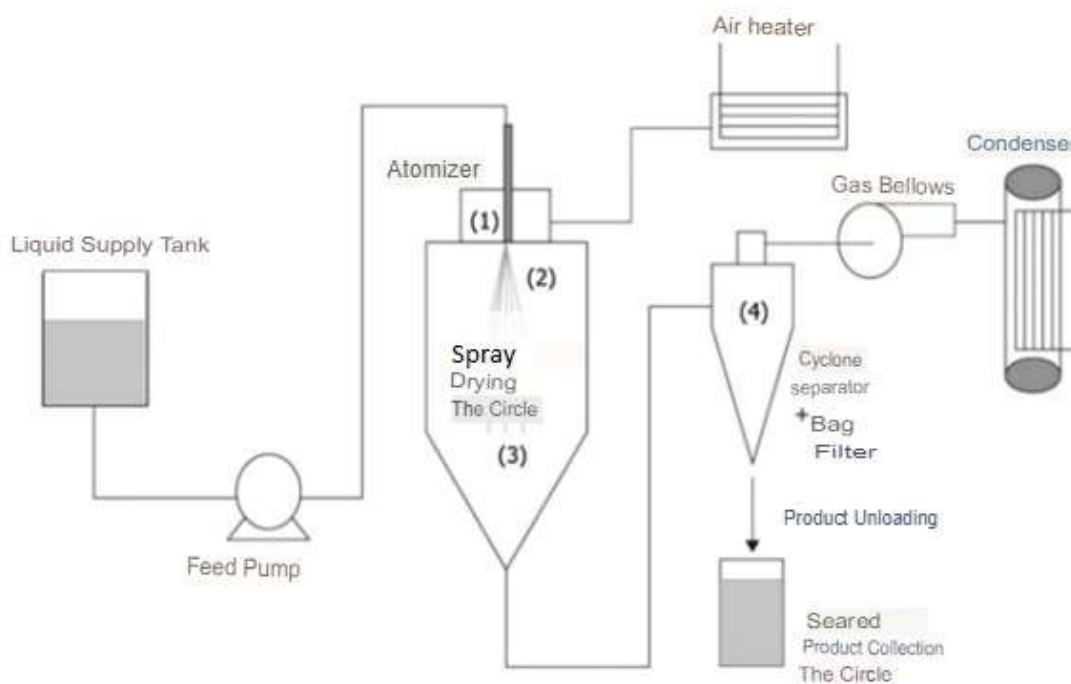


Figure 3. Working principle of spray dryers (Baltacıoğlu et al., 2021)

4. CONCLUSION

Microencapsulation of oil molecules by a spray drying process in the production of cream powder causes a significant increase in the quality of the final product, increases the fluency of the powders, makes them easier to process industrially, solves the problem of agglomeration, prevents Maillard reaction and lipid oxidation during storage, especially in bakery and pastry products. It increases the possibility of use as an additive in the food industry. The important thing in the microencapsulation process is to choose the appropriate coating material and to minimize the loss of the natural properties of the product until consumption. Apart from the production of cream powder, it is thought that the microencapsulation technique can create great potential for the future in the food industry, and more comprehensive research is needed on this subject.

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**RISK ASSESSTMENT ABOUT EFFECTIVENESS OF BIOSECURITY PRACTICES ON
HORSE PROPERTIES IN TURKEY**

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ABSTRACT

This research was conducted with 32 horse owners and managers between April 2019 and March 2022 in order to investigate the biosecurity practices in non-commercial horse properties in Türkiye and the attitudes and behaviors of horse owners towards viral horse diseases, and to explain the number of visits of horse experts and the procedures that visitors must follow. The data were a semi-structured questionnaire that included open, closed, and multiple-choice questions that explored views on enterprise size, animal health and biosafety practices, and practice in equine properties. While obtaining data from the horse owners, 274 nasal swaps were taken from the horses in the hara in Equine viral arteritis virus. Survey interviews investigated horse owners' previous experiences, perceptions, and resulting behaviors, as well as communication around EVA. Factors at the property level, test results, and relationships between the data were examined by logistic regression. Swap samples were investigated by PCR in terms of EAV antigen. According to the test result, EAV was negative. Twenty-nine (90.63%) of horse owners and managers reported having biosecurity procedures in place to check newly arrived horses for health, while 8 (25.00%) reported isolating horses as a standard protocol on arrival. The main reason for isolation of horses in properties where isolation was not a standard procedure was the result of a recognized disease in other properties (n=6). A small number of participants (n=3) controlled for fever or other clinical signs of infectious disease in new horses. Moving horses from a property has been associated with the implementation of biosecurity practices and practices specific to the clinical manifestations of respiratory disease. Only 5 (15.63%) horse managers reported following visitor procedures. Overall, 26 (81.25 %) of horse estates were visited by a horse specialist, but 4 (12.50 %) reported biosecurity protocols for these visitors. Visitor procedures are limited and disease is likely to spread at a high frequency of visits. The insights obtained facilitate a better understanding of the decision-making processes behind horse owners' preventive horse health measures and can provide feedback to the industry and industry stakeholders on effective risk communication strategies.

Keywords: Biosecurity, Equine viral arteritis, risk assesstment,

**ANTALYA SUSAM ALANLARINDA SUSAM GÜVESİ *Antigastracatalaunalis* DUP.
(LEPIDOPTERA: PYRALIDAE) VE TÜTÜN BEYAZSİNEK *Bemisia tabaci* (HEMIPTERA:
ALEYRODIDAE) ÜZERİNDE BİYOLOJİK MÜCADELE OLANAKLARI**
**POSSIBILITIES OF BIOLOGICAL CONTROL ON SESAME MOTH *Antigastra catalaunalis*
DUP. (LEPIDOPTERA: PYRALIDAE) AND TOBACCO WHITEFLY *Bemisia tabaci*
(HEMIPTERA: ALEYRODIDAE) IN ANTALYA SESAME FIELDS**

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ÖZET

Susam güvesi ve Beyazsinek zararlıları Susam bitkisinde çok önemli zarara sebep olmaktadır. Susam birçok sanayi alanında önemli ölçüde kullanılmaktadır. Susam güvesi ve Beyazsinek zararlıları özellikle ikinci dönem susam ekim alanlarında erken müdahale yapılmazsa önemli ölçüde zarara sebep olmaktadır. Buda verimi çok düşürmektedir. Ülkemizde bu zararlılar için genel olarak kimyasal mücadele tercih edilmektedir. Günümüzde kimyasal mücadelenin kullanımı birçok zararlı sonuçlar meydana getirmektedir. Bundan dolayı, çalışmamızda kimyasal mücadeleye alternatif olması için biyolojik mücadele etmenleri ve preparatlarının kullanımı yapılacaktır.

Bu çalışmada % 1,5 *Beauveria bassiana* strain Bb-1 1x10(8) kob/mil min sporları içeren Nostalgist B1 biyolojik insektisidi, 0,3 g/L Azadirachtin etken maddesi içeren Nimbecidine biyolojik insektisiti ve yumurta parazitoiti olan *Trichogramma evanescens* uygulaması yapılacak ve etkinlikleri kontrol edilecektir. Uygulama alanı 2000 metre karelik alan 3 parselle ayrılmış, her parsel A,B,C harfleri ile isimlendirilmiştir. Her parsel 4 bloğa ayrılmıştır. Her parsel de kontrol blokları olmak üzere her blokta ayrı ayrı yukarıdaki etmenlerin ve biyolojik insektisitlerin uygulaması yapılmıştır. Yapılan Çalışmada A3, B3, C3 bloklarına toplam 20000 adet *Trichogramma evanescens* susam güvesi yumurtası için salınmıştır. A1 Nimbecidine, A2 Nostalgist, B1 Nostalgist, B2 Nimbecidine, C1 Nimbecidine, C2 Nostalgist

şeklinde uygulamalar yapılmıştır. A4, B4, C4 blokları kontrol blokları yapılmıştır. Uygulama sonuçlarına göre yapılan sayımlarda yaprak yüzeyinde beyazsinek yumurtası ve nimfinde önemli ölçüde azalma olmuştur. Susam güvesi larva sayımlarında ağaç başına düşen popülasyonlarda çok önemli düşüş gözlenmiştir.

Anahtar Kelimeler: Susam, Susam güvesi, Beyaz sinek *Beauveria bassiana*, *Trichogramma evanescens*, Azadirachtin

ABSTRACT

Sesame moth and whitefly pests cause significant damage to these same plant. Sesame is widely used in many industrial areas. Sesame moth and whitefly pests cause significant damage especially in the second period sesame cultivation areas if early intervention is not made. This reduces the yield a lot. Chemical control is generally preferred for these pests in our country. Today, the use of chemical control creates many harmful results. Therefore, in our study, biological control agents and preparations will be used as an alternative to chemical control.

In this study, Nostalgist B1 biological insecticide containing 1.5% *Beauveria bassiana* strain Bb-1 1×10^8 cfu/ml min spores, Nimbecidine biological insecticide containing 0.3 g/L Azadirachtin active ingredient and *Trichogramma evanescens*, an egg parasitoid, will be applied and their effectiveness will be evaluated. will be checked. The application area is divided into 3 parcels of 2000 square meters, each parcel is named with the letters A, B, C. Each parcel is divided into 4 blocks. The above factors and biological insecticides were applied separately in each block, including the control blocks in each plot. In the study, a total of 20000 *Trichogramma evanescens* Sesame moth eggs were released to the A3, B3, C3 blocks. Applications were made as A1 Nimbecidine, A2 Nostalgist, B1 Nostalgist, B2 Nimbecidine, C1 Nimbecidine, C2 Nostalgist. A4, B4, C4 blocks were made as control blocks. According to the application results, there was a significant decrease

in whitefly eggs and nymphs on the leaf surface. A very significant decrease was observed in the populations per tree in these same moth larva counts.

KeyWords: Sesame, Sesame moth, Whitefly, *Beauveria bassiana*, *Trichogramma evanescens*, Azadirachtin

SESSİZ TEHLİKE MİKOTOKSİNLER VE BİYOLOJİK DETOKSİFİKASYONU
SILENT DANGER MYCOTOXINS AND THEIR BIOLOGICAL DETOXIFICATION

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ÖZET

Gıda kaynaklı sağlık problemleri her geçen gün artarak, gıda ve yem güvenliğini tehdit eden fiziksel, kimyasal ve biyolojik riskler karşımıza çıkmaktadır. Bu riskler, insan ve hayvan sağlığını tehdit etmenin yansira ciddi ekonomik kayıplara da neden olmaktadır. Biyolojik tehlikeler, bu risk grupları içerisinde çok daha fazla dikkat edilmesi gereken gruptur. Özellikle mikrobiyolojik risk grupları olarak tanımlanan patojen bakteriler, virüsler, parazitler, küf ve mantarlar bulaşma, geniş bölgelere hızlı yayılma ve ölümcül olma potansiyeli yüksek canlılardır. Bu tehlikeler arasında mantar krallığının organizmaları tarafından üretilen, toksik bir ikincil metabolit olan hem insanlarda hem de hayvanlarda hastalık ve ölüme neden olabilen mikotoksinler önemli bir yere sahiptir. Önem derecesine göre ülkelere bazında farklılıklar göstermekle birlikte birinci derecede önemli mikotoksinler, Aflatoksinler ve Zeralenon (ZEA) [en yaygın olanları Aflatoksin B1 (AFB1)], Trikothesenler, Okratoksinler (OTA) ve ergot alkaloidleridir [en yaygınları Deoxynivalenol (DON) ve T-2 toksin (T-2)]. Gıdalar ve yem ham maddelerinde mikotoksin oluşumunu engellemek ve/veya mikotoksin bulaşıklığının etkisini azaltmaya yönelik artan ilgi bilim adamlarını mikotoksinlerin biyotransformasyonu ve adsorbsiyon yoluyla biyoyararlanımının azaltılarak detoksifikasyonu konularında odaklanmaya yöneltmiştir. Son yıllarda mikotoksinlerin fiziksel ve kimyasal detoksifikasyon yöntemlerinin gerek gıda gerekse hayvan yemleri besin kalitesi üzerine olumsuz etkileri olmakta, besin madde kaybı oluşturmakta, insan ve hayvan sağlığı üzerine olumsuz etkileri nedeniyle uygulanamamaktadır. Yine bu yöntemlerin uygulama zorluğu, pahalı bir yatırımı gerektirmesi ve yemdeki oluşturdıkları organoleptik ve fiziksel bozukluklar araştırmacıları, insan ve hayvan sağlığına karşı olumsuz herhangi bir etkisi bulunmayan güvenilir ve başarılı olan biyolojik detoksifikasyon yöntemlerine yöneltmiştir. Bu çalışmada, mikotoksinlerin biyolojik detoksifikasyonu ile ilgili çalışmaların derlenmesi amaçlanmıştır. Bu biyolojik yöntemlerle, başta Laktik asit bakterileri olmak üzere diğer probiyotik bakteriler, mayalar, protozoonlar ve toksin bağlayıcı diğer mikroorganizmalar kullanılarak yapılan çalışmalardan bir derleme sunulmuştur.

Anahtar Kelimeler: Mikotoksinler, yem, biyolojik detoksifikasyon.

ABSTRACT

Food-borne health problems are increasing day by day, and physical, chemical and biological risks that threaten food and feed safety are emerging. These risks are not only threaten human and animal health, but also cause serious economic losses. Biological hazards are the group that needs much more attention among these risk groups. Pathogenic bacteria, viruses, parasites, molds and fungi, which are defined as microbiological risk groups in particular, are organisms with a high potential for contamination, rapid spread to large areas, and deadly. Among these dangers, mycotoxins, a toxic secondary metabolite produced by organisms of the fungal kingdom, which can cause disease and death in both humans and animals, have an important place. Although it differs according to the countries in order of importance, the most important mycotoxins are Aflatoxins and Zeralenone (ZEA), the most common being Aflatoxin B1 (AFB1); Trichothecenes, Ochratoxins (OTA) and ergot alkaloids, the most common being

Deoxynivalenol (DON) and T-2 toxin (T-2). the most important mycotoxins are Aflatoxins and Zeralenone (ZEA) [the most common are Aflatoxin B1 (AFB1)], Trichothecenes, Ochratoxins (OTA) and ergot alkaloids [the most common are Deoxynivalenol (DON) and T-2]. Increasing interest in preventing mycotoxin formation and/or reducing the effect of mycotoxin contamination in foods and feed raw materials has led scientists to focus on the biotransformation of mycotoxins and their detoxification by reducing their bioavailability by adsorption. In recent years, physical and chemical detoxification methods of mycotoxins have negative effects on the nutritional quality of both food and animal feed, cause loss of nutrients, and cannot be applied due to their negative effects on human and animal health. Again, these methods are difficult to implement, require an expensive investment, and the organoleptic and physical disorders they create in feed have led researchers to reliable and successful biological detoxification methods that do not have any negative effects on human and animal health. In this study, it is aimed to compile studies on the biological detoxification of mycotoxins. A review of studies using these biological methods, primarily lactic acid bacteria, other probiotic bacteria, yeasts, protozoa and other toxin-binding microorganisms is presented.

Keywords: Mycotoxins, feed, biological detoxification.

**CANİNE PARVOVİRÜS ENFEKSİYONUNUN MOLEKÜLER, SEROLOJİK,
HEMATOLOJİK, EPİDEMİYOLOJİK VE C-REAKTİF PROTEİN SEVİYELERİ ile
ARAŞTIRILMASI**

**EVALUATION OF CANINE PARVOVIRUS INFECTION BY MOLECULAR,
SEROLOGICAL, EPIDEMIOLOGICAL, HEMATOLOGICAL, AND C-REACTIVE
PROTEIN LEVELS**

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ÖZET

Canine Parvovirus (CPV) enfeksiyonu, köpekler arasında yüksek ölüm oranları ile seyretmektedir, dünya genelinde yaygındır ve halen en bulaşıcı akut viral köpekgil hastalıklarından birisi olarak kabul edilmektedir. Bu çalışmadaki amaç; moleküler, serolojik, epidemiyolojik, hematolojik ve istatistiksel analiz yöntemlerini kullanarak CPV enfeksiyonunu güncel bilgilerle araştırmaktır. Bu amaçla 2020-2021 yılları arasında halsizlik, kusma, ateş ve ishal şikayetleri olan aşılanmamış 52 köpekten dışkı, kan, serum örnekleri ve ayırt edici hasta verileri toplandı. Viral DNA, taze dışkıdan ekstrakte edildi ve ortalama DNA konsantrasyonu ve saflığı, Nanodrop Spektrofotometri ile ölçüldü. İncelenen örneklerin 29'unda (%55,8) RT-PCR ile CPV genomik DNA'sı, 27'sinde (%51,9) ELISA ile serumda anti-CPV IgM ve IgG antikorları ve 20'sinde (%38,5) immünokromatografi ile dışkıda viral antijenler saptandı. Serum C-reaktif proteinin (CRP) ortalama değeri, köpeğe özgü kantitatif ELISA yöntemi ile 4,66 g/L (3,27-6,05 g/L) olarak ölçüldü. Hematolojik analizler hasta köpeklerde lenfopeni (%89,6), lökopeni (%44,8), anemi (%68,9) ve düşük hematokrit (%82,8) olduğunu gösterdi. Sonuçlara göre hematolojik parametrelerin ve CRP'nin parvovirüs enfeksiyonunu tanımlamada yeterince spesifik olmadığı, ancak ayırıcı tanı ve prognoz için yararlı olduğu düşünüldü. İstatistiksel analizler, tüm köpeklerin 1 yaşın altında olduğunu gösterdi; bunlardan 3 aya kadar olan 21 köpek (%72,4) ve 6 aya kadar olan 8 köpek (%27,6) CPV pozitif ve prevalans %93,1 (n=27) ile en yüksek sokağa erişimi olan ve serbest dolaşan köpekler arasındaydı. Hastalığın tanısında RT-PCR sonuçları ile ELISA antikor testleri arasında anlamlı bir fark olmadığı, ancak dışkı viral antijen immünokromatografisi yöntemi ile anlamlı bir fark olduğu gözlemlendi.

Anahtar Kelimeler: 3-7 kelime.

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ABSTRACT

Canine Parvovirus (CPV) infection is still accepted as one of the most contagious acute viral diseases worldwide, with high mortality rates among canids. The aim was to approach the CPV infection with current information using molecular, serological, epidemiological and hematological analysis. During the study stool, blood, serum samples, and distinctive patient data were obtained from 52 unvaccinated dogs with complaints of weakness, vomiting, fever, and diarrhea during 2020-2021. Viral DNA was extracted from fresh stools and the average DNA concentration and purity were measured by Nanodrop

Spectrophotometry. CPV genomic DNA by RT-PCR in 29 (55.8%), anti-CPV IgM and IgG antibodies in serum by ELISA in 27 (51.9%), and viral antigens in stool by immunochromatography in 20 (38.5%) of the samples examined, were detected. The mean value of serum C-reactive protein (CRP) was measured 4.66 g/L (3.27-6.05 g/L) by canine-specific quantitative ELISA. Lymphopenia (89.6%), leukopenia (44.8%), anemia (68.9%), and low hematocrit (82.8%) were prominent in hematology. Statistical analysis was indicated all dogs were under 1 year of age, of which 21 dogs (72.4%) up to 3 months old and 8 dogs (27.6%) up to 6 months old were CPV positive and the prevalence is highest among dogs with outdoor access 93.1% (n=27). It was concluded that hematological parameters and CRP were not specific enough to define parvovirus infection, but useful for differential diagnosis and prognosis. Results indicated that there was no significant difference between RT-PCR results and ELISA antibody tests, but there was a significant difference with stool viral antigen immunochromatography.

Keywords: Canine parvovirus, RT-PCR, ELISA, IgM, IgG, Epidemiology, CRP

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**KÖFTELERDE N^e-(KARBOKSİMETİL) LİZİN (CML) OLUŞUMU ÜZERİNE
NARİNGENİN ETKİSİ**
**EFFECT OF NARINGENIN ON N^e-(CARBOXYMETHYL) LYSINE (CML)
FORMATION IN MEATBALLS**

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ÖZET

Bu çalışma, bileşimine farklı oranlarda naringenin (N) ilave edilen köftelerin pişirilmesi sırasında N^e-(karboksimetil) lizin (CML) oluşumu üzerindeki etkisini incelemek amacıyla yapıldı. Bu amaçla naringenin köftelere 0,04 mg/100g (N1) ve 0,06 mg/100g (N2) oranında ilave edilerek 4±1 °C’de 16 gün muhafaza edildi. Muhafaza periyodu boyunca dörder günlük aralıklarla köfte grupları 250 °C 10 dakika pişirilerek CML, tiyobarbitürik asit reaktif maddeler (TBARS) ve duyu analizler yapıldı. Köftelerin CML miktarları 0. günde 13,74±0,73 -14,29±0,56, 16. gününde ise 15,24±0,12 - 18,15±0,43 µg/g arasında saptandı. Muhafazanın 0, 4, 8. günlerinde gruplar arasında fark yok iken 12. gününde kontrol grubu ile N1 ve N2 grupları arasında sırasıyla 2,32, 2,73 µg/g, muhafazanın 16. gününde ise kontrol grupları ile N1 ve N2 grupları arasında sırasıyla 2,01, 2,91 µg/g fark olduğu saptandı. Köftelerin TBARS değerleri 0. günde 1.55±0.21 - 1.78±0.17, 16. gününde ise 2,54±0,28 - 3,28±0,47mg MDA/kg arasında saptandı. Muhafazanın 0, 4, 8 günlerinde gruplar arasında fark yok iken 12. gününde kontrol grubu ile N1 ve N2 grupları arasında sırasıyla 0,39, 0,43 MDA/kg fark saptandı. Muhafazanın 16. gününde ise kontrol grupları ile N1 ve N2 grupları arasında sırasıyla 0,43, 0,74 MDA/kg fark olduğu saptandı. N içeren gruplar ile kontrol grubu arasında 8. muhafaza gününde koku ve genel beğeni açısından, 12. muhafaza gününde ise genel beğeni açısından fark olduğu saptandı (P<0,05). Diğer muhafaza günlerinde gruplar arasında fark olmadığı tespit edildi. Sonuç olarak, köfte bileşimine naringenin ilave edilmesinin köftelerde CML oluşumunu inhibe ettiği, oksidasyon hızını yavaşlattığı ve duyu özellikleri olumsuz etkilemediği tespit edildi. Böylece naringenin köftelere ilavesinin insan sağlığı açısından özellikle CML oluşumu ve oksidasyonu yavaşlatması ile faydalı bir bileşen olduğu sonucuna varılmıştır.

Anahtar Kelimeler: CML, Köfte, N^e-(karboksimetil) lizin, Naringenin

ABSTRACT

This study was carried out to examine the effect of N^e-(carboxymethyl) lysine (CML) formation during cooking of meatballs with different ratios of naringenin (N) added to their composition. For this purpose, naringenin was added to the meatballs at the rate of 0.04 mg/100g (N1) and 0.06 mg/100g (N2) and stored at 4±1 °C for 16 days. CML, thiobarbituric acid reactive substances (TBARS) and sensory

analyses were performed by cooking meatball groups at 250 °C for 10 minutes at four-day intervals throughout the storage period. The amount of CML of the meatballs was 13.74 ± 0.73 - 14.29 ± 0.56 on day 0, and between 15.24 ± 0.12 - 18.15 ± 0.43 $\mu\text{g/g}$ on day 16. While there was no difference between the groups on days 0, 4 and 8 of storage, the difference between the control group and the N1 and N2 groups on the 12th day was 2.32, 2.73 $\mu\text{g/g}$, respectively. On the 16th day of storage, there was a difference of 2.01, 2.91 $\mu\text{g/g}$ between the control groups and the N1 and N2 groups, respectively. The TBARS values of the meatballs were between 1.55 ± 0.21 - 1.78 ± 0.17 on day 0, and between 2.54 ± 0.28 - 3.28 ± 0.47 mg MDA/kg on day 16. There was no difference between groups at 0, 4, 8 days of storage. On the 12th day of storage, a difference of 0.39 and 0.43 MDA/kg was detected between the control group and the N1 and N2 groups, respectively. On the 16th day of storage, there was a difference of 0.43 and 0.74 MDA/kg between the control groups and the N1 and N2 groups, respectively. It was determined that there was a difference between the groups containing N and the control group in terms of smell and general taste on the 8th storage day, and in the general taste on the 12th storage day ($P < 0.05$). It was determined that there was no difference between the groups on the other storage days. As a result, it was determined that the addition of naringenin to the meatball composition inhibited the formation of CML in the meatballs, slowed the oxidation rate and did not adversely affect the sensory properties. Thus, it was concluded that the addition of naringenin to meatballs is a beneficial component for human health, especially by slowing down the formation of CML and oxidation.

Keywords: CML, Meatballs, N^ε-(carboxymethyl) lysine, Naringenin.

**HAYVANSAL ATIK YAĞLARINDAN BİYİYAKIT ELDESİ İÇİN HAYVAN NÜFUSUNUN
HESAPLANMASI**
**ANIMAL POPULATION CALCULATION FOR BIOFUEL PRODUCTION FROM ANIMAL
WASTE FATS**

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ÖZET

Bilimsel literatürde ülkemizin gelecek yıllardaki hayvan sayısı ile ilgili bir veri bulunmadığından bu çalışmada net bir hayvan nüfus projeksiyonu yapılması amaçlanmıştır. İnsanların sağlıklı ve dengeli bir şekilde beslenmesi için beş temel besin grubunu tüketmesi gerekmektedir. Bu temel besin öğelerinin büyük bir çoğunluğunu et, süt ve süt ürünleri oluşturmaktadır. Bu gruptaki besin ihtiyacı genellikle büyükbaş ve küçükbaş hayvanlar tarafından karşılanmaktadır. Ancak, 2022 yılı başında Türkiye’de et ithalatı yasaklanmıştır. Türkiye’nin gün geçtikçe artan nüfusunu beslemek için ülkedeki hayvan sayısının yeterli olup olmayacağı dikkate alınması gereken bir konudur. Ayrıca, hayvanların kesiminde et, deri ve gıdada kullanılabilir yağlar alındıktan sonra ortaya çıkan atık yağlar halk sağlığı için büyük tehdit oluşturmaktadır. Atık yağların doğaya atılması ise çevre kirliliğine neden olmaktadır. Hayvan yağların atık yönetimi, ülkenin kalkınması ve çevresel öncelikler için büyük önem arz etmektedir. Oluşan bu atık yağları biyoyakıt (direkt yakıt olarak, biyodizel, vs.) dönüştürerek doğa için sürdürülebilir ve temiz bir enerji kaynağı sağlanabilir. Böylelikle atık yağlarının bertarafı kolaylaştırılır. Bu çalışmada, gelecek yıllardaki hayvan sayısı tahmini yapmak için 2 farklı metot geliştirilmiştir. İlk metotta 2010-2021 yılları arasında kişi başına düşen hayvan sayısı ile gayri safi yurt içi hâsıla (GSYH) verileri arasındaki matematiksel (doğrusal) ilişki analiz edilmiştir. İkinci metotta 2010-2021 yılları arasındaki hayvan nüfusu verileri ile doğrusal regresyon modeli geliştirilmiştir. Yapılan analizler sonucu, kişi başına düşen hayvan (sığır ve koyun) sayısı aynı değerler etrafında sabit kalmıştır. GSYH değerinin yıllar içerisinde azalması ya da artması hayvan sayısını etkilememiştir. Bu metotta GSYH ile kişi başına düşen hayvan sayısı arasında bağlantı kurulamadığı için sadece kişi başına düşen hayvan sayısı hakkında yorum yapmak mümkün değildir. Bu metodun uygulanabilirliği söz konusu olmadığı için ikinci metodun uygulanabilirliği incelenmiştir. Bu metotta determinasyon katsayısı (R^2) değerleri sığır ve koyun için sırasıyla 0,91 ve 0,94 olarak bulunmuştur. Buradan hareketle elde edilen denklemler ile hayvan sayısı tahmini yapılmıştır. Sonuç olarak, bu çalışma neticesinde geliştirilen modeller ile tahmin edilen, gelecek yıllarda hayvan sayılarının ortaya çıkacak problemlerin analizinde ve çözülmesinde önemli bir rol oynayacaktır.

Anahtar Kelimeler: Hayvan nüfus projeksiyonu, atık yağlar, biyoyakıt, modelleme.

ABSTRACT

In this study, it is aimed to make a clear animal population projection since there is no data in the scientific literature about the number of animals in Turkey in the next years. People must consume five basic food group to keep healthy and balanced diet. Meat, milk, and dairy products constitute most of these basic nutrients. The nutritional needs in this group are generally met by bovine animals and sheep and goats. However, at the beginning of 2022, meat imports were banned in Turkey. Whether the number of animals in the country will be sufficient to feed the increasing population of Turkey is an issue that needs to be considered. Also, waste fats produced after the consumption of meat, skin, and food-grade fats in the slaughter of animals pose a great threat to public health. Disposal of waste fats into nature causes environmental pollution. Waste management of animal waste fats is great importance for the development of the country and environmental priorities. By converting these waste fats into biofuel (directly as fuel, biodiesel, etc.), a sustainable and clean energy source can be provided for nature. Thus, the disposal of waste fats gets easy. In this study, two different methods were developed to estimate the number of animals in the coming years. In the first method, the mathematical (linear) relationship between the number of animals per capita and the gross domestic product (GDP) data between 2010-2021 was analyzed. In the second method, a linear regression model was developed with animal population data between 2010-2021. As a result of the analysis, the number of animals (cattle and sheep) per capita remained constant around the same values. The decrease or increase in the GDP value over the years did not affect the number of animals. In this method, it is not possible to comment only on the number of animals per capita, since no connection can be established between GDP and the number of animals per capita. Since the applicability of this method is not in question, the applicability of the second method was examined. The coefficient of determination (R^2) values in this method were found to be 0.91 and 0.94 for cattle and sheep, respectively. The number of animals was estimated with the equations obtained from here. As a result, the predicted by the models developed because of this study will play an important role in the analysis and solution of the problems that will arise in the number of animals in the coming years.

Keywords: Animal population projection, waste fats, biofuel, modelling.

IDENTIFYING, CLASSIFYING, AND PRIORITIZING ITEMS AFFECTING THE
CONTAGION OF BIOLOGICAL AGENTS AMONG HOSPITAL PERSONNEL

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ABSTRACT

Background: There are items affecting the contagion of biological diseases in hospitals. However, these items have different importance. This study was aimed to identify, classify, and prioritize items affecting the contagion of biological agents among hospital personnel.

Methods: This cross-sectional study was performed in three stages, including identifying items affecting the contagion of biological agents, classifying these items, and weighting these items. A non-systematic review was conducted using various keywords in valid databases to identify the items. Then, those were categorized into five groups based on the similarity. The fuzzy AHP was applied to the weight of each of the effective items and dimensions in the contagion of biological agents. The consistency rate (CR) of this study was 0.075, which is acceptable.

Results: 29 items were identified in this study which were categorized into five dimensions. The dimensions in order of priority were: job items (0.255), equipment-related items (0.233), ventilation items (0.196), environmental items (0.172), and organizational items (0.144). The separation status of hazardous wards (0.198) among environmental items, status of artificial air conditioning (0.273) among the ventilation items, danger level of person's job (0.221) among the job items, efficiency level of used personal protective equipment (0.211) among equipment-related items, and surveillance level on identification and quarantine of infected cases (0.184) among organizational items had highest weights.

Conclusion: These results can be helpful for managers of hospital to focus on important items for preventing the contagion of biological agents in the hospitals.

Keywords: biological agents, hospital personnel, fuzzy AHP

**CANİNE PAPİLLOMAVİRUS (CPV) ENFEKSİYONUNUN TANI ve TEDAVİSİ,
FİLOGENETİK ve EPİDEMİYOLOJİK İNCELEMESİ ile MUKOZAL OTOTERAPİ
REMİSYONU, TARANTULA CUBENSİS ZEHİRİ, LEVAMİSOL+AZİTROMİSİN
UYGULAMASI ve KENDİ KENDİNE İYİLEŞMENİN KARŞILAŞTIRILMASI; 57 VAKA.**

**CANINE PAPILLOMAVIRUS (CPV) INFECTION DIAGNOSIS AND TREATMENT:
PHYLOGENY and EPIDEMIOLOGY with MUCOSAL AUTO-THERAPY REMISSION,
TARANTULA CUBENSIS VENOM, LEVAMISOLE+AZITHROMYCINE MEDICATION
and SELF-HEALING, 57 CASES.**

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ÖZET

Önceki yıllarda köpeklerde papillomatozis enfeksiyonu üzerine teşhis ve çeşitli tedavi protokolleri bildirilmiştir. Bu çalışma, köpek papillomatozisine karşı veteriner hekimlikte kullanılan tanı, epidemiyoloji, filogeni ve farklı tedavi yöntemlerinin değerlendirilmesine dayanmaktadır. Hastalığın tanısı klinik belirtiler, PCR, histopatoloji ve filogeniye dayanıyordu. Mukozal saflaştırılmamış ototerapi, *Tarantula cubensis* zehiri, levamisol + azitromisin ilacı ve kendi kendine iyileşmenin etkinlik karşılaştırması, klinik yanıt, siğillerin remisyonu ve istatistiksel analizlerle değerlendirildi. 2014-2022 yılları arasında Veteriner Fakülteleri kliniklerine, özel veteriner hekim muayenehanelerine ve barınaklara getirilen yaşları 0,3 ile 20 arasında değişen 57 doğal enfekte köpek incelendi. 19 köpeğe 15 haftalık mukozal saflaştırılmamış oto-terapi, 16 köpeğe *Tarantula cubensis* zehiri, 13 köpeğe levamisol-azitromisin kombinasyonu uygulandı ve ayrıca herhangi bir tedavi uygulanmayan 9 köpekte kendi kendine iyileşme gözlemlendi. Köpeklerin istatistiksel verilerini karşılaştırmak için Yates düzeltilmeli ki-kare testi ve Fisher'in kesin testi kullanıldı. Tamamen iyileşen köpeklerin; 16 (n=19/16; %84,12) ototerapide, 6 (n=16/6; %37,5) *Tarantula cubensis* zehiri, 8 (n=13/8; %61,5) levamisol-azitromisin kombinasyonu ve 4 (n=9/4; %44,4) kendini iyileştiren grupta oldukları gözlemlendi. Sonuçlar, köpek papillomatozunun tedavisi için mukozal ototerapinin güvenli, etkili, kullanımı kolay ve hasta dostu olduğunu gösterdi. Cinsiyet, yaş ve siğil lokalizasyonuna göre incelemeye yönelik lojistik regresyon modellemesi, siğil remisyonunun mukozal ototerapi tedavisiyle en fazla ve daha az ölçüde, ayrıca levamisol ve azitromisin ile pozitif olarak ilişkili olduğunu, ancak *Tarantula cubensis* zehiriyle olmadığını doğruladı. Filogenetik ağaç, Adana bölgesinden A1, B1 ve C1 izolatlarının diğer Türkiye izolatları (MH376704, MH376705 Koç,B.T. ve Oğuzoğlu,T.C.) ile uyumlu olduğunu ve İstanbul bölgesinden A2 ve B2 izolatları ile uzak benzerlik gösterdiğini ortaya koymuştur. İstanbul bölgesinden C2 izolatı incelendiğinde ise virüsün hem çalışmaya alınan virüsler hem de veri tabanındaki diğer 20 izolatın progenitor virüsü (ata virüs) olabileceği düşünülmüştür.

Anahtar Kelimeler: Canine papillomavirüs, Ototerapi, PCR, Filogenetik, Histopatoloji, Tedavi, Epidemiyoloji.

Teşekkür: Bu çalışma kısmen Çukurova Üniversitesi Ceyhan Veteriner Fakültesi ve İstanbul – Cerrahpaşa Üniversitesi Veteriner Fakültesi tarafından desteklenmiştir.

ABSTRACT

Diagnosis and various medication protocols previously reported on canine papillomatosis. This study based on the evaluation of the diagnosis, epidemiology, phylogeny and different treatment methods used in veterinary medicine against canine papillomatosis. The diagnosis was based on clinical signs, PCR, histopathology and phylogeny. The efficacy comparison of the mucosal non-purified auto-therapy, *Tarantula cubensis* venom, levamisole + azithromycine medication and self-healing was evaluated by clinical response, remission of warts and statistical analyses. 57 naturally infected dogs aged between 0.3 and 20 years brought to veterinary clinics, private veterinary practices and shelters between 2014-2022 were examined. 15 weeks of mucosal non-purified auto-therapy was performed in 19 dogs, *Tarantula cubensis* venom in 16 dogs, levamisole-azithromycine medication in 13 dogs and also self-healing was observed in 9 dogs that did not receive any treatment. Yates-corrected chi-square test

and Fisher's exact test was used to compare the proportion of dogs. Dogs that have fully recovered; 16 (n=19/16; 84,12%) in autotherapy, 6 (n=16/6; 37,5%) *Tarantula cubensis* venom, 8 (n=13/8; 61,5%) levamisole-azithromycine treatment and 4 (n=9/4; 44,4%) were observed to be in the self-healing group. Results indicated that the mucosal autotherapy was safe, effective, easy to use and patient friendly for the treatment of canine papillomatosis. Logistic regression modelling to adjust for gender, age and wart localization, confirmed that wart remission was positively associated with mucosal autotherapy treatment and to a lesser extent, also to levamisole and azithromycine but not to *Tarantula cubensis* venom. The phylogenetic tree indicated that A1, B1 and C1 isolates from the Adana region were compatible with other Turkish isolates (MH376704, MH376705 Koc,B.T. and Oguzoglu,T.C.) and presented distant similarity with the A2 and B2 isolates from the İstanbul region. When the C2 isolate from the İstanbul region was examined, it was decided that it could be the progenitor virus of both the viruses included in the study and the other 20 isolates virus in the database.

Keywords: Canine papillomavirus, Autotherapy, PCR, Phylogeny, Histopatology, Treatment, Epidemiology.

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SICAK YEMEKLERDE SOĞUTMA HIZININ BESİN DEĞERİ ÜZERİNE ETKİSİ
THE EFFECT OF COOLING RATE ON NUTRITIONAL VALUE OF HOT MEALS

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ÖZET

Sağlıklı beslenmek için gün içerisinde tüketilen gıdalardan alınan mikro besinler, vücudun günlük ihtiyacını karşılamalıdır. Ancak mikro besinlerden birçoğu sıcaklığa dayanıklı olmayıp pişirme aşamasında gıdanın içerisinde büyük oranlarda bozularak etkinliğini kaybetmekte ve vücuda sağladığı yarar azalmaktadır. Günlük olarak önemli miktarlarda alınması gereken ve yüksek sıcaklıklara maruz kaldığında konsantrasyonu düşen en önemli mikro besinler arasında A ve C vitamini bulunmaktadır. Yapılan çalışma kapsamında pişmiş yemeklerde soğutma hızının farklı yemek türlerinde A ve C vitamini kaybına etkisinin incelenmesi amaçlanmıştır.

Piştirilen yemekler 90-15 °C aralığında farklı soğutma hızlarında tasarlanan iki farklı soğutma ortamında (25°C'lik ortam sıcaklığı ve hızlı soğutma özelliği bulunan buzdolabı) soğutulmuştur. Soğutma hızının A ve C vitamini kaybına etkisini incelemek amacıyla sebze çorbası ve domatesli biber sosu olmak üzere üç farklı yemek türü belirlenmiştir. Karşılaştırmalı gerçekleştirilen testlerde yemeklerden biri pişirildikten sonra hızlı soğutma özelliği bulunan buzdolabına hemen konulmuştur, diğeri ise oda sıcaklığında tutulmuş; oda sıcaklığına ulaştıktan sonra orijinal buzdolabında saklanmıştır. Yemeklerin 90°C ve 15°C'de A ve C vitaminleri miktarları belirlenmiştir. Daha sonra her iki koşul için meydana gelen vitamin kaybı miktarları kıyaslanmıştır.

Sebze çorbasının hızlı soğutulması yavaş soğutmaya kıyasla A vitaminini %36,8 oranında, C vitaminini ise %55,2 oranında daha fazla koruduğu belirlenmiştir. Domatesli biber sosunun hızlı soğutulması ise yavaş soğutmaya kıyasla A vitaminini %56,5 oranında, C vitaminini ise %34,8 oranında daha fazla koruduğu belirlenmiştir. Benzer şekilde brokoli yemeğinin hızlı soğutulması yavaş soğutmaya kıyasla A vitaminini %54,8 oranında, C vitaminini ise %70 oranında daha fazla koruduğu belirlenmiştir. Sonuç olarak, sıcak yemeklerin hızlı soğutulması sırasında yüksek sıcaklıklara daha kısa süre maruz kalmaları vitamin gibi hassas bileşenlerin korunması açısından avantaj sağlamıştır.

Anahtar Kelimeler: Soğutma hızı, sıcak yemek, vitamin kaybı, besin değeri

ABSTRACT

For a healthy diet, micronutrients obtained from the foods consumed during the day should meet the daily needs of the body. However, many of the micronutrients are heat sensitive and as a result during the cooking process, they decompose in the food at high rates and lose their effectiveness and the benefit to the body decreases. Vitamins A and C are among the most essential micronutrients that must be taken daily in significant amounts and whose concentration decreases when exposed to high temperatures.

Within the scope of the study, it was aimed to examine the effect of cooling rate on vitamin A and C loss of in various types of cooked food.

Cooked meals were cooled in two different cooling environments designed at different cooling rates between 90-15 °C (ambient temperature of 25 °C and a refrigerator with rapid cooling feature). In order to examine the effect of cooling rate on vitamin A and C loss, three different types of food were determined, namely tomato and pepper sauce, vegetable soup and broccoli meal. In the comparative tests, one of the dishes was immediately placed in the refrigerator with rapid cooling after cooking, and the other was kept at room temperature; Stored in the original refrigerator after reaching room temperature. The amounts of vitamins A and C of the meals were determined at 90°C and 15°C. Then, the amount of vitamin loss for both conditions was compared.

It was determined that rapid cooling of vegetable soup preserved vitamin A by 36.8% and vitamin C by 55.2% compared to slow cooling. It was determined that rapid cooling of tomato and pepper sauce preserved its vitamin A by 56.5% and vitamin C by 34.8% compared to slow cooling. Similarly, it was determined that rapid cooling of broccoli meal preserved vitamin A by 54.8% and vitamin C by 70% more than slow cooling. As a result, shorter exposure to high temperatures during the rapid cooling of hot meal provided an advantage in terms of protecting sensitive components such as vitamins.

Keywords: Cooling rate, hot meal, vitamin loss, nutritional value

KEDİLERDE HAEMOPLAZMA TÜRLERİNİN REAL-TİME PCR İLE ARAŞTIRILMASI
INVESTIGATION OF HAEMOPLASMA SPECIES IN CATS WITH REAL-TIME PCR

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ÖZET

Haemoplazmalar (hemotropik mikoplazmalar) birçok memeli hayvanda anemiye neden olan, eritrositlerin yüzeyine yapışan bakterilerdir. Kedilerde tanımlanan türler *M. haemofelis* (Mhf), *Candidatus Mycoplasma haemominutum* (CMhm), *Candidatus Mycoplasma turicensis* (CMT), *Candidatus Mycoplasma haematoparvum*'dur. *M. haemofelis*, kedilerdeki en patojen tür ve klinik

olgulardan en sıklıkla sorumlu olan tür olarak vurgulanmaktadır. Hayvanlarda hemoplazmoz şiddetli anemiden klinik belirtiler göstermeyen kronik infeksiyonlara kadar değişen formlarda görülebilir. Bu araştırmada kedilerde haemoplazma türlerinin varlığının real-time PCR yöntemi ile saptanması ve türlerin dağılımlarının belirlenmesi amaçlanmıştır. Ayrıca kedilerde hastalığın şekillenmesinde rol oynaması olası yaş, ırk, cinsiyet, yaşam şekli ve bunun gibi birçok faktörün, istatistiki olarak değerlendirilmesi ve böylece hastalığı epidemiyolojisi hakkında da bilgiler elde edilmesi amaçlanmıştır. Bu amaçla, İstanbul Üniversitesi-Cerrahpaşa, Veteriner Fakültesi İç hastalıkları kliniğine getirilen ve anemi, iştahsızlık, ateş, kilo kaybı, sarılık, hipoglisemi, splenomegali, mukozalarda solukluk, depresyon gibi klinik bulgularından en az birini gösteren 246 kediden kan örnekleri toplandı. DNA ekstraksiyonunun takiben Real-time PCR ile *CMhm*, *Mhf* ve *CMt* varlığı yönünden incelendi. Real-time PCR sonuçlarına göre incelenen 246 kedinin 20 (%8,13)'sinde *CMhm*, 3 (%1,22)'ünde *CMt*, 2 (%0,81)'sinde *Mhf* saptandı. Toplam 246 kedinin 21 (%8,54)'inde hemoplazma türlerinden en az biri saptandı. İki kedide hem *Mhf* hem *CMhm*; iki kedi de hem *Cmt* hem de *CMhm* saptanmış, hemoplazma saptanan 21 kedinin 4 (%19,05)'ünde iki farklı hemoplazma türü saptandı. PCR pozitifliği ile kedilerin dışarı ile temaslarının olması ($p=0,058$) ve kedilerin başka kediler ile temas halinde olması ($p=0,02$) ve ağız içi yaranın saptanması ($p=0,001$) arasındaki ilişki istatistiki olarak anlamlı bulundu. Ülkemizde hemoplazma türlerinin kedilerdeki varlığı ve risk faktörleri, klinik bulgular ile ilişkisi gibi epidemiyolojik verileri kapsayan çalışmaların devam etmesi gereklidir. Bu şekilde günümüzde çok fazla incelenmeyen bu türlerin gözden kaçma olasılığı düşecek, nedeni tanımlanamamış bazı klinik bulgulara uygun antibiyotik seçimi ile daha kısa sürede tedavi edilmesi mümkün olacaktır.

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Anahtar Kelimeler: Haemoplazma, Kedi, Kan, Real-Time PCR

ABSTRACT

Haemoplasmas (hemotropic mycoplasmas) are organisms which are attached to the surface of erythrocytes of various mammals and cause anemia. Species identified in cats are *M. haemofelis* (*Mhf*), *Candidatus Mycoplasma haemominitum* (*CMhm*), *Candidatus Mycoplasma turicensis* (*CMt*), *Candidatus Mycoplasma haematoparvum*. *M. haemofelis* is highlighted as the most pathogenic species and the species most frequently responsible for clinical cases in cats. Hemoplasmosis in animals can occur in forms ranging from severe anemia to chronic infections without clinical signs. In this study, it was aimed to determine the presence of haemoplasma species in cats by Real-time PCR method and to determine the distribution of species. In addition, it is aimed to be evaluated statistically about many possible factors such as age, race, sex, way of life and other factors that may play a role in the formation of the disease in the cats so as to obtain information about the epidemiology of the disease. For this purpose, blood samples collected from 246 cats showing at least one of the clinical findings such as anemia, loss of appetite, fever, weight loss, jaundice, hypoglycemia, splenomegaly, mucosal paleness and depression, and brought to clinics of Istanbul University- Cerrahpaşa, Faculty of Veterinary Medicine. DNA extraction was followed by Real-time PCR for *CMhm*, *Mhf* and *CMt*. According to Real-time PCR results, *CMhm* was detected in 20 (8,13%), *Cmt* in 3 (1,22%) and *Mhf* in 2 (0,81%) of 246 cats examined. At least one of the 24 haemoplasma species was found in 21 (8.54%) of 246 cats. The two cats were both *Mhf* and *CMhm* positive and in another two cats *CMhm* and *CMt* were detected. The relationship between PCR positivity and the presence of contact with the outside ($p=0,058$) and the presence of contact of other cats ($p=0,02$) and the detection of intra-oral infection ($p=0,001$) were statistically significant. In our country, studies involving epidemiologic data such as the presence of haemoplasmas and risk factors in relation to clinical findings should be continued. In this way, those species which are not investigated too much today will be less likely to be overlooked and, in some unidentified clinical findings, the selection of appropriate antibiotics will enable shorter treatment times.

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Keywords: Blood, Cat, Haemoplasma, -Real-Time PCR.

**PYODERMA SAPTANAN KÖPEKLERDEN İZOLE EDİLEN
Staphylococcus pseudintermedius TÜRLERİNİN KARAKTERİZASYONU***
**CHARACTERIZATION OF *Staphylococcus pseudintermedius* SPECIES ISOLATED
FROM DOGS WITH PYODERMA***

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ÖZET

Pyoderma, köpeklerde karşılaşılan deri hastalıklarının arasında önemli bir yer tutmaktadır. Pyodermaya neden olan bakteriyel etkenlerin en başında da *Staphylococcus pseudintermedius* gelmektedir. Zoonoz karakteri olan bu etkenin çevre ve halk sağlığı açısından da önemi çok büyüktür. Bu çalışmanın amacı; klinik olarak pyoderma tanısı konulan köpeklerden *S. pseudintermedius* izolasyon oranının belirlenmesi, antibiyotik direnç profili ile biyofilm oluşturma yeteneklerinin fenotipik ve genotipik olarak değerlendirilmesini içermektedir. Bu amaçla; İstanbul Üniversitesi- Cerrahpaşa, Veteriner Fakültesi, İç Hastalıkları kliniğine getirilen ve pyoderma tanısı konulan 205 köpeğin lezyonlu bölgelerinden alınan sıvab örnekleri, Mikrobiyoloji Anabilim Dalı'nda *S. pseudintermedius* yönünden incelenmiştir. İncelenen örneklerin %53,17 (n=109)'sinden *S. pseudintermedius* izole edilmiştir. İzolatların fenotipik olarak antibiyotik duyarlılıklarının belirlenmesinde disk difüzyon yöntemi kullanılmıştır. Bununla birlikte metisilin (*mecA*), beta laktamaz (*blaZ*), makrolid (*ermA*, *ermB*, *ermC*), tetrasiklin (*tet(K)*, *tet(L)*),

tet(M), *tet(O)*), kloramfenikol (*cat set1*, *cat set2*) ve gentamisin (*aac (6')-aph (2'')*) direnci ile ilişkili gen bölgeleri PCR yöntemi ile incelenmiştir. Biyofilm oluşumunun değerlendirilmesinde Congo Red Agar Yöntemi ve Mikrotiter Plate Test kullanılmıştır. Ayrıca biyofilm oluşturma yeteneği ile ilişki gen bölgesi (*icaA*, *icaD*) de PCR yöntemi ile incelenmiştir. 13 farklı antibiyotik ile yapılan antibiyotik duyarlılık testi incelenmesine göre yapılan antibiyotiplendirme sonucunda 24 antibiyotikte çoklu antibiyotik direnci saptanmıştır. En çok direnç belirlenen antibiyotikler penisilin (n=60), sulfisoksazole (n=50) ve tetrasiklin (n=41) olmuştur ve 9 izolatta metisilin direnci saptanmıştır. Biyofilm oluşturma yeteneğinin değerlendirilmesinde fenotipik olarak yapılan iki yöntemin sonuçları karşılaştırılmıştır. Biyofilm oluşturma özelliği fenotipik olarak negatif olan izolatlarda ilgili gen bölgelerinin varlığı saptanmıştır. Ülkemizde bu etken ile ilgili çalışmalar sınırlı sayıdadır. Özellikle veteriner hekimlikte önemli bir nozokomiyal patojen olan *S. pseudintermedius*'un zoonoz karakteri ve gelişmiş olan antibiyotik direnci gözardı edilmemelidir.

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Anahtar Kelimeler: *Staphylococcus pseudintermedius*, pyoderma, antimikrobiyal direnç, köpek.

ABSTRACT

Pyoderma is the most important disease that the dogs encountered in skin diseases. *Staphylococcus pseudintermedius* is the most frequently bacterial agent that cause pyoderma. This agents' zoonotic character is the great importance for environment and public health. The aim of this study includes determining the isolation rate of *S. pseudintermedius* from dogs with pyoderma, phenotypic and genotypic evaluation of antibiotic resistance profiles and biofilm formation abilities. For this purpose, swab samples taken from the lesioned areas of 205 dogs, which were brought to Istanbul University-Cerrahpaşa, Faculty of Veterinary Medicine, Internal Medicine Clinic and diagnosed as pyoderma as a result of clinical examinations, were examined for *S. pseudintermedius* in the Department of Microbiology. *S. pseudintermedius* was isolated from 53.17% (n=109) of the examined samples. Phenotypically antibiotic susceptibility test of isolates was determined by disc diffusion method. However, the gene regions associated with methicillin (*mecA*), beta lactamase (*blaZ*), macrolide (*ermA*, *ermB*, *ermC*), tetracycline (*tet(K)*, *tet(L)*, *tet(M)*, *tet(O)*), chloramphenicol (*cat set1*, *cat set2*) and gentamicin (*aac (6')-aph (2'')*) resistance were investigated by PCR. Congo Red Agar Method and Microtiter Plate Test were used to evaluate biofilm formation. In addition, gene regions (*icaA*, *icaD*) associated with biofilm formation ability were also investigated by PCR. As the result of the antibiotic susceptibility test performed with 13 different antibiotics, multi drug resistance was detected in 24 antibiotypes. The most resistant antibiotics were penicillin (n=60), sulfisoxazole (n=50) and tetracycline (n=41). Methicillin resistance was detected in 9 isolates. The results of two phenotypic methods were compared to evaluate the biofilm forming ability. The presence of relevant gene regions was determined in isolates that were phenotypically negative for biofilm formation. There are limited studies about *S. pseudintermedius* in Türkiye. The zoonotic character and developed antibiotic resistance of *S. pseudintermedius*, which is an important nosocomial pathogen especially in veterinary medicine, should not be ignored.

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Keywords: *Staphylococcus pseudintermedius*, pyoderma, antimicrobial resistance, dog.

ADANA YÖRESİNDEKİ KÖPEKLERİN HEMOGRAM VERİLERİNİN
DEĞERLENDİRİLMESİ
EVALUATION OF HEMOGRAM DATA OF DOGS IN ADANA REGION

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ÖZET

Bu çalışma Eylül 2022 ile Aralık 2022 dönemleri arasında Adana’da faaliyet gösteren özel bir Veteriner Kliniğine rutin analizler için muayeneye getirilen sahipli evcil köpeklerin hematolojik parametrelerinin değerlendirilmesi amacıyla yapılmıştır. Bu amaçla kliniğe getirilen sahipli köpeklerden kan örnekleri alınarak biyokimyasal analizler yapıldı. Çalışmanın materyalini kliniğe getirilen, yaşları 1-10 yaş arasında değişen, farklı ırklardan, 40 erkek, 38 dişi olmak üzere 78 adet köpek oluşturdu. Ayrıntılı anamnezler alındıktan sonra, klinik muayeneleri yapılan köpeklerden kan örnekleri alındı. Çalışmada serum hemogram değerlerine bakıldı. Çalışma sonunda numune alınan köpeklerin hemogram değerlerinin belirlenmesi amacıyla kan örneklerinde; Lökosit (WBC), Nötrofil (NEU), Lenfosit (LYM), Monosit (MON), Eozinofil (EOS), Eritrosit (RBC), Hemogloblin (HGB), Hematokrit (HCT), Ortalama eritrosit hacmi (MCV), Ortalama hücre hemogloblin miktarı (MCH), Ortalama hücre hemogloblin konsantrasyonu (MCHC), Eritrosit dağılımı genişliği (RDW-CW, RDW-SD), ortalama trombosit hacmi (MPV), trombosit dağılım genişliği (PDW), Prokalsitonin (PCT) olmak üzere 16 farklı değere bakılmıştır.

Tüm köpeklerde cinsiyet yönünden kan parametrelerinde WBC ve NEU değerlerinde istatistiki olarak anlamlı fark göstermiştir ($p<0,05$). Diğer değerlerin normal referans değerleri aralığında kaldığı gözlemlendi. Sonuç olarak; bu veriler kliniğe getirilen sahipli evcil köpeklerde enfeksiyon göstergesi olarak değerlendirildi. Köpeklerde bu verilerin anlamlı bulunmasının sebebinin köpeklerin idrar yapması için sahipleri tarafından dışarı çıkarılmaları sonucunda enfeksiyon kapabilecekleri sonucuna varıldı. Ayrıca çalışmadaki köpekler, soy ağacı belli olan köpekler olduğu için çok fazla hastalık görülmemiştir. Bu veriler kliniğe getirilen sahipli evcil köpeklerin; bakım ve beslenmelerinin düzenli olarak yapıldığı için, aşılarının ve parazit ilaçlarının veteriner hekim kontrolünde düzenli olarak yapıldığı için hemogram değerlerinden WBC ve NEU hariç normal sınırlarda olduğu kanısına varıldı.

Anahtar Kelimeler: Köpek, hemogram, biyokimyasal parametreler, klinik, kan.

ABSTRACT

This study was conducted to evaluate the biochemical parameters of owned domestic dogs brought to a private Veterinary Clinic operating in Adana for routine analysis between September 2022 and December 2022. For this purpose, biochemical analysis was performed by taking blood samples from the owning dogs brought to the clinic. The material of the study was made up of 61 male, 45 female dogs from different races, aged between 1-10 years old, brought to the clinic. After receiving detailed anamnesia, blood samples were taken from the dogs who had clinical exams. In the study, serum hemogram values were examined. In order to determine the hemogram values of the dogs sampled at the end of the study, in blood samples; Leukocyte (WBC), Neutrophil (NEU), Lymphocyte (LYM), Monocyte (MON), Eosinophil (EOS), Erythrocyte (RBC), Hemoglobin (HGB), Hematocrit (HCT), Mean corpuscular volume (MCV), Mean corpuscular hemoglobin (MCH), Mean corpuscular hemoglobin concentration (MCHC), Red blood cell distribution width (RDW-CW, RDW-SD), mean platelet volume (MPV), platelet distribution width (PDW), Procalcitonin (PCT) among 16 different values were examined.

Mean erythrocyte volume (MCV), Mean cell hemoglobin amount (MCH), Mean cell hemoglobin concentration (MCHC), Erythrocyte distribution width (RDW-CW, RDW-SD), mean platelet volume (MPV), platelet distribution width (PDW), Procalcitonin (PCT) values were measured.

There was no statistically significant difference in any data values in blood parameters in terms of gender in all dogs ($p>0.05$). It was observed that all values remained within the range of normal reference values. In conclusion, these data Care and feeding of owned domestic dogs brought to the clinic because it is done on a regular basis, veterinary medicine, vaccines and parasite control are done regularly because it is concluded that the hemogram values are within normal limits. In addition, since the dogs in the study were with a certain pedigree, not too many diseases were observed.

Keywords: Dog, hemogram, biochemical parameters, clinic, blood.

**BİTKİSEL SIVI EKSTRAKTLARIN SOĞUK TÜTSÜLENMİŞ SOMON (*Salmo salar*)
ÜZERİNDEKİ ANTİMİKROBİYAL ETKİSİ**
**ANTIMICROBIAL EFFECT OF HERBAL LIQUID EXTRACTS ON COLD SMOKED
SALMON (*Salmo salar*)**

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ÖZET

Su ürünlerinin yüksek besin değerine sahip olması aynı zamanda onları mikrobiyal bozulmaya duyarlı hale getirmektedir. Bitkisel sıvı ekstraktlar, su ürünlerinin bozulmasını geciktirmelerinin yanında doğal olmalarından dolayı insan sağlığı açısından daha çok tercih edilmektedir. Bu çalışmanın amacı, soğuk tütsülenmiş somon üzerinde bitkisel sıvı ekstrakt (BSE) solüsyonu (civanperçemi, kuzukulağı ve sinirli ot ekstraktları ticari karışımı) kullanarak antimikrobiyal etkisinin incelenmesi ve *Listeria monocytogenes* gelişimini engelleyerek bu ürünlerin raf ömrünün uzatılmasıdır. Antimikrobiyal etkinin yanı sıra duyu kalite parametreleri (renk, tat, koku, genel görünüş) üzerine etkisi de incelenmiştir. Soğuk tütsüleme işlemi yapıldıktan sonra spreyleme yöntemi ile yüzeyine %5 ve %8 BSE solüsyonu uygulanan ve BSE solüsyonu uygulanmayan (kontrol grubu) somon ürünleri vakum paketlenmiş ve 49 gün boyunca soğukta (+4±1°C) muhafaza edilmiştir. Her uygulama grubuna haftada bir olmak üzere duyu ve mikrobiyolojik analizler (toplam mezofilik canlı, psikrofilik canlı, toplam koliform ve küf-mayaya sayımı) yapılmıştır. Depolama boyunca yapılan toplam mezofilik ve psikrofilik canlı mikroorganizma sayım sonuçları, %5 ve %8 BSE solüsyonu uygulanmış ürünlerde maksimum limit olarak belirtilen 10⁷ kob/g balık değerini 42. günde geçmiştir. Kontrol grubu ise bu değere 21. günde ulaşmıştır. %5 ve %8 BSE solüsyonu uygulamasının, depolamanın başlangıcında 4 log₁₀ kob/g balık olacak şekilde inokule edilen *L. monocytogenes* yükünü, depolamanın 0. ve 7. gününde sırasıyla 1 log₁₀ ve 0,5 log₁₀ düzeyinde azalttığı görülse de depolamanın sonraki günlerinde kontrol grubu ile aynı düzeyde olduğu gözlenmiştir. Depolama boyunca yapılan duyu analiz sonuçlarına göre %5 ve %8 BSE solüsyonu uygulanmış ürünlerin duyu kalite parametrelerinde kontrol grubuna göre önemli bir değişiklik belirlenmemiştir. BSE solüsyonu uygulanmış ürünlerin mikrobiyal yükünde, kontrol örneklerine göre depolama süresince daha düşük düzeyde mikrobiyal gelişim gözlenmesi uygulanan doğal antimikrobiyalin etkili olduğunu göstermektedir. Elde edilen sonuçlara göre; %5 ve %8 BSE solüsyonu uygulanmış ürünler arasında mikrobiyal inaktivasyon ve duyu parametreleri açısından bir farklılık olmadığından soğuk tütsülenmiş somon ürünlerinde %5 bitkisel sıvı ekstrakt solüsyonu kullanımı önerilmektedir.

Anahtar Kelimeler: Bitkisel sıvı ekstrakt, Civanperçemi, Kuzukulağı, Sinirli ot, *Salmo salar*, *Listeria monocytogenes*, Raf ömrü

ABSTRACT

Aquatic food products having a high nutritional value are more susceptible to microbial spoilage. Herbal liquid extracts are preferred in terms of human health due to their naturalness in addition to delaying the deterioration of aquatic food products. The aim of this study is to determine the antimicrobial effect of herbal liquid extracts (HLE) solution (commercial mixture of yarrow, sheep's sorrel and common plantain) on cold smoked salmon products and to extend the shelf-life of these products by preventing the growth of *Listeria monocytogenes*. In addition to the antimicrobial effect, the effect on sensory parameters (color, taste, smell, general appearance) were also investigated. 5% and 8% HLE solutions

were applied to the surface of cold smoked salmon products by spraying method. Control group (without HLE solution), and the samples with 5% and 8% HLE solutions were vacuum packed and kept in cold ($+4\pm1^{\circ}\text{C}$) for 49 days. Sensory and microbiological analyses (total viable mesophilic, psychrophilic, total coliform and mold/yeast counts) were performed once a week for each application group. The results of total viable mesophilic and psychrophilic microorganisms counts performed during storage, exceeded the maximum limit of 10^7 cfu/g fish on 42nd day of storage for the products treated with 5% and 8% HLE solution. The control group, on the other hand, reached this value on the 21st day of storage. Although 5% and 8% HLE solution application decreased *L. monocytogenes* count by 1 \log_{10} and 0.5 \log_{10} on the 0 and 7th day of storage respectively, which was initially inoculated to be 4 \log_{10} / g fish, it was observed to be at the same level as the control group on the next days of storage. According to the results of sensory analysis performed during storage, no significant changes were determined in the sensory quality parameters of the products treated with 5% and 8% HLE solution compared to the control group. Products treated with HLE solutions showed a lower level of microbial growth during storage than the control samples, indicating that the applied natural antimicrobial liquid extract was effective. Since there was no significant difference between the products treated with 5% and 8% HLE solutions in terms of microbial inactivation and sensory quality parameters, the use of 5% HLE solution in smoked salmon products are recommended.

Keywords: Herbal liquid extracts, Yarrow, Sheep's sorrel, Common plantain, *Salmo salar*, *Listeria monocytogenes*, Shelf-life.

**SUSAM PROTEİN İZOLATININ YAPISAL VE FONKSİYONEL ÖZELLİKLERİ ÜZERİNE
YÜKSEK BASINÇLI HOMOJENİZASYONUN ETKİSİ**
**EFFECT OF HIGH PRESSURE HOMOGENIZATION ON CONFORMATIONAL AND
FUNCTIONAL PROPERTIES OF SESAME PROTEIN ISOLATE**

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ÖZET

Dünya nüfusunun artmasına paralel olarak tüketicilerin proteince zengin gıdalara olan ilgisinin de artış göstermesi, hayvansal protein kaynaklarının pahalılığı, dini inançlar (helal gıda üretimi) ve vegan/vejetaryen beslenme alışkanlıklarının yaygınlaşması gibi nedenlerle günümüzde bitkisel proteinlerin gıdalarda kullanımına yönelik ilgi de artmaktadır. Bitkisel proteinler ucuz ve sürdürülebilir olmaları, amino asit profili açısından dengeli olmaları nedeniyle avantaj sağlamaktadır. Ancak bitkisel proteinlerin zayıf işlevsellik sergilemesi, onların gıda ürünlerinde kullanımını sınırlamaktadır. Bu nedenle, son zamanlarda proteinlerin fonksiyonel özelliklerinin farklı tekniklerle geliştirilmesine yönelik çalışmalar hız kazanmıştır. Bu çalışmada, gıda atığı olan susam posasından ekstrakte edilen susam proteininin yapısal ve fonksiyonel özelliklerinin yüksek basınçlı homojenizasyon (YBH) teknolojisi ile geliştirilmesi amaçlanmıştır. Bu amaçla susam posasından ekstrakte edilen susam izolatına (protein içeriği %90.33) 0, 50, 100 ve 150 MPa basınçlarında YBH uygulanmıştır. YBH sonrası proteinlerin sekonder yapıları ve alt fraksiyonlarında önemli düzeyde değişiklik tespit edilmemiştir. Bununla birlikte en düşük partikül boyutu (0.79 µm) 100 MPa ve en yüksek zeta potansiyeli ise 150 MPa basınç uygulanan proteinlerde saptanmıştır. Proteinin suda çözünürlüğü 100 MPa'la kadar artan basınç ile artış göstermiş olup maksimum %.89.21 seviyeye ulaşmış, daha yüksek basınç seviyesinde azalma göstermiştir. Benzer şekilde proteinlerin yüzey hidrofobisitesi ve sertbest -SH gruplarında 100 MPa basınca kadar artış gözlenmiştir. Proteinlerin fonksiyonel özelliklerinden olan su/yağ bağlama kapasitesi, köpürme kapasitesi ve emülsiyon oluşturabilme özellikleri 100 MPa basınç uygulaması ile maksimuma ulaşmıştır. Kontrol örneğinde emülsiyon aktivite değeri 32.2 m²/g iken 100 MPa basınç uygulaması ile 64.63 m²/g değerine kadar artış göstermiş, emülsiyon stabilite değeri maksimuma (59.84 dak) ulaşmıştır. Köpük kapasitesi homojenizasyon uygulaması ile birlikte 2 kattan fazla artış göstermiş olup en satbil köpük 150 MPa basınç ile elde edilmiştir. Sonuç olarak 100 MPa'da YBH işleminin susam protein izolatının fonksiyonel özelliklerinin iyileştirilmesinde önemli etki gösterdiği ve dolayısıyla endüstriyel uygulamalar için potansiyel inovasyon teknolojisi olduğu ortaya konmuştur.

Anahtar Kelimeler: Susam proteini, fonksiyonel özellikler, protein modifikasyonu, yüksek basınçlı homojenizasyon (YBH).

Teşekkür: Bu çalışma Türkiye Bilimsel ve Teknolojik Araştırma Kurumu (TOVAG 120O773) tarafından desteklenmiştir.

ABSTRACT

Today, the interest in the use of plant proteins is increasing due to the increase in consumers' interest in protein-rich foods in parallel with the increase in the world population, the expensiveness of animal

protein sources, religious beliefs (halal food production) and the spread of vegan/vegetarian dietary habits. Plant proteins are advantageous because they are cheap, sustainable and balanced in terms of amino acid profile. However, the poor functionality of plant proteins limits their use in food products. Therefore, studies on improving the functional properties of proteins with different techniques have recently gained momentum. In this study, it was aimed to improve the conformational and functional properties of sesame protein extracted from sesame meal that is a food waste, by using high pressure homogenization (HPH) technology. For this purpose, HPH was applied to sesame isolate (protein content 90.33%) at pressures of 0, 50, 100 and 150 MPa. No significant changes were detected in the secondary structures and sub-fractions of proteins after homogenization treatment. However, the lowest particle size (0.79 μm) was determined at 100 MPa and the highest zeta potential was detected in the proteins applied pressure of 150 MPa. The protein solubility increased with increasing pressure up to 100 MPa, reached the maximum level of 89.21%, and decreased at higher pressure level. Similarly, an increase in surface hydrophobicity and free -SH groups of proteins was observed up to 100 MPa pressure. Water/oil holding capacity, foaming capacity and emulsifying properties, which are functional properties of proteins, reached their maximum values with 100 MPa pressure application. While the emulsion activity in the control sample was 32.2 m^2/g , it increased up to 64.63 m^2/g with 100 MPa pressure application, and the emulsion stability value reached its maximum (59.84 min). The foam capacity increased more than 2 times with the homogenization application at 100 MPa, and the most stable foam was obtained with 150 MPa. As a result, it has been revealed that HPH treatment at 100 MPa has a significant effect on improving the functional properties of sesame protein isolate, and thus it is a potential innovation technology for industrial applications.

Keywords: Sesame protein, high pressure homogenization (HPH), protein modification, functional properties.

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KÜÇÜK IRK KÖPEKLERDEKİ GÖZ HASTALIKLARINA RETROSPEKTİF BAKIŞ (2015-2019): 153 OLGU

A RETROSPECTIVE VIEW OF EYE DISEASES IN SMALL BREED DOGS (2015-2019): 153 CASES

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ÖZET

Çalışmanın amacı, 2015-2019 yılları arasında Yakın Doğu Üniversitesi Hayvan Hastanesine çeşitli göz şikayetleriyle getirilen küçük ırk köpeklerde göz hastalıklarının dağılımını incelemektir. Çalışma popülasyonu, 2 ay-17 yaş (ortalama 6 yıl) arası, 81 erkek, 72 dişi, 12 farklı ırktan 153 köpekten oluşmaktadır. Schirmer gözyaşı testi, tonometri, oküler ultrasonografi ve binoküler oftalmoskopi gibi tamamlayıcı teknikler uygulandı. Medikal sağaltıma yanıt vermeyen durumlarda ve acil durumlarda veya sağaltımın operatif kabul edildiği durumlarda operatif sağaltım uygulandı. İncelenen parametreler arasında hayvanların cinsiyeti, yaşı ve cinsi, klinik belirtiler ve oküler bozukluklar, sağaltım protokolleri yer aldı. Çalışmada en çok yer alan ırklar %37.7 (57/153) Pekingese ve, %28.1 (43/153) Terrier ırkı köpekler oldu. Lezyonlarda ise %45.8 (70/153) korneal lezyonlar ve %20.9 (32/153) lens lezyonları dikkat çekti. Genel olarak, olguların %69.3'ü (106/153) travma kaynaklı değilken, lezyonların uni ve bilateral veya medikal ve operatif sağaltımları arasında yakın sonuçlar elde edildi ve anlamlı bir fark belirlenemedi. Sonuç olarak, çalışmada en fazla belirlenen korneal ve katarakt lezyonlarının yanı sıra göz lezyonların oluşumunda ırksal yatkınlığın edinsel faktörlerden daha fazla rol oynadığı düşünüldü.

Anahtar Kelimeler: Köpek, ırk predispozisyonu, oküler bozukluklar

ABSTRACT

The aim of the study is to examine the distribution of eye diseases in small breed dogs brought to the Near East University Animal Hospital with various eye complaints between 2015 and 2019. The study population consisted of 81 males, 72 females, 153 dogs from 12 different breeds, aged 2 months to 17 years (average 6 years). Complementary techniques were performed, including Schirmer's tear test, tonometry, ocular ultrasonography and binocular ophthalmoscopy. Operative treatment was applied in cases that did not respond to the medical treatment and in emergencies or when the treatment was deemed operative. The parameters examined included the sex, age and breed of the animals, clinical signs and ocular disorders, and treatment protocols. The breeds most frequently included in the study were 37.7% (57/153) Pekingese and 28.1% (43/153) Terrier breeds. In the lesions, 45.8% (70/153) corneal lesions and 20.9% (32/153) lens lesions were noted. In general, Overall, 69.3% (106/153) of the cases were not caused by trauma, while close results were obtained between uni and bilateral or medical and operative treatments of the lesions, and no significant difference could be determined. In conclusion, it was thought that racial predisposition played a greater role than acquired factors in the formation of eye lesions, as well as the most common corneal and cataract lesions in the study.

Keywords: Dog, breed predisposition, ocular disorders

ORTA KARADENİZ BÖLGESİ KİVİ BAHÇELERİNDE HASTALIK ETMENLERİNİN
BELİRLENMESİ
INVESTIGATION OF CAUSAL AGENTS OF DISEASES IN KIWIFRUIT ORCHARDS OF
MIDDLE BLACK SEA REGION OF TURKIYE

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ÖZET

Bu çalışma; 2014, 2015 ve 2016 yıllarında Orta Karadeniz Bölgesinde yer alan Ordu, Samsun ve Kastamonu illerindeki kivi bahçelerinde hastalık etmenlerinin yaygınlık oranlarını belirlemek amacıyla yürütülmüştür. Bu amaçla 2014 yılında toplam 458 da alana sahip 56 bahçe, 2015 yılında 379 da alana sahip 46 bahçe, 2016 yılında ise 387,5 da alana sahip 42 bahçe incelenerek hastalık belirtisi gösteren yaprak, meyve ve gövdeden alınan örnekler laboratuvara getirilmiştir. Örneklerde kültüre alma ve izolasyon çalışmaları sonucunda *Alternaria alternata*, *Botrytis cinerea*, *Phomopsis* sp., *Fusarium* spp., *Rhizoctonia solani* ve *Armillaria mellea* fungal etmenleri tespit edilmiştir. Bu etmenlerden *A. alternata* (%11,02) ve *B. cinerea* (%7,17)'nin bölgede en yaygın etmen olduğu tespit edilmiştir. Bakteri şüpheli 4 adet örnekte yapılan laboratuvar analizlerinde herhangi bir bakteriyel izolat elde edilmemiştir. Ayrıca, virüs şüpheli 9 örneğin Apple stem grooving virus, Apple stem pitting virus, Alfalfa mosaic virus ve Cucumber mosaic virus'e karşı DAS-ELISA ile test edilmesi sonucunda ise örneklerde herhangi bir virüs tespit edilmemiştir.

Anahtar Kelimeler: Kivi, survey, hastalık.

ABSTRACT

This study was carried out to determine the prevalence of disease agents in kiwi orchards in Ordu, Samsun, and Kastamonu in the Middle Black Sea Region in 2014, 2015, and 2016. For this purpose, 56 kiwifruit orchards from approximately 46 ha in 2014, 46 orchards from 38 ha in 2015, and 42 orchards from 39 ha in 2016 were examined and samples from these areas from leaves, fruits, and stems that showed diseased symptoms were cultured by laboratory assays. As a result of isolation and identification studies, fungal agents of *Alternaria alternata*, *Botrytis cinerea*, *Phomopsis* sp., *Fusarium* spp.,

Rhizoctonia solani, and *Armillaria mellea* were determined in the samples. Among these fungi, *A. alternata* (11%) and *B. cinerea* (7.2%) were found to be the most common in the region. No bacterial isolate was obtained from four tested samples. Also, nine samples showing virus-like symptoms were tested against the Apple stem grooving virus, Apple stem pitting virus, Alfalfa mosaic virus, and Cucumber mosaic virus by DAS-ELISA, no virus was detected in the samples.

Keywords: Kiwifruit, survey, disease.

**KARADENİZ BÖLGESİNDE BAĞDA KÜLLEME HASTALIĞI (*Erysiphe necator* Schw.)'NA
KARŞI FARKLI İLAÇLAMA PROGRAMLARININ ETKİNLİĞİNİN BELİRLENMESİ**
**THE DETERMINATION OF EFFICIENCY OF DIFFERENT SPRAYING PROGRAMS AGAINST
POWDERY MILDEW (*Erysiphe necator* Schw.) IN VINEYARD IN THE BLACK SEA REGION**

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ÖZET

Bu çalışma, Karadeniz bölgesinde Bağ Küllemesi (*Erysiphe necator*) hastalığına karşı yapılacak kimyasal mücadelede ilk ilaçlama zamanı ile diğer ilaçlama aralıklarının belirlenmesi ve hastalığın mücadelesinde etkili bir ilaçlama programının oluşturulması amacıyla yapılmıştır. Çalışma, 2015 yılında, bir yıl önceden bağ küllemesi hastalığı etmeni *Erysiphe necator* Schw. ile bulaşık olduğu bilinen, Amasya İlinin Taşova ilçesinde 3 da'lık Razakı üzüm çeşidi ile kurulu bağda yürütülmüştür. Çalışma, tesadüf blokları deneme desenine göre, 4 karakter (Program A, Program B, Program C ve Kontrol) ve 5 tekerrürlü olacak şekilde kurulmuştur. Çalışmada hastalığın mücadelesine yönelik farklı ilaçlama zamanı ve aralıkları olan Program A, Program B, Program C'ye göre uygulamalar yapılmıştır.

Hastalıkla mücadelede Program A'ya göre 6 kez ilaçlama uygulaması yapılmış ve kontrole göre en düşük etkinlik yaprakta % 77.4, salkımda (meyvede) % 87.1 oran ile bu programda ortaya çıkmıştır. Hastalıkla mücadelede Program B'ye göre 7 uygulama yapılmış ve bu programda kontrole göre en yüksek etkinlik yaprakta % 87.5, salkımda (meyvede) % 91.9 oranında olmuştur. Hastalıkla mücadelede Program C'ye göre 9 uygulama yapılmış ve kontrole göre yaprakta % 86.1, salkımda (meyvede) % 91.3 oranı ile bu programa göre yapılan ilaçlama uygulamalarında gerçekleşmiştir. Salkım ve yaprakta gerçekleştirilen değerlendirmeler sonucu Program B'nin ve Program C'nin aynı istatistiki grupta yer aldıkları, bağ küllemesi ile mücadelede bölgemiz için uygun ilaçlama programları olacağı kanısı ortaya çıkmaktadır. Sonuç olarak; Program B'nin ilaçlama programının bölgemizde, kontrole göre en yüksek (yaprakta % 87.5, salkımda (meyvede) % 91.9 oranında) etkinlik göstermesinin yanı sıra Program C'ye göre ilaçlama sayısının az olması, işçilik ve ilaç maliyetinden elde edilecek tasarruf ve çevre sağlığının korunması gibi kazançlar dikkate alındığında daha uygun olacağı düşünülmektedir.

Anahtar Kelimeler: Karadeniz Bölgesi, Üzüm, Külleme, *Erysiphe necator*, kimyasal mücadele

ABSTRACT

This study was conducted to determine the first timing of spray application and other spray intervals in the chemical control against grape powdery mildew (*Erysiphe necator*) disease and to establish an effective spraying application program in the control of the disease in the Black Sea Region. The study was carried out in a 0.3 ha. vineyard with cv. Razakı that located in the Taşova district in Amasya in 2015, which was known to be infected by powdery mildew disease in previous year. The study was designed in a randomized block with 4 blocks (Program A, Program B, Program C, and Control) at 5 replications. In the study, different spraying times and its intervals according to Program A, Program B, and Program C were applied for control of the disease. In the result of the study, six-time spraying application was performed and the lowest efficiency was observed in this program with a rate of 77.4% on the leaf and 87.1% on the bunches compared to the control in the Program A. In the Program B, seven-times spraying application was performed and the highest efficiency was detected as 87.5% in the

leaf and 91.9% in the bunches compared to the control. Finally, nine-times spraying application was performed and the rate of 86.1% on the leaf and 91.3 % on the bunches were observed in the Program C. As a result of the evaluations on the bunches and leaves, it is concluded that Program B and Program C were founded statistically as the same group and that will be appropriate spraying programs in the control of powdery mildew for vineyard of this region. In conclusion, the application of Program B as well as benefits the highest efficiency (87.5% in the leaf, 91.9% in the bunch) compared to the control, would be considered thought appropriate for the Black Sea region when the considered the advantages such as the lower number of spraying application, saving of the labor and pesticides costs, and protection of environmental health compared to Program C.

Key words: Black Sea Region, Grape (*Vitis vinifera* L.), Powdery Mildew, *Erysiphe necator* Schw., Chemical Control.

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ÖZET

Adli Entomoloji, arthropodların ve onların yasal ve suç araştırmalarına olan ilişkilerinin bilimsel olarak incelenmesidir. Bu araştırma alanı, suçların çözülmesine ve mahkemelerde kanıt sağlamaya yardımcı olmak için kullanılır. Adli bilimciler ve yasal uygulama kurumları için değerli bir araçtır, çünkü ölüm zamanı ve yeri hakkında kritik bilgiler sağlayabilir ve şüphelileri belirleyebilir ve iddiaları yalanlayabilir.

Arthropodlar, ölmüş bedenlerin bozunmasında çok önemli bir rol oynar ve bedende bulunan arthropodların incelenmesi, ölüm zamanı hakkında önemli bilgiler sağlayabilir ve aynı zamanda bedenin bulunduğu ortam hakkında bilgi verir. Örneğin, belirli arthropod türlerinin varlığı, ölüm zamanını gösterir ve gelişim evreleri bozunmanın ne kadar süre boyunca devam ettiği hakkında daha fazla bilgi sağlar.

Bedende bulunan arthropodların incelenmesine ek olarak, Adli Entomologlar çevredeki arthropodları da incelerler. Bu, bedenin taşındığını veya ölümün bulunduğu yer dışında başka bir yerde meydana geldiğini belirlemeye yardımcı olabilir.

Adli Entomologlar, patoloğlar ve toksikologlar gibi diğer adli bilimcilerle sıklıkla çalışırlar ve ölüm ile ilgili olan durumların tam resmini oluşturmaya yardımcı olurlar. Ayrıca, mahkemelerde uzman tanık olarak çağırılabilir ve bulgularının davanın sonucunun çok önemli bir rol oynayabilir.

Bu çalışma Adli Entomoloji bilim dalının hukuki ve kriminal olaylarda, yargı mercilerine yapmış olduğu katkılar, faili meçhul cinayetlerin aydınlatılmasında, söz konusu bir şüpheli üzerindeki iddiaları çürütmek veya elde edilen bulgular sayesinde kişinin suçlu olduğunu tespit etmek, ölümün nasıl ve nerede gerçekleştiğine dair soru işaretlerini ortadan kaldırmak ve hukuka uygun kararlar vermek adına

oldukça önemli bir bilim dalı olduğuna dikkat çekmek ve konu ile ilgili gelecekte yapılacak olan çalışmalara kaynak oluşturmak amacıyla yapılmıştır.

Anahtar Kelimeler: Entomoloji, Kriminal, Arthropod

ABSTRACT

Forensic Entomology is the scientific study of arthropods and their relationship to legal or criminal investigations. This field of study is used to help solve crimes and to provide evidence in court cases. It is a valuable tool for forensic scientists and law enforcement agencies, as it can provide critical information about the time and place of death, and can help to identify suspects and refute allegations.

Arthropods play a crucial role in the decomposition of dead bodies, and the study of insects found on a body can provide important information about the time of death, as well as the environment in which the body was found. For example, the presence of specific species of arthropods can indicate the time of death, and their developmental stages can provide further information about the length of time the body has been decomposing.

In addition to the study of insects found on a body, Forensic Entomologists also study the arthropods found in the surrounding area. This can help to determine if the body was moved or if the death occurred in a different location than where the body was found.

Forensic Entomologists often work with other forensic scientists, such as pathologists and toxicologists, to help build a complete picture of the circumstances surrounding a death. They may also be called to give expert testimony in court cases, where their findings can play a key role in the outcome of the trial.

In this seminar, the contributions of Forensic Entomology to the judicial authorities in legal and criminal cases, to illuminate the unsolved murders, to refute the allegations on a suspect in question or to determine that the person is guilty thanks to the findings obtained, to eliminate the question marks about how and where the death took place. It was made in order to draw attention to the fact that it is a very important branch of science in order to remove the law and to make decisions in accordance with the law, and to create a resource for future studies on the subject.

Keywords: Entomology, Criminal, Arthropod

**FÜME BALIK (*Oncorhynchus mykiss*) ATIKLARININ ERİŞTE İMALATINDA
DEĞERLENDİRİLMESİ**

**EVALUATION OF SMOKED FISH (*Oncorhynchus mykiss*) BY-PRODUCTS IN NOODLE
MANUFACTURING**

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ÖZET

Ülkemizde faaliyet gösteren su ürünleri işleme fabrikalarında ana ürün dışında birçok atık ürün ortaya çıkmaktadır. Açığa çıkan bu atıklar (fileto atıkları, paketleme esnasındaki gramaj fazlalıkları, balık kıyması veya füme işleme atıkları vb) gerek alt yapı eksikliği gerekse iş gücü yetersizliğinden etkili bir şekilde değerlendirilmemektedir. Füme balık atıkları da bu atıkların içinde önemli bir yere sahiptir. Füme balık paketleme esnasında ürünler belirli ağırlıklarda paketlenildiği için ağırlık fazlalıkları kesilerek alınıp kalan kısımlar ise yan ürün olarak değerlendirilmektedir. Bu ve benzeri atıkların etkili bir şekilde hem ekonomiye katkı sağlaması hem de su ürünleri sektöründe sürdürülebilirliği sağlama açısından önem arz etmektedir. Dünyada ve ülkemizde su ürünleri yan ürünlerinden insan tüketimi için piyasaya sunulmuş pek çok ürün (balık sosisi, surimi, balık salamı, balık cipsi, balık çorbası vs) mevcuttur. Bu çalışmada füme alabalık üretimi yapan bir işletmeden temin edilen füme alabalık atıkları durum buğday unu ile yapılan erişte içerisine %0 (kontrol grubu), %5, %10 ve %15 oranlarında füme balık atıkları karıştırılarak erişte hamuru elde edilmiş ve makarna kesme makinesinde kesilerek 85oC de 5 saat kurutularak eriştelere hazırlanmıştır. Hazırlanan eriştelere besin kompozisyonu analizleri ve renk ölçümleri yapılmıştır. Analizler sonucunda protein miktarları %10.46-14.37 arasında yağ miktarları ise %1.32-3.12 arasında değişim gösterdiği tespit edilmiş olup en yüksek protein ve yağ %15 balık katkılı eriştede tespit edilmiştir (p<0.05). Karbonhidrat miktarının ise balık katkı miktarı arttıkça azaldığı belirlenmiştir (p<0.05). Ürünlerin renk ölçümleri incelendiğinde sadece %15 katkılı eriştelere renk değişimlerinin istatistiki açıdan önemli olduğu bulunmuştur. Yapılan bu ürünün normal erişteye göre yüksek protein ve düşük karbonhidrat içermesi açısından özellikle çocuklar tarafından ve balık tüketimi düşük olan bölgelerde tercih edilebileceği düşünülmektedir.

Anahtar Kelimeler: Balık yan ürünleri, Gıda katkısı, Alabalık, Erişte, Besin kompozisyonu

ABSTRACT

Many waste products arise in fish processing factories in our country. These wastes (fillet wastes, excess weight during packaging, fish mince or smoked processing waste, etc.) are not evaluated effectively due to lack of infrastructure and labor. Smoked fish wastes also have an important place in these wastes. Since the products are packed in certain weights during the packaging of smoked fish, the excess weight is cut off and the remaining parts are considered as by-products. These and similar wastes are important in terms of contributing effectively to the economy and ensuring sustainability in the aquaculture sector. There are many products (fish sausage, surimi, fish salami, fish chips, fish soup, etc.) put on the market for human consumption among seafood by-products in the world and in our country. In this study, noodle dough was obtained by mixing 0% (control group), 5%, 10% and 15% smoked fish wastes into noodles made with durum wheat flour, which was obtained from a smoked trout production company. Noodles were prepared by drying at 85°C for 5 hours. Nutrient composition analyzes and color measurements of the prepared noodles were made. Nutrient composition analyzes and color measurements were made in the prepared noodles. As a result of the analyzes, it was determined that the protein amounts were between 10.46% and 14.37%, and the fat amounts varied between 1.32% and

3.12%, and the highest protein and oil were detected in the noodles with 15% fish ($p<0.05$). It was determined that the amount of carbohydrates decreased as the amount of fish additive increased ($p<0.05$). When the color measurements of the products were examined, it was found that only the color changes in the noodles with 15% additive were statistically significant. Since this product contains high protein and low carbohydrates compared to normal noodles, it is thought that it can be preferred especially by children and in regions with low fish consumption.

Keywords: Fish by-product, Food additive, Trout, Noodle, Food nutrition

INVESTIGATION OF FACTORS AFFECTING COLOSTRUM QUALITY IN HOLSTEIN
COWS UNDER STANDARDIZED CONDITIONS

SIYAH ALACA İNEKLERDE STANDARDİZE EDİLMİŞ ŞARTLARDA
KOLOSTRUM KALİTESİNE ETKİ EDEN FAKTÖRLERİN İNCELENMESİ

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ABSTRACT

The success of colostral passive immune transfer; The quality of the colostrum used in feeding can be affected by factors such as the amount, method of administration, and time of administration. Colostrum quality is determined by the amount of Ig it contains. Especially the amount of IgG in colostrum constitutes 85% of Ig in colostrum. The amount of colostral Ig varies depending on many variables, these are maternal race, colostrum amount obtained at first milking and total colostrum volume secreted, calving season, maternal age, maternal diseases, prepartum feeding and drying time, applied vaccines and drugs, colostrum leakage from the prenatal udder and time between birth and first milking. In this study, the effects of calf birth weight, sex, single-twin birth, dystocia, age, and lactation number on colostrum quality were investigated when external variables such as breed, season, maintenance conditions, dry period feeding, dry period, vaccination were eliminated in a single farm. The animal material of this study consisted of 183 Holstein cows of different ages, which gave birth in November-December 2022, in an enterprise located in Ankara. The business has established modern maintenance and feeding standards and trained its staff on technical issues. Dry period and lactation periods are standardized. In the study, colostrum quality was determined by measuring the total protein level and using a brix refractometer, which is based on the principle of indirect determination of the Ig level. When evaluating the results: the brix 22% value was accepted as equivalent to 50 g/L Ig density, which is considered the limit of good-quality colostrum, and below this value was classified as poor-quality colostrum. Before proceeding to the statistical analysis, the variables were evaluated in terms of parametric test assumptions. Descriptive statistics were calculated for qualitative and quantitative variables. Differences in colostrum quality in the groups of the difficult delivery score and the number of lactations were calculated with a one-way analysis of variance. Duncan's test was used as an advanced test in cases where there was significance. In addition, the difference in colostrum quality between single/twin birth and gender groups was analyzed by Student's t-test. The relationship between calf birth weight, the number of lactations, the age of the cow, average milk yield, and colostrum quality was determined using the Pearson correlation coefficient. $P < 0.05$ was accepted as the limit of significance. All statistical analyzes were performed using the IBM SPSS 23.0 statistical program. The brix value of 183 Holstein cows added to the study group was found to be over 22%. In the study performed, no significant difference was found in terms of difficulty birth score, single/twin birth, and colostrum quality in gender groups ($p > 0.05$). A weak negative correlation was determined between colostrum quality, number of lactations, and cow's age ($p < 0.05$). This shows that colostrum quality decreases as the number of lactations and the age of the cow increase. When the number of lactations was examined in the correlation, it was determined that there were significant differences. When lactation numbers were grouped, it was observed that colostrum quality was higher in the first lactation and decreased as the number of lactations increased.

Keywords: Colostrum, Quality, Dystocia, Lactation, Holstein

1. INTRODUCTION

Due to the syndesmochorial placenta of cattle, they are unable to transfer macromolecules and immune components to their calves. Therefore, the only way for the immunological system of the agammaglobulinemic calf to develop naturally is through colostral passive transfer immunity (Dewell et al., 2006; Godden, 2008; Gökçe and Erdoğan, 2013). The period covering the first 28 days of life is referred to as the neonatal period, during which the calf is highly vulnerable to diseases (Erkılıç and Erdoğan, 2015). The Ig's that will protect the calf from disease begin to form at the end of the first week. However, it takes time for them to reach protective levels (Quigley and Drewry, 1998). During this period, immunity is established through the Ig's obtained from colostrum. In a successful colostral passive immunization transfer, the serum IgG concentration of the calf is expected to exceed 10 g/L between 32-48 hours (Godson et al., 2003).

The success of colostral passive immunization transfer can be influenced by factors such as the quality and quantity of colostrum used in feeding, and the method and timing of administration (Godden, 2008).

The quality of colostrum is determined by the amount of Ig's it contains, with the amount of IgG, which accounts for 85% of the Ig's in colostrum, being the most important determinant. IgG can be measured directly in laboratory settings or indirectly through methods that are proportional to the dry matter and density of colostrum (Fleenor and Stott, 1980; Maunsell et al., 1999).

The amount of colostral Ig varies depending on several variables such as the breed of the mother, the amount of colostrum obtained in the first milking, the total volume of colostrum secreted, the season of calving, the age of the mother, any diseases the mother has experienced, prepartum feeding and dry period length, the use of vaccines and drugs, the pre-birth leakage of colostrum from the udder, and the time elapsed between birth and first milking (Devery-pocius and Larson, 1983; Donovan et al., 1986; Godden, 2008; Mohammed et al., 1991).

It is believed that changes in Ig production are due to dilution caused by variations in the amount of milk produced depending on the cow breed (Murphy et al., 2005). Vaccines and stimulants administered during the dry period and colostrum production are known to have a positive effect on Ig levels (Chase et al., 2008; Cortese, 2009; Güngör and Baştan, 2004). It has been reported that insufficient protein and energy intake during the dry period and the final third of pregnancy in cows result in a decrease in the volume and quality of the colostrum produced, but some researchers have found no significant difference in colostral Ig levels between poorly nourished and control groups (Fatanhia et al., 2012; Godson et al., 2003; Hough et al., 1990; Kaygısız and Köse, 2007; Quigley and Drewry, 1998). Colostrum quality is reported to decrease when the dry period lasts less than 21 days or longer than 60 days (Godden, 2008; Rastani et al., 2005). A decrease in dry matter intake due to an increase in temperature during certain seasons has been shown to negatively affect colostrum quality, as lower temperatures increase energy loss (El-Fattah et al., 2012; Morin et al., 2001; Nardone et al., 1997). Pathological conditions such as mastitis, hypocalcemia, retained placenta, difficult labor, and prolonged delivery time do not affect colostral IgG concentration, but can reduce the total amount of colostrum produced, particularly during the perinatal period (Filteau et al., 2003; Waldner et al., 2009).

This study investigated the impact of calf birth weight, gender, single vs. twin birth, difficult birth, age, and lactation number on colostrum quality when external variables such as breed, season, care conditions, dry period feeding, duration of the dry period, and vaccination were controlled in a single operation. The aim was to obtain insight into reducing the number of calves exposed to passive transfer deficiency, reducing disease and mortality, and contributing to herd management.

2. MATERIAL METHOD

This study was conducted using animal material from 183 different aged Holstein cows that gave birth between November-December 2022 in Ankara. The farm established modern care and feeding standards and trained its personnel on technical subjects. The dry and lactation periods were standardized. Care conditions, feeding adequacy, season, breed, duration of dry periods, vaccination, and other variables were eliminated based on this information. On this farm, cows are separated into dry periods two months before giving birth. Vaccination is administered twice, 45 and 30 days before birth, to prevent calf diarrhea during pregnancy.

In the study, the quality of colostrum was measured using a brix refractometer (ATC LYK SUR-1 Clinical Refractometer, China) based on the principle of indirectly determining Ig levels by measuring total protein levels. Colostrum measurements were taken by trained personnel in the farm environment using fresh colostrum. Two drops of colostrum were placed on the measurement surface of the brix refractometer, and the number in the observation section was read and recorded by holding it up to the light (Metin Kıyıcı and Sevişoğlu, 2022). After each reading, the refractometer was cleaned with cotton and calibrated with distilled water. When evaluating the results, a brix value of 22% was considered equivalent to an Ig density of 50 g/L, which is the quality colostrum threshold, and values below this was classified as poor-quality colostrum (Quigley et al., 2013; Chigerve and Hagey, 2014).

Before proceeding with statistical analyses, variables were evaluated for parametric test assumptions. Descriptive statistics were calculated for qualitative and quantitative variables. The difference in colostrum quality among groups with different calving scores and lactation numbers was calculated using one-way ANOVA. Duncan's test was used as an advanced-stage test in cases where significance was found. Additionally, the difference in colostrum quality among single/twin births and gender groups was analyzed using Student's t-test. The relationship between calf birth weight, lactation number, cow age, average milk yield, and colostrum quality was determined using the Pearson correlation coefficient. A significance level of $P < 0.05$ was accepted. All statistical analyses were conducted using IBM SPSS 23.0 statistical software.

3. RESULTS

In this study, colostrum samples from 183 Holstein cows that gave birth between November and December 2022 in a single farm were examined. When external variables such as breed, season, care conditions, dry period feeding, duration of dry period, and vaccination were eliminated, the effect of calf birth weight, gender, single/twin birth, difficult birth, age, and lactation number on colostrum quality was investigated. Of the 185 Holstein cows on the farm, 89.7% gave birth without intervention. 98.3% of the born calves were single births and 54.1% were female.

		N	%
Dystoisa	Score 1	166	89,7%
	Score 2	6	3,2%
	Score 3	6	3,2%
	Score 4	7	3,8%
Single or Twin Birth	Single	180	98,3%
	Twin	3	1,7%
Sex	Female	100	54,1%
	Male	85	45,9%

Table 1. Distribution of difficult birth, single and twin births, and sex in the population (N: Number of animals, %: Percentage)

Parameter	Mean	SE	SD	Median	Minimum	Maximum
Colostrum Quality	28,60	0,15	1,98	29,00	25,00	38,00
Calf Birth Weight	39,99	0,45	6,19	40,00	19,00	55,00
Lactation Number	2,03	0,08	1,02	2,00	1,00	6,00
Dam Age	1245,86	36,02	489,97	1289,00	632,00	3075,00
Average Milk Yield	35,47	1,02	13,88	36,30	0,00	64,60

Table 2. Statistical distribution of colostrum quality, calf birth weight, lactation number, cow age, and average milk yield parameters (Mean: Arithmetic mean, SE: Standard error, SD: Standard deviation)

Parameter	Dystoisa	Mean	SE	SD	Median	Minimum	Maximum	p
Colostrum Quality	Score 1	28,60	0,15	1,98	29,00	25,00	38,00	0,943
	Score 2	28,83	0,60	1,47	28,50	27,00	31,00	
	Score 3	28,17	0,87	2,14	28,00	26,00	31,00	
	Score 4	28,71	1,02	2,69	29,00	25,00	32,00	

Table 3. The effect of dystocia on colostrum quality (Mean: Arithmetic mean, SE: Standard error, SD: Standard deviation)

Parameter	Single-Twin	Mean	SE	SD	Median	Minimum	Maximum	p
Colostrum Quality	Single	28,61	0,15	1,95	29,00	25,00	38,00	0,896
	Twin	28,40	1,47	3,29	26,00	26,00	32,00	

Table 4. The effect of single and twin births on colostrum quality (Mean: arithmetic mean, SE: standard error, SD: standard deviation)

Parameter	Sex	Mean	SE	SD	Median	Minimum	Maximum	p
Colostrum Quality	Female	28,60	0,19	1,94	29,00	25,00	32,00	0,993
	Male	28,60	0,22	2,04	29,00	25,00	38,00	

Table 5. The effect of calf gender on colostrum quality (Mean: Arithmetic mean, Std. Error: Standard error, Std. Deviation: Standard deviation)

	Colostrum Quality	Calf Birth Weight	Lactation Number	Dam Age	Average Milk Yield
Colostrum Quality	1	-0,065	-0,301***	-0,288***	-0,098
Calf Birth Weight		1	0,247**	0,291***	0,214**
Lactation Number			1	0,943***	0,265***
Dam Age				1	0,281***
Average Milk Yield					1

Table 6. Correlation between colostrum quality, calf birth weight, lactation number, cow age, and average milk yield

Parametre	Lactation Number	Mean	SE	SD	Median	Minimum	Maximum	p
Colostrum Quality	Lak 1	29,77 ^a	0,24	1,91	30,00	25,00	38,00	<0,001
	Lak 2	27,89 ^b	0,21	1,80	28,00	25,00	32,00	
	Lak 3	27,97 ^b	0,29	1,65	28,00	25,00	30,00	
	Lak >4	28,19 ^b	0,38	1,52	28,50	26,00	30,00	

Table 7. The effect of lactation number on colostrum quality (Arith.Mean: Arithmetic mean, Std. Error: Standard Error, Std. Deviation; Standard deviation)

In this study, colostrum samples from 183 Holstein cows that gave birth were examined. When external variables such as breed, season, care conditions, dry period feeding, duration of dry period, and vaccination were eliminated in a single farm, the effect of calf birth weight, gender, single/twin birth, difficult birth, age, and lactation number on colostrum quality was investigated. Of the 185 Holstein cows on the farm, 89.7% gave birth without intervention. 98.3% of the born calves were single births and 54.1% were female.

In the study, no significant difference was found in terms of colostrum quality in difficult birth score (Table 3), single/twin birth (Table 4), and gender groups (Table 5) ($p>0.05$). A weak negative correlation was determined between colostrum quality and lactation number and age of the cow ($p<0.05$) (Table 6). This indicates that colostrum quality decreases as lactation number and cow age increase (Table 7).

When lactation number was examined in the correlation, significant differences were found. When lactation numbers were grouped, it was observed that colostrum quality was higher in the first lactation and decreased as lactation number increased.

4. DISCUSSION

Passive transfer insufficiency is an important determinant in the survival and susceptibility to neonatal diseases of calves (Gökçe and Erdoğan, 2013). Due to the special placental structures of cows, colostrum is required for the formation of passive immunity. Serum IgG level is expected to be above 10g/L in calves 24-48 hours after colostrum intake (Godden, 2008).

The amount, timing, method, and quality of colostrum given are important parameters in the formation of passive immunity (Godden, 2008).

The quality of colostrum is an important parameter in determining the amount and method of colostrum given to achieve successful passive transfer. There is a linear relationship between colostral IgG level and calf serum IgG level (Quigley, 2007). Studies have shown that colostrum with an IgG concentration greater than 50 g/L is considered sufficient in terms of quality (Besser and Gay, 1994; McGuirk and Collins, 2004; Godden, 2008; Chigerwe et al., 2008).

The quality of colostrum is significantly affected by breed, season, care and feeding conditions, length of dry period, dry period care and feeding conditions, first milking time, and vaccinations (Borchardt et al., 2022; Kara and Ceylan, 2021; Kara et al., 2020; Shoshani et al., 2014; Gökçe and Erdoğan 2013; Conneely et al., 2013; Gulliksen et al., 2008; Soufleri et al., 2005). In this study, these factors affecting colostrum quality were standardized. The effect of birth difficulty score, single vs. twin birth, calf gender, calf birth weight, dam's lactation number, and average milk yield on colostrum quality was examined by eliminating these human-related factors that affect colostrum quality.

There are various thoughts on how calf gender can affect colostrum quality. A study conducted on 33 Holsteins in Colombia reported that colostrum quality was influenced by gender and that male calves had higher colostral Ig concentrations, but there was no significant difference in total Ig amount (Angulo et al., 2015). In a study that classified colostrum as low, medium, and high quality, it was reported that gender did not have a significant effect (Kaygisiz and Köse, 2007). A study on 186 cows reported that colostrum quality was not affected by gender (Silper et al., 2012). In this study, 100 female and 85 male calves were born from 183 cows. As with other studies, it was seen that gender did not have a significant effect on colostrum quality.

The quality of colostrum has been evaluated in many studies in terms of age and lactation number. In a study conducted on 77 Holstein and 24 Jersey cows, it was reported that cows in their third lactation or higher had higher quality colostrum, and in the same study, it was reported that cows in their first and second lactations had colostrum of similar quality (Tyler et al., 1999a). In a study investigating the effect of colostrum collection time on colostrum quality, it was reported that cows in their third and fourth lactations had higher quality colostrum compared to cows in their first and second lactations (Moore et al., 2005). In a study conducted on 827 cows, IgG levels of 42.4 mg/mL, 68.6 mg/mL, and 98.9 mg/mL were measured in the first, second, and third lactations, respectively (Morrill et al., 2012). A study conducted in Switzerland reported that the IgG level in colostrum was 69.2 g/L in the first lactation and 65.2 g/L in the second lactation (Reschke et al., 2017). Chigerwe et al. (2008) reported in their study that there was no significant difference in colostrum IgG levels among cows in their first, second, and third lactations. In a similar study, Saucedo-Quintero et al. (2004) found average colostrum qualities of 103.43 g/L, 87.86 g/L, 98.05 g/L, and 78.64 g/L for the first, second, third, and fourth or higher lactations, respectively. The highest IgG concentration was found in the first lactation, while the average IgG concentrations in the colostrum of cows in their fourth or higher lactations were the lowest. Tyler et al. (1999) conducted a similar study in Jersey cows and calculated the average colostrum IgG concentrations in cows divided into three groups: first lactation, second lactation, and third or higher lactations, as 119 g/L, 113 g/L, and 115 g/L, respectively. In this study, as in the study by Saucedo-Quintero et al. (2004), the highest quality colostrum was measured in cows in their first lactation. In this study, the highest colostrum quality was obtained during the first lactation. Similar to other studies, there was an increase between the second and third lactations, but a significant decrease was observed in the fourth lactation.

In a study of 373 animals where birth score was determined, animals were classified as high quality and low quality based on serum IgG levels depending on difficult birth (dystocia) score, and it was reported that colostrum quality significantly decreased ($>50\text{g/L}$) in animals requiring assistance and operation for cesarean section (Reschke et al., 2017). Various conditions were observed from unassisted birth to difficult birth in this study. However, no significant difference was observed between difficult birth and colostrum quality ($p>0.005$). The minimum and maximum values observed in colostrum measured with Brix refractometer were 25% and 38%, respectively. All of these values are above the 22% threshold considered as high-quality colostrum.

In a study of 334 Holstein cows in 2019, it was reported that there was a significant effect of colostrum measurements with Brix colostrometer on colostrum quality in single and twin births, but no significant effect on colostrum IgG concentration (Abdullahoğlu et al., 2019). Three twin births occurred in this study. The average colostrum quality of cows giving birth to twins was determined as 28.40%, and no significant effect on colostrum quality was observed.

5. CONCLUSION

It is known that the quality, quantity, administration method, and timing of colostrum feeding can affect the success of passive transfer. In this study, we aimed to examine colostrum quality from the perspective of genetic characteristics and cow-specific factors, while minimizing the effects of human factors. The results showed that calf gender, dystocia score, and single vs. twin births were not statistically significant, but lactation number and age significantly affected colostrum quality. It was observed that cows in their first lactation had the highest colostrum quality, while the lowest colostrum quality was detected in the fourth lactation. This finding, which is important for passive transfer success, needs to be further investigated through more studies.

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**ORAL YOLLA ALINAN CAPSAİCİNİN SİNDİRİM SİSTEMİNDEKİ ADİPOKİN
EKSPRESYONU ÜZERİNE ETKİLERİ**
**EXPRESSION OF ADIPOKINES IN GASTROINTESTINAL SYSTEM OF RATS FED WITH
CAPSAICIN**

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ÖZET

Capsaicin, Capsicum annum olarak bilinen acı kırmızı biberden elde edilen önemli bir aktif bileşiktir. Mide asit salgısını inhibe etme, mide ülserlerini önleme, intestinal kan akışını artırma gibi etkileri olan CAP' ın uygun dozlarda çoğunlukla gastrointestinal sistemde pozitif etkilerinin olduğu öne sürülmektedir. Adipokinler enerji homeostazının, iştahın, glukoz ve lipid metabolizmasının, bağışıklığın düzenlenmesinde önemli roller oynayan biyoaktif peptidlerdir. Çalışmamızda, oral yolla alınan Capsaicinin sıçanlarda sindirim sistemindeki bazı adipokinlerin ekspresyonu üzerine olabilecek etkilerinin immunohistokimya yöntemi ile belirlenmesi amaçlandı. Kontrol grubu (n:10) standart sıçan yemi ile beslenirken, deney grubu (n:10) ise % 0,04 mg/kg oranında capsaicin içeren yem ile beslendi. Sıçanlardan, 60 gün sonunda, mide, duodenum ve pankreas dokusu örnekleri alındı. Tüm gruplara ait dokularda immunohistokimya yöntemi ile ghrelin, adiponektin, leptin, visfatin ve resistin boyanması yapıldı. Ghrelin için bakıldığında, midede kuvvetli derecede boyanma görüldü. Mide, duodenum ve pankreas dokusunda kontrol ve deney gruplarında boyanma derecelerinde farklılık tespit edilmedi. Adiponektin için, incelenen tüm dokularda gruplar arası farklılık görülmeydi. Leptin için bakıldığında mide ve duodenumda gruplar arasında farklılık gözlenmemesine karşın, pankreas dokusunda deney grubunda boyanma derecesi kontrol grubuna kıyasla daha yoğun olarak tespit edildi. Resistin için bakıldığında, duodenumda her iki grupta, midede ise kontrol grubunda immun reaksiyon görülmezken, midede deney grubunda hafif, pankreasta ise deney grubunda daha yoğun reaksiyon görüldü. Visfatin için, mide ve pankreas dokusunda gruplar arasında fark görülmedi ancak duodenum dokusunda deney grubunda boyanma derecesi kontrol grubuna göre daha yoğun olarak tespit edildi. Elde ettiğimiz bulgular, Capsaicinin sindirim sisteminde adipokinlerin (adiponektin, ghrelin, resistin, leptin, visfatin) ekspresyonlarında değişikliğe neden olduğunu göstermiştir. Dolayısıyla Capsaicinin iştah, glukoz ve lipid metabolizmasının düzenlenmesi gibi fonksiyonlarda adipokinler üzerinden etkili olabileceğini düşündürmüştür.

Anahtar Kelimeler: Adipokin, Capsaicin, Duodenum, İmmunohistokimya, Mide, Pankreas.

ABSTRACT

Capsaicin is an important active compound obtained from the hot red pepper known as Capsicum annum. CAP, which has effects such as inhibiting gastric acid secretion, preventing gastric ulcers, increasing intestinal blood flow, has been suggested to have mostly positive effects in the gastrointestinal system at appropriate doses. Adipokines are bioactive peptides that play important roles in the regulation of energy homeostasis, appetite, glucose and lipid metabolism and immunity. In our study, we aimed to determine the possible effects of orally taken Capsaicin on the expression of some adipokines in the digestive tract of rats by immunohistochemistry. The control group (n:10) was fed

with standard rat chow, while the experimental group (n:10) was fed with chow containing 0.04% capsaicin. At the end of 60 days, gastric, duodenal and pancreatic tissue samples were obtained from the rats. The tissues of all groups were stained for ghrelin, adiponectin, leptin, visfatin and resistin by immunohistochemistry. For ghrelin, strong staining was observed in the stomach but there was no difference between groups in the stomach, duodenum and pancreatic tissue. For adiponectin, there was no difference between the groups in all tissues. For leptin, no difference was observed between the groups in the stomach and duodenum, but the staining was more intense in the experimental group in pancreatic tissue. For resistin, no immune reaction was observed in the duodenum in both groups. In the stomach, there was no immune reaction in the control group, while a mild reaction was observed in the experimental group. For visfatin, there was no difference between the groups in stomach and pancreatic tissue, but in duodenum, the reaction was more intense in the experimental group. Our findings showed that Capsaicin caused changes in the expression of adipokines (adiponectin, ghrelin, resistin, leptin, visfatin) in the digestive tract. Therefore, it was suggested that Capsaicin may be effective through adipokines in functions such as appetite, glucose and lipid metabolism regulation.

Keywords: Adipokine, Capsaicin, Duodenum, Immunohistochemistry, Stomach, Pancreas.

OSMOTİK DEHİDRASYON İLE VAKUM ÖNİŞLEMİNİN KIRMIZI PANCARIN KÜTLE DEĞİŞİMİ VE KURUTMA KİNETİĞİ ÜZERİNE ETKİSİ
EFFECT OF OSMOTIC DEHYDRATION WITH VACUUM PRETREATMENT ON MASS EXCHANGE AND DRYING KINETICS OF RED BEET

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ÖZET

Kırmızı pancar (*Beta vulgaris* L.) iki yıllık otsu bir bitki olup karotenoidler, polifenoller, flavonoidler, askorbik asit ve betalainlerden oluşan yüksek biyoaktif içeriği nedeniyle en değerli sebzelerden biridir. Bununla birlikte taze kırmızı pancar yüksek nem içeriğinden dolayı oldukça çabuk bozulan bir gıdadır. Dolayısıyla raf ömrünü uzatmak ve depolamayı kolaylaştırmak için kırmızı pancarın kurutulması gerekmektedir. Kurutma nem içeriği yüksek gıdaların raf ömrünü uzatmak için en yaygın kullanılan ve ekonomik olan yöntemdir. Son yıllarda kurutma sürecini hızlandırmak, gıda kalitesini ve güvenliğini arttırmak için kurutma teknolojilerinde uygulanan ön işlemleri, teknikleri, ekipmanları ve kaliteyi içeren birçok gelişme olmuştur. Özellikle kurutma öncesi uygulanan osmotik dehidrasyon, ultrases, vurgulu elektrik alan, vakum uygulama gibi işlemler meyve ve sebzelerin kuruma hızını etkili bir şekilde hızlandırabilmekte, kurutma kalitesini arttırabilmekte, besin değerini ve rengi koruyabilmektedir. Bu çalışmada ön işlem olarak osmotik dehidrasyon ve vakum uygulamasının kırmızı pancarda kütle transferi ve kurutma kinetiği üzerine etkisinin belirlenmesi amaçlanmıştır. Bunun için dilimler halinde pancara %40 ve %60 sakaroz çözeltisinde osmotik dehidrasyon işlemi uygulanmıştır. Osmotik dehidrasyon, ilk 20 dakika boyunca vakumlu veya vakum uygulamasız olarak toplam 180 dakikalık süren işlem ile gerçekleştirilmiş ve örnekler 60°C sıcaklıkta 1 m/s hava hızında konvektif olarak kurutulmuştur. Osmotik dehidrasyon işlemi su kaybı ve dolayısıyla ağırlık kaybının önemli düzeyde artmasına neden olmuştur. Bununla birlikte katı madde kazanımı, osmotik-vakum dehidrasyon uygulaması ile birlikte önemli düzeyde artmıştır. Ön işlem uygulanmamış kontrol örneğinde nem içeriğinin %8'in altına inmesi için 390 dakika kurutma süresi gerekli iken osmotik-vakum dehidrasyonu ile bu süre 180 dakika kısılmıştır. Pancarın kurutma davranışını tanımlamak için 8 farklı yarı teorik matematiksel model uygulanmış ve Page modelinin ($R^2 > 0.997$, $RMSE < 0.018$ ve $\chi^2 < 0.431 \times 10^{-3}$) ön işlem uygulanan pancar dilimlerinin deneysel verilerine en iyi şekilde uyduğu, kontrol örneğinde ise Diffusion modelinin daha uygun ($R^2 = 0.998$, $RMSE = 0.013$ ve $\chi^2 = 0.183 \times 10^{-3}$) olduğu saptanmıştır. Kurutulmuş örneklerin renk ve büzülme özellikleri osmotik-vakum dehidrasyon ön işlemleri ile olumlu etkilenmiştir.

Anahtar Kelimeler: Kırmızı pancar, kurutma, osmotik-vakum dehidrasyon, kütle ve ısı transferi

ABSTRACT

Red beet (*Beta vulgaris* L.) is a biennial herbaceous plant and one of the most valuable vegetables due to its high bioactive content of carotenoids, polyphenols, flavonoids, ascorbic acid and betalains. However, fresh red beet is a perishable food due to its high moisture content. Therefore, red beet must be dried in order to extend its shelf life and facilitate storage. Drying is the most widely used and economical method to extend the shelf life of foods with high moisture content. In recent years, there have been many developments in drying technology, including pretreatments, techniques, equipment and quality, to speed up the drying process and increase food quality and safety. Especially, pretreatment such as osmotic dehydration, ultrasound, pulsed electric field, vacuum application applied before drying can effectively accelerate the drying rate of fruits and vegetables, increase the drying quality, preserve the nutritional value and color. In this study, it was aimed to determine the effect of osmotic dehydration and vacuum application as pretreatment on mass transfer and drying kinetics in red beet. For this, osmotic dehydration process was applied to beet slices in 40% and 60% sucrose solutions. Osmotic

dehydration was carried out for the first 20 min with or without vacuum, for a total processing time of 180 min, and the samples were convectively dried at 60°C at 1 m/s air velocity. Osmotic dehydration process caused a significant increase in water loss and also weight loss. However, the solids gain increased significantly with the osmotic dehydration-vacuum application. In the untreated control sample, 390 min of drying time was required to reduce the moisture content below 8%, while this time was shortened to 180 min with the pretreatment of osmotic-vacuum dehydration. In order to describe the drying behavior of beet, 8 different semi-theoretical mathematical models were applied and Page model ($R^2>0.997$, $RMSE<0.018$ and $\chi^2<0.431\times10^{-3}$) best suited the experimental data of pretreated beet slices, whereas Diffusion model ($R^2=0.998$, $RMSE=0.013$ and $\chi^2=0.183\times10^{-3}$) was most suitable model for the control sample. Color and shrinkage properties of dried samples were positively affected by the application of osmotic-vacuum dehydration pretreatment.

Keywords: Red beet, drying, osmotic-vacuum dehydration, mass and heat transfer

**STARTER KÜLTÜRLERİN OLGUNLAŞMA DÖNEMİNDEKİ FERMENTE SUCUKLARIN
RENK STABİLİTESİNE ETKİSİ**

**EFFECT OF STARTER CULTURE INOCULATION ON COLOR STABILITY OF DRY
FERMENTED SAUSAGES DURING RIPENING PERIOD**

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ÖZET

Türk fermente sucuğu, doğal mikroflora veya starter kültürlerin eklenmesiyle olgunlaştırılan geleneksel bir et ürünüdür. *Pedioroccus pentosaceus*, *Staphylococcus carnosus* ve *Lactobacillus sakei* sucuk üretiminde en sık kullanılan starter kültürler arasındadır. Bu çalışmada, Türk tipi fermente sucuğun olgunlaşma döneminde, starter kültür ilavesinin renk stabilitesine etkisi değerlendirilmiştir. Bu amaçla iki farklı starter kültür kombinasyonu (*Staphylococcus carnosus*+*Pedioroccus pentosaceus* (SP) ve *Staphylococcus carnosus*+*Lactobacillus sakei* (SL)) sucuk hamuruna ilave edilmiştir. Starter bakteriler sucuk hamuruna 1:1 oranında ve 10⁻⁶ CFU/g seviyesinde ilave edilmiştir. Enstrümantal ve duyuşsal renk değerlendirmelerinin analizleri olgunlaşmanın 18. gününe kadar yapılmıştır. Sucuk örneklerinin rengi (CIE L* (parlaklık), a* (kırmızılık) ve b* (sarılık)) değerleri açısından ölçülmüştür. Analiz sonuçlarına göre, starter kültürlü ve starter kültürsüz hazırlanan örnekler arasında renk özelliklerinde belirgin farklılıklar vardır. Starter kültür ilave edilmemiş numune ile karşılaştırıldığında, istenilen sucuk rengi olgunlaşma döneminde SP ve SL numunelerinde gözlenmiştir. Tüm sucuk örneklerinde metmiyogloblin bulunmasına rağmen, starter kültürler son ürünün renk stabilitesini arttırmıştır. SL formülasyonu, olgunlaşma döneminde daha iyi olgunlaşma performansı ve daha yüksek kalite özellikleri göstermiştir. Bu nedenle, lipolitik starter kültürlerin uygun kombinasyonlarda kullanılmasının fermente sucuklarda olgunlaşmayı hızlandırmada ve kaliteyi arttırmada olumlu etkisi olacağı kanısına varılmıştır. Sonuç olarak, starter kültürlerin fermente sucuklara ilave edilmesi renk stabilitesi ve duyuşsal kalitenin artmasına neden olacağı kanısına varılmıştır.

Anahtar Kelimeler: Fermente Sucuk, Starter Kültür, Olgunlaşma, Renk Stabilitesi

ABSTRACT

Turkish dry fermented sausage is a traditional meat product fermented by either natural microflora or the addition of starter cultures. *Pedioroccus pentosaceus*, *Staphylococcus carnosus* and *Lactobacillus sakei* are among the most commonly used starter cultures in manufacturing of sucuk. In this study, the effect of starter culture inoculations on the colour quality of Turkish type dry fermented sausage were evaluated during ripening period. For this purpose, two different starter culture combinations (*Staphylococcus carnosus* + *Pedioroccus pentosaceus* (SP) and *Staphylococcus carnosus* +

Lactobacillus sakei (SL)) were inoculated in sausage dough. All starter bacteria have been added to the dough at 10^{-6} CFU/g level with the ratio of 1:1. Analysis of instrumental and sensorial colour evaluations were conducted until the 18th day of ripening. The colour of sucuk samples (CIE L^* (lightness), a^* (redness), and b^* (yellowness) values) was measured. According to the analysis results, there were apparent differences on the colour properties between samples prepared with and without starter cultures. The desired sucuk colour was shown in SP and SL samples compared to non-inoculated sample during ripening period. Although the metmyoglobin consist in all sucuk samples, the starter cultures enhance the colour quality of the final product. SL formulation showed better ripening performance and higher quality characteristics in ripening period. Therefore, it has been concluded that the use of lipolytic starter cultures in suitable combination would have positive effect in accelerating the ripening and enhancing the quality of dry fermented sausages. In conclusion, it has been concluded that adding starter cultures to fermented sausages will increase color stability and sensory quality.

Keywords: Dry Fermented Sausage, Starter Culture, Ripening, Color Stability

BİR KEDİDE DİRENÇLİ PİYOTORAKS OLGUSU VE TEDAVİSİ
A CASE AND TREATMENT OF RESISTANT PYOTHORAX IN A CAT

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ÖZET

1,5 yaşlı, Scottish Fold ırklı, erkek kedi; dispne, dilde morarma, yüksek ateş ve ağrılı oturuş şikayetiyle merkezimize başvurmuştur. Başka bir hayvan sağlığı merkezinden diyafram fıtığı olduğu düşünülerek sevk edilmiş olup teşhisin doğru olmadığı tarafımızca saptanmıştır. Olgunun önceki hayvan sağlık merkezinde torakosentez ile göğüs boşluğundan 300 ml kadar yoğun kıvamlı, kötü kokulu, pembe-kahverengi sıvı boşaltıldığı; bu işlemin ardından antimikrobiyal ajan olarak amoksisilin-klavulanik asit başlandığı, ancak hastanın pleural efüzyon varlığının her geçen gün daha da şiddetlenmesi bilgisi tarafımıza verilmiştir.

Hastanın ilk muayenesinde yüksek ateş, letarji, kaşeksi, tüylerde karışıklık, dispne gözlemlenmiştir. Olgunun toraks radyografisinde şiddetli pleural efüzyon varlığının devam ettiği tespit edilmiştir. Torakosentez işlemi yapılmış olup boşaltılan efüzyonun bir önceki gibi yoğun kıvamlı, kötü kokulu, kahverengi-pembe renkte olduğu görülmüştür. Hasta hospitalizasyona alınarak seftriakson (Novosef, Sanofi, İstanbul) 25 mg/kg, intravenöz, q12h ve furosemid (Diüril, Vetaş, İstanbul) 2 mg/kg, intravenöz, q24h başlanmış; yavaş infüzyon ile sıvı replasmanı sağlanmıştır. Tedavi süresince hasta belirli aralıklarla toraks radyografisi çekilerek kontrol edilmiştir. Olgunun tedavisinin 3. günündeki toraks radyografisinde pleural efüzyonun daha da şiddetlenerek devam ettiği gözlemlenmiştir. 3. Gün mevcut tedaviye ek olarak enrofloksasin (Baytril %5, Bayer, Almanya) 5 mg/kg, subkutan, q24h tedavi protokolüne eklenmiştir. Revize edilen tedavi protokolünden 5 gün sonra toraks radyografisinde pleural efüzyonun aynı şiddette devam ettiği gözlemlenmiştir. Yapılan torakosentez işleminde alınan sıvının makroskopik karakterinde değişim saptanmış olup daha önce kötü kokulu, bulanık ve pembe-kahverengi olan sıvının yerini kokusuz, berrak ve açık sarı renkli sıvı almıştır. Bu noktada elde edilen bulgular ışığında Feline Enfeksiyöz Peritonitis (FIP)'ten şüphelenilmiş ve Feline coronavirus açısından incelenmesi için dış laboratuvara kan örneği gönderilmiştir. Olgunun serolojik incelemesinde Feline coronavirus pozitif bulunması üzerine Immunocomb FCoV antikor titre testi (Immunocomb/Biogal UK) bakılmış olup S2 düşük pozitif olduğu görülmüştür. Hastalığın klinik seyri ve diğer laboratuvar bulguları Feline Enfeksiyöz Peritonitis hastalığının efüziv formu ile paralel gitmediği için ayırıcı tanı amacıyla alınan efüzyonun sitolojik olarak incelenmesi uygun görülmüştür. Bu amaçla yapılan mikroskopik incelemelerde çok sayıda bakteri kümeleri ile şiddetli nötrofil ve makrofajlar hücreleri görülürken, yapılan immunositokimyasal analizde FCoV negatif sonuç elde edilmiştir. Histopatolojik incelemeler sonrası piyotoraks tanısı kesinleşmiş olup bakteri identifikasyonu ve antibiyogram için 14 gün süreyle

kullanılmış olan antimikrobiyal tedaviye 10 gün ara verilip dış laboratuvara örnekler gönderilmiştir. İdentifikasyon sonucunda Mycoplasma sp. tespit edilmiştir. Antibiyogram sonucunda ise klindamisin duyarlılığı tespit edilmiştir. Yeni bir tedavi protokolü olarak başlanan klindamisin (Clindan®, Bilim Ilac, İstanbul) 5.5 mg/kg, intravenöz, q12h, 14 gün olarak kullanılmış olup hasta taburcu edilmiştir. Sonrasında belli aralıklarla tekrarlanan toraks radyografilerinde yeniden şekillenen bir pleural efüzyon tablosuna rastlanmamıştır.

Bu olgu, klinik rutininde hem ayırıcı tanının değerlendirilmesi hem de piyotoraks vakalarında ilk etapta tercih edilen geniş spektrumlu anbiyotik kullanımı sonucunda yanıt alınamaması sebebiyle bakteri identifikasyonu ve antibiyogram sonucunun önemini vurgulamak amacıyla yazılmıştır. Piyotoraks olgularında hem ayırıcı tanı hem de antimikrobiyal seçiminde klinisyenlere yol göstermesi hedeflenmiştir.

Anahtar Kelimeler: Dispne, Feline enfeksiyöz peritonitis, Mycoplasma, Piyotoraks, Pleural Efüzyon.

ABSTRACT

1.5-year old Scottish Fold male cat, which had dyspnea was transferred from another animal health institution with the diagnosis of diaphragmatic hernia however it was misdiagnosed. In previous animal health institution thoracocentesis procedure was performed and approximately 300 cc pleural effusion was drained from pleural cavity which was pink-braun colored and malodorous. Therewithal amoxicillin-clavulanic acid was administered but no progress was obtained. However, each time the pleural effusion recurred more severely than the previous one.

During the first examination of the patient; lethargy, cachexia, hair tangling and dyspnea were observed. There is presence of severe pleural effusion in thorax x-ray. thoracocentesis was performed due to the presence of severe pleural effusion. The pleural effusion content was malodorous and cloudy. Afterwards the patient was hospitalized, and treatment protocol which included intravenous ceftriaxone (25 mg/kg, q12h) and intravenous furosemide (2 mg/kg, q12h) was started. And fluid replacement was provided through slow intravenous infusion. When the thorax x-ray was repeated after three days from beginning of treatment, it was observed that the pleural effusion continued more severely. Therewith subcutaneously enrofloxacin (5 mg/kg, q24h) was started in addition to current treatment protocol. After 5 days from the new protocol, which was enrofloxacin included, thoracocentesis was performed again and alteration in the character of effusion was observed. The foul-smelling pink-brown liquid was replaced by an odorless, clean, light yellow liquid. At this point, with the suspicion of Feline Infectious Peritonitis, a blood sample was sent to the external laboratory to be examined for Feline coronavirus. After the serological examination of the case was positive for Feline coronavirus, the Immuncomb FCoV antibody titer test (Immunocomb/Biogal UK) was checked and S2 was found to be low positive. However, since the clinical course of the disease and other laboratory findings were not proportional to the effusive form of Feline Infectious Peritonitis. Cytological examination of the effusion was approved to be clear about differential diagnosis. Numerous bacterial clusters and severe neutrophil and macrophage cells were observed in cytological examination. By the way, FCoV negative results were obtained in the immunocytochemical analysis of effusion. After histopathological examinations, the diagnosis of pyothorax was certain. And antibiotic treatment which continued 14 days was discontinued for 10 days for bacterial identification and antibiogram. As a result of the identification Mycoplasma sp. detected. Due to identification and antibiogram intravenous clindamycin (5.5 mg/kg, q12h, 14 days) was administered and no repetitive pleural effusion was observed. Patient recovered and was discharged from the clinic.

This case was written to emphasize the importance of bacterial identification and antibiogram results in clinical routine, both for the evaluation of the differential diagnosis and the lack of response as a result of the use of broad-spectrum antibiotics, which is preferred in the first place in pyothorax cases. It is aimed to guide clinicians in both differential diagnosis and antimicrobial selection in pyothorax cases..

Keywords: Dyspnea, Feline infectious peritonitis, Mycoplasma, Pyothorax, Pleural Effusion.

IMPORTANCE OF PHYSIOTHERAPY IN VETERINARY SCIENCES: A MINIREVIEW

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ABSTRACT

Physiotherapy is a novel and rapidly evolving branch of study, with the initial goal of improving treatment for recovering patients. Its good outcomes in humans recommended that human physiotherapy approaches should be adapted and implemented in animal rescue. Physiotherapy interventions are used not just in the treatment of animals, but as well as in healthy animals to increase their athletic performance and well-being. The bulk of physiotherapeutic techniques are based on human procedures. The evaluation and management of neural situations and musculoskeletal is part of animal well-being physiotherapy. It analyzes fine motor coordination and anatomy to identify the correct issues. Physiotherapy has historically been utilized in therapeutic applications, with many studies on its advantages published. The appropriate choice of physiotherapeutic treatments, as well as strong collaboration between both the vet and the physiotherapist, is critical to therapy effectiveness. Furthermore, the application of physiotherapy in veterinary clinics is a novel idea, and the research basis for such therapies is in its early stages.

Keywords: Veterinary physiotherapy, Veterinary rehabilitation, Dog physiotherapy, Pets physiotherapy, Types of physiotherapy.

BIOLOGICAL AND ANTI NEWCASTLE DISEASE VIRAL SCREENINGS OF *L. SERRIOLA* EXTRACTS IN POULTRY

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ABSTRACT

Newcastle disease is one of the most severe viral diseases to affect poultry. Due to this, commercial poultry farms all over the world experience severe financial losses. In this concern the research was carried out in three phases. The phase I comprised phytochemicals, antioxidant and genotoxicity of different extracts from *L. serriola* through *in vitro* assays. Phase II investigated herbal extracts by *in ovo* antiviral activity through SPF-embryonated chicken eggs. In the phase III, the best promising extract was used to screen out the antiviral activity *in vivo* by histopathology & biochemical analyses. The findings revealed that all extracts of *L. serriola* has the potent source of phytochemicals present in them. The higher TPC contents were found in methanolic extract i.e. 55.8 ± 1.55 mg GAE/g. Antioxidant profile revealed that all the extracts have antioxidant potential and display the highest antiradical behavior in the pattern of methanolic > acetonic > chloroform > *n*-hexane, through DPPH, Ferric reducing antioxidant power (FRAP), OH radical scavenging and NO radical scavenging assays. The genotoxicity was assessed through comet assay which exposed that at low dose (0.5 mg/mL) was considered to be safe for effective treatment. Moreover, the methanolic extract also showed the notable thrombolytic potentials compare to clopidogrel. The *in ovo* study exposed the best results indicated by *L. serriola* at 400 µg/mL of methanolic & 300 µg/mL of acetonic extract completely inhibited the virus replication. So regarding to previous results, methanolic extract of *L. serriola* was selected for the oral administration in drinking water of broiler chicken to check a good immune response against NDV challenged strain. *L. serriola* extract at 100 mg/kg BW provided the maximum restoration of hematological and biochemical parameters as compared to control groups. Results revealed that using extract of *L. serriola* for NDV in poultry has the potential to significantly reduce the clinical and subsequent histopathologic aspects ($p < 0.05$) associated with the disease. In curative antiviral trial administrations of *L. serriola* extract might be a healthier approach in alleviating the possessions of NDV by *in ovo* and *in vivo*.

Keywords: Newcastle disease virus, *L. serriola*, SPF- embryonated eggs, *in vitro*, *in ovo*, *in vivo*.

**POMERIAN BİR KÖPEKTE RESTRIKTİF SOLDAN SAĞA PATENT DUKTUS
ARTERİOZUS**
RESTRICTIVE LEFT TO RIGHT PATENT DUCTUS ARTERIOSUS IN A POMERIAN DOG

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ÖZET

Patent duktus arteriozus (PDA), köpeklerde sık görülen doğumsal kalp hastalığıdır. Doğumdan sonra normal fetal yapının (duktus arteriozus) devam etmesi, kanın desendans aortadan pulmoner artere şant yapmasına izin vererek hacim yüklenmesine ve ardından sol kalp yetmezliğine yol açar. Ekokardiyografi, PDA'yı teşhis etmek için altın standarttır. Şant hacminin büyüklüğünü tahmin etmede ve hemodinamik önemini değerlendirmede yardımcı olmaktadır. Altı yaşında dişi bir Pomeranian köpeği takipne, nefes darlığı ve egzersiz intoleransı şikayetleri ile hastanemize başvurdu. İlk klinik muayenelerinde göğsün sol tarafında 5/6 derece sürekli üfürüm tespit edildi. Kalp fonksiyonlarını ve yapılarını değerlendirmek için iki boyutlu, M-mode ve Doppler transtorasik ekokardiyografi kullanıldı. Sağ parasternal kısa eksen ekokardiyografik incelemede ana pulmoner arterde kan akışında türbülans tespit edildi. CW-Doppler, PDA akım profilinde soldan sağa şant, pik sistolik velositenin yarısından fazla diyastol sonu velositenin bulunduğunu (EDV) ve restriktif akış paterni görüntülendi. Şantın boyutu 3,6 mm ve Qp/Qs 1,89 olarak ölçüldü. Bulgularımız orta derecede hemodinamik öneme sahip PDA ile uyumluydu. Ayrıca 2. derece sol ventrikül diyastolik disfonksiyonu ve yüksek sol atriyum basıncı saptandı. Sonuç olarak ekokardiyografi klinik vakalarda PDA'nın yönü, akım paterni ve şiddetinin saptanmasında altın standarttır. Orta ila şiddetli PDA vakaları, sol taraflı konjestif kalp yetmezliğine yol açabilir.

Anahtar kelimeler: Patent duktus arteriosus, Ekokardiyografi, Doppler

ABSTRACT

Patent ductus arteriosus (PDA) is a common congenital heart defect in dogs. Persistence of a normal fetal structure (ductus arteriosus) after birth allows for shunting of blood from the descending aorta to the pulmonary artery, leading to volume overload and subsequently left heart failure. The echocardiography is the gold standard bedside investigation to diagnose PDA. It can help in estimating the magnitude of shunt volume and assessing its hemodynamic significance. A six-year-old female Pomeranian dog was admitted with signs of tachypnea, short breathing, and exercise intolerance. First clinical examinations showed a 5/6-degree continuous murmur on the left side of the chest. Transthoracic echocardiography using of two-dimensional, M-mode and Doppler echocardiography

were performed to evaluate cardiac functions and structures. An echocardiographic examination on the right parasternal short axis view showed turbulence in blood flow in the main pulmonary artery. CW-Doppler revealed a left-to-right shunt and restrictive flow pattern with end-diastolic velocity (EDV) more than half of the peak systolic velocity. The dimension of the shunt measured as 3.6 mm and Qp/Qs equal to 1.89. Our findings were compatible with PDA of moderate hemodynamic importance. Also, grade 2 left ventricular diastolic dysfunction and high left atrium pressure were detected. In conclusion, echocardiography is the gold standard for the detection of PDA direction, flow pattern, and severity of clinical cases. Moderate to severe PDA cases can lead to left-sided congestive heart failure.

Keywords: Patent ductus arteriosus, Echocardiography, Doppler

ABOUT OPTIMUM AND INADMISSIBLE SOIL BULK DENSITY PLOUGHED UP

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ABSTRACT

On the basis of processing of soil properties database (all about 2000 sections), experimental field and laboratory modelling researches dynamics of bulk density soil ploughed up of Ukraine is described. Within the limits of scope of fluctuations key parameters of the most friable, modal (the most probable value), optimum (in relation to grain cultures), admissible (at which in soil is kept not less than 15 % of air) and inadmissible (at the critical contents of air less than 15 %, causing negative transformations in soil formation processes and development of roots) are installed.

The modal level of compaction is differentiated for all gradation of texture, that installs characteristic, equilibrium compaction inherent in the genetic status of soil. Between admissible and inadmissible levels form compaction, suitable for cultivation of agricultural crops and which should be maintained during their vegetation. For the majority of soil light texture of Polissya the bulk density should be in a range of 1,35–1,65 gr/cm³, loamy soils of Forest-Steppe and heavy loamy/light clay soils of Forest-Steppe and Steppe accordingly 1,10–1,35 and 1,15–1,40 gr/cm³.

The specified zonal parameters of compaction are recommended to be used as soil-saving specifications and to not suppose unduly friable and overcompacted condition.

Keywords: optimum, modal equilibrium, admissible, inadmissible soil bulk density.

**TÜRKİYE’DEKİ SÜTTEN YENİ KESİLEN TAYLARDA LAWSONIA
INTRACELLULARIS’İN MOLEKÜLER VE SEROLOJİK YÖNDEN ARAŞTIRILMASI**
**MOLECULAR AND SEROLOGICAL INVESTIGATION OF LAWSONIA
INTRACELLULARIS IN WEANLING FOALS IN TÜRKİYE**

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ÖZET

Amaç: Süttten yeni kesilen taylarda tanımlanan *Lawsonia intracellularis*’in sebep olduğu tek tırnaklı proliferatif enteropati hastalığının Amerika Birleşik Devletleri, Batı Avrupa, İsrail, Kore ve Brezilya gibi farklı ülkelerde varlığı ortaya konulmuş, ancak Türkiye’ de ve Doğu Avrupa bölgesindeki varlığı araştırılmamıştır. Bu çalışmanın amacı, süttten yeni kesilen taylarda *L. intracellularis*’in seroprevalansını ve fekal saçılımını belirlemektir.

Yöntem: Bu amaçla kesitsel bir çalışma tasarlanarak Türkiye’nin üç farklı ilinden klinik bulgulu ve bulgusuz 97 taydan gaita ve kan serumu örnekleri toplanmıştır. Serum total protein ve albümin seviyeleri biyokimya otoanalizatöründe ölçümlenmiştir. Serum ve gaita örnekleri aynı zamanda bELISA (Blokli ELISA) ve eş-zamanlı PZR ile sırasıyla spesifik antikor ve etken DNA’sını tespit etmek için test edildi.

Bulgular: bELISA ile % 25,8 oranında seropozitiflik saptandı. Ancak, hiçbir gaita örneğinde eş-zamanlı PZR ile pozitiflik saptanmadı. İstatiksel analizler sonucunda klinik bulgulu atlar ile, seropozitiflik ve serum ALB/TP seviyeleri açısından belirgin bir ilişki bulunmadı.

Sonuç: Seropozitiflik, Türkiye’de ilk defa süttten yeni kesilen tay popülasyonunda

L. intracellularis’e maruziyeti gösterdi. Hastalığın ülkede/bölgedeki epidemiyolojisini daha iyi anlamak amacıyla süttten yeni kesilen taylarla birlikte erişkin atlarda ve potansiyel yaban hayatı rezervuarlarında daha fazla araştırmaya ihtiyaç duyulmaktadır.

Anahtar Kelimeler: At, ELISA, eş-zamanlı PZR, *Lawsonia intracellularis*, prevalans.

ABSTRACT

Scope: Equine proliferative enteropathy caused by *Lawsonia intracellularis* has been described in weanlings in many different countries including the USA, Western Europe, Israel, Korea and Brazil but not investigated in Türkiye and Eastern Europe. The objective of the study was to determine the seroprevalence and fecal shedding of *L. intracellularis* in weanling foals.

Method: A cross-sectional study was designed in randomly selected 97 weanling foals with or without clinical signs from 3 different provinces of Türkiye. Total protein and albumin levels in serum samples from 97 foals were measured using automated biochemistry analyser. Serum samples and fecal samples

were also tested by bELISA (Blocking ELISA) and real-time PCR to detect *L. intracellularis*-specific antibodies and DNA, respectively.

Findings: Seropositivity was found to be 25.8% by bELISA. However, none of the fecal samples were positive by real-time PCR. Statistically, no significant associations were found between seropositivity and clinical signs or serum ALB/TP levels.

Conclusion: Seropositivity indicated the exposure of weanling foal population to *L. intracellularis* for the first time in Türkiye. Further investigations are needed to better understand the epidemiology of the disease in the weanlings as well as adult horse populations and potential wildlife reservoirs in the country/region.

Keywords: ELISA, horse, *Lawsonia intracellularis*, prevalence, real-time PCR.

**ET VE ET ÜRÜNLERİNDE KULLANILAN NİTRAT VE NİTRİTLERİN TEMİZ ETİKET
ALTERNATİFLERİ**
**CLEAN LABEL ALTERNATIVES OF NITRATES AND NITRIDES USED IN MEAT AND
MEAT PRODUCTS**

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ÖZET

Sanayileşme ile birlikte, tüketicilerin küresel beslenme algısı ve gıdalarla ilgili beklentisinin değişimiyle, özellikle daha sağlıklı et ve et ürünlerine talebin arttığı görülmektedir. Bu durum et endüstrisi başta olmak üzere tüm gıda sektörünü etkileyen gıdaların sağlık açısından kalitesini iyileştirmeyi amaçlayan, yeni bir trendin yani ‘temiz etiket’ kavramının doğmasına neden olmuştur. Bu kavram ile birlikte, et teknolojisi alanında yapılan araştırmalar inorganik ve/veya sentetik katkı maddelerini içermeyen ürün üretimi için alternatif ve doğal katkı maddelerinin geliştirilmesi üzerine odaklanılmıştır. Nitrat ve nitritler et ve et ürünlerinde ürünün kalite özelliklerini iyileştirmek, mikrobiyolojik ve biyokimyasal bozulmayı engellemek veya geciktirmek amacıyla en çok kullanılan katkı maddelerinin başında gelmektedir. Ancak nitrat ve nitritler, sekonder aminler ve aminoasitlerle tepkimeye girerek kanserojenik N-nitrozamin bileşiklerini oluşturması nedeniyle tüketici tarafından endişe edilen bileşiklerdir. Nitrit ve nitratın N-nitrozamin bileşiklerini oluşturması riskini azaltmak amacıyla, bu bileşiklerin kullanım miktarları yasalarla sınırlandırılmış olmasına rağmen, tüketici tarafından halen endişe duyulan bileşiklerin başında gelmektedir. Bu sebeple nitrat ve nitrit kullanımı yerine aynı fonksiyonları yerine getirebilecek temiz etiketli doğal alternatif bileşiklerin kullanımı ile ilgili araştırmalar dikkat çekmeye başlamıştır. Yapılan güncel çalışmalarda, roka, kereviz, ıspanak, turp, marul gibi bitkisel kaynakların doğal nitrat alternatifleri olarak çözüm getirebileceği ortaya konmuştur. Bu doğal nitrit alternatifleri sentetik nitrat ve nitritlere alternatif olarak sunulmakla birlikte, öncelikle nitrite dönüştürülmüş olması ve de tek başlarına kullanıldığında inorganik nitrat ve nitritlerin görevini yerine getirebilmesi gerekmektedir. Ancak çalışmalarda, tek başlarına kullanımlarında aynı fonksiyonel özelliği göstermekte yeterli olmadıkları, organik asitler, uçucu yağlar vb. maddelerle birlikte kullanılması önerilmektedir. Bu nedenle, et ve et ürünlerinde bu temiz etiket alternatiflerinin antimikrobiyel ve kürleme fonksiyonları gerçekleştirebilme yeterlilikleri iyice araştırılarak optimize edilmesi ve yasal otoritelerce kabul görmesi açısından önem arz etmektedir.

Anahtar kelimeler: Nitrat/nitritler, temiz etiket, sağlıklı et ürünü

ABSTRACT

With industrialization, consumer perception and expectations of global nutrition have changed, leading to increased demand for healthier meat and meat products, especially the emergence of a new trend, the "clean label" concept, aimed at improving the quality of food in terms of health, affecting the entire food industry, including the meat industry. This concept has led to a focus on developing alternative and natural additives for the production of products that do not contain inorganic and/or synthetic additives in meat technology research. Nitrates and nitrites are the most commonly used additives to improve product quality, prevent or delay microbiological and biochemical spoilage in meat and meat products. However, nitrates and nitrites are compounds that cause concern among consumers because they react with secondary amines and amino acids to form carcinogenic N-nitroso compounds. Although the use of nitrates and nitrites is limited by laws to reduce the risk of forming N-nitroso compounds, they are still a source of concern among consumers. Therefore, research into the use of clean label natural alternatives that can perform the same functions as nitrates and nitrites has begun to attract attention.

Recent studies have shown that plant sources such as rocket, celery, spinach, turnip, and lettuce can provide natural nitrate alternatives. These natural nitrite alternatives are offered as alternatives to synthetic nitrates and nitrites, but they must first be converted to nitrite and be able to perform the same functions as inorganic nitrates and nitrites on their own. However, studies suggest that they are not sufficient on their own and should be used in conjunction with organic acids, volatile oils, etc. Therefore, it is important to thoroughly research the ability of these clean label alternatives to perform antimicrobial and curing functions in meat and meat products, and for them to be accepted by legal authorities.

Key words: Nitrates/nitrites, clean label, healthy meat products.

**DİYARBAKIR İLİ SÜT SIĞIRCILIĞI İŞLETMELERİNDE BUZAĞI KAYIPLARI VE
EKONOMİK ETKİLERİ**
CALF LOSSES AND ECONOMIC EFFECTS IN DİYARBAKIR DAIRY FARMS

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ÖZET

Bu çalışma ile Diyarbakır ili süt sığircılığı işletmelerinde buzağı kayıpları ve il ekonomisi üzerine etkilerinin ortaya konması amaçlanmıştır. Çalışma 01-15 Ağustos 2021 tarihleri arasında yürütülmüştür. Çalışma materyalini, il genelini temsil edebilecek süt sığircılığı yapan işletmelerle yüz yüze yapılan anketler oluşturmuştur. Araştırmada popülasyondaki farklı kapasitelere sahip işletmelerin yeterince temsil edilmesini sağlamak amacıyla tabakalı örnekleme metodu kullanılarak 149 işletme çalışmaya dâhil edilmiştir. Çalışmada, buzağı kaybına neden olan faktörler dört ana başlık (gebe kalamama, atık, güç doğum, 0-6 aylık buzağılarda ölüm) altında incelenmiştir. Çalışma sonuçlarına göre Diyarbakır ili süt sığircılığı işletmelerinde buzağı kayıplarının %23,6 olduğu belirlenmiştir. Bu kayıpların %11,1 gebe kalamama (fertilite sorunları)'ya bağlı olduğu, 0-6 aylık buzağılarda ölüme bağlı kayıpların %7,4 olduğu, atıklara bağlı kaybın %4,9 ve güç doğuma bağlı buzağı kayıplarının ise %0,2 olduğu ortaya konmuştur. Buzağı kayıplarına neden olan 4 ana faktör arasında en etkili olarak; gebe kalamamanın olduğu (%11,1) tespit edilmiştir.

Çalışma sonuçlarına göre; Diyarbakır ilinde 2021 TÜİK verilerine göre doğurma kabiliyetine sahip iki yaş ve üzeri dişi sığır varlığı 264.419 adettir. İl genelinde buzağı kaybının %23,6 olduğu düşünüldüğünde yaklaşık 62.403 baş buzağının yukarıda belirtilen nedenlerden dolayı kaybedildiği söylenebilir. 2022 yılı piyasa koşulları dikkate alındığında ortalama bir buzağının 9.000 TL olduğu değerlendirildiğinde il genelinde yıllık buzağı kaybı kaynaklı ekonomik kaybın yaklaşık 561.627.000 TL (31.201.500 USD Doları) olduğu belirlenmiştir. (1\$=18 TL)

Diyarbakır ili süt sığircılığı işletmelerindeki buzağı kayıp oranının bilinenin bir hayli üstünde olduğu tespit edilmiştir. Gerek bölge gerekse ülke ekonomisi açısından büyük kayba neden olan buzağı kayıplarının önüne geçilmesi için işletme sahiplerinin bilinçlendirilmesi, bununla birlikte yerel ve merkezi yönetimlerin gerekli önlemleri ivedi olarak alması önerilmektedir.

Anahtar Kelimeler: Buzağı kaybı, Diyarbakır, Ekonomik etki

ABSTRACT

It is aimed to reveal the calf losses and their effects on the provincial economy in dairy cattle farms in Diyarbakır. The study was carried out between 01-15 August 2021. The study material consisted of face-to-face surveys with dairy cattle farms that could represent the entire province. In order to ensure adequate representation of dairy farms with different capacities in the population, 149 dairy farms were included in the study by using the stratified sampling method. In the study, the factors causing calf loss were examined under four main headings (infertility, abortus, calving difficulty, early calf mortality). The results showed that calf losses in dairy farms in Diyarbakır was 23.6%. More specifically, 11.1% was due to infertility, 7.4% was due to early calf mortality, 4.9% was due to abortus, and 0.2% was due to calving difficulty. Among these four main causes, infertility was the predominant factor.

According to the results of study; According to 2021 TUIK data, there are 264,419 heads of female cattle aged two years and over in the province, it can be said that approximately 62,403 calves have been lost due to the above-mentioned reasons. Considering that an average calf cost is 9,000 TL in market conditions, it has been determined that the annual economic loss due to calf loss is approximately 561.627,000 TL (31,201,500 USD Doları) in the province.

It was revealed that the calf loss rate in dairy cattle farms in Diyarbakır is much higher than known. It is recommended to raise awareness of farmers in order to prevent calf losses, which cause great loss in terms of both the region and the country's economy, and that local and central governments should be taken the necessary measures immediately.

Keywords: Calf loses, Diyarbakır province, Economic effect

TRABZON VE ARTVİN İLLERİNDE GELENEKSEL OLARAK ÜRETİLEN SALAMURA
BALIKLARDA MİKROBİYAL FLORANIN BELİRLENMESİ

DETERMIANTION OF MICROBIAL FLORA IN TRADITIONALLY PRODUCED SALTED
FISH IN TRABZON AND ARTVIN PROVINCES

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ÖZET

Ülkemizin farklı illerinde geleneksel olarak farklı balık türlerinin tuzlanarak ve kurutularak, serin bir ortamda muhafaza edilmesi söz konusudur. Ancak, Karadeniz Bölgesi'nin bazı illerinde geleneksel olarak üretilen salamura Hamsi örnekleri diğer yörelerdekinden farklı olarak tuzlandıktan sonra kendi saldı suyu içerisinde ve oda sıcaklığında 1-2 yıl boyunca muhafaza edilmektedir. Bu durum akıllara bu salamura Hamsi örneklerinin fermente balık ürünü olabileceğini getirmektedir. Bu çalışmada Trabzon ve Artvin illerinden, 2021 yılına ait olan ve geleneksel olarak yöre halkı tarafından üretilen salamura Hamsi örnekleri temin edilmiştir. Örneklerin pH ve tuz miktarı belirlenmiştir. Her iki salamura balık örneğinden M17 ve MRS agara ekimler yapılmıştır. MALDI-TOF MS analizleri ile her iki besiyerinde gelişen kolonilerin tür tespiti yapılmıştır. Ayrıca, her iki salamura balık örneğinin mikrobiyotasının tespiti için ise METAGENOM analizleri yapılmıştır. Elde edilen sonuçlar neticesinde, Trabzon ve Artvin örneklerinde sırasıyla pH 5.24 ± 0.01 ve 5.64 ± 0.02 , tuz miktarı ise $\% 7.61 \pm 0.48$ ve $\% 13.85 \pm 0.55$ olarak belirlenmiştir. M17 ve MRS agara yapılan ekimler sonucunda yoğun bir koloni gelişimi gözlenememiştir. MALDI-TOF MS analizleri sonucunda; Trabzon örneğinde *Bacillus subtilis*, *Bacillus thuringiensis*, *Paenibacillus pabuli* ve *Candida parapsilosis*; Artvin örneğinde ise *Bacillus simplex* ve *Micrococcus luteus* türleri teşhis edilmiştir. METAGENOM analizleri sonucuna göre Trabzon örneğinin mikrobiyotasında baskın olan prokaryot mikroorganizma cinsleri sırasıyla *Acinetobacter*, *Shewanella*, *Stenotrophomonas*, *Prevotella*, *Pseudomonas*, *Halobacterium*, *Algoriella*, *Nubsella* ve *Psychrobacter* olarak belirlenirken; Artvin örneğinde ise sırasıyla *Brochothrix*, *Psychrobacter*, *Photobacterium*, *Lactocaseibacillus*, *Leuconostoc*, *Salinibacter*, *Acinetobacter*, *Lactococcus* ve *Bacteroides* olarak tespit edilmiştir. Salamura Hamsi örneklerinin fungal mikrobiyotasında baskın olan cinsler Trabzon örneğinde sırasıyla *Diplodia*, *Tuber*, *Candida*, *Magnaporthiopsis*, *Cladosporium*, *Alternaria*, *Fusarium*, *Cryptococcus* ve *Aureobasidium* olarak tespit edilirken; Artvin örneğinde sırasıyla *Diplodia*, *Magnaporthiopsis*, *Dipodascus*, *Alternaria*, *Tuber*, *Aureobasidium*, *Saprochaete*, *Saccharomyces* ve *Fusarium* olarak belirlenmiştir. Burada belirtilen cinsler oran olarak $\% 2$ 'nin üzerinde tespit edilen cinsler olup, tam flora cins çeşitliliği bakımından oldukça zengin bir içeriğe sahiptir.

Anahtar Kelimeler: Salamura balık, Hamsi, MALDI-TOF MS, METAGENOM, Mikrobiyal Flora, Mikrobiyota.

ABSTRACT

Traditionally, in different cities of our country, different fish species are salted and dried and stored in a cool environment. However, salted Anchovy samples, which are traditionally produced in some provinces of the Black Sea Region, are preserved for 1-2 years at room temperature after salting, unlike other regions. This brings to mind that these salted Anchovy samples may be fermented fish products.

In this study, salted Anchovy samples belonging to the year 2021 and traditionally produced by local people were obtained from Trabzon and Artvin provinces. The pH and salt content of the samples were determined. Inoculations were made on M17 and MRS agars from both salted fish samples. Colonies growing on both media were identified by MALDI-TOF MS analysis. In addition, METAGENOM analyzes were performed to determine the microbiota of both salted fish samples. As a result of the analyses, pH was determined as 5.24 ± 0.01 and 5.64 ± 0.02 , and the amount of salt was $7.61 \pm 0.48\%$ and $13.85 \pm 0.55\%$ in Trabzon and Artvin samples, respectively. An intensive colony development was not observed on M17 and MRS agar. As a result of MALDI-TOF MS analysis, *Bacillus subtilis*, *Bacillus thuringiensis*, *Paenibacillus pabuli* and *Candida parapsilosis* were identified in the Trabzon sample and *Bacillus simplex* and *Micrococcus luteus* were identified in the Artvin sample. According to the results of METAGENOM analysis, the prokaryotic microorganisms that are dominant in the microbiota of Trabzon sample were determined as *Acinetobacter*, *Shewanella*, *Stenotrophomonas*, *Prevotella*, *Pseudomonas*, *Halobacterium*, *Algoriella*, *Nubsella* and *Psychrobacter*, respectively and it was determined as *Brochothrix*, *Psychrobacter*, *Photobacterium*, *Lacticaseibacillus*, *Leuconostoc*, *Salinibacter*, *Acinetobacter*, *Lactococcus* and *Bacteroides* in the Artvin sample, respectively. While the dominant genera in the fungal microbiota of salted Anchovy samples were determined as *Diplodia*, *Tuber*, *Candida*, *Magnaporthiopsis*, *Cladosporium*, *Alternaria*, *Fusarium*, *Cryptococcus* and *Aureobasidium* in Trabzon sample, respectively; in the Artvin sample, they were determined as *Diplodia*, *Magnaporthiopsis*, *Dipodascus*, *Alternaria*, *Tuber*, *Aureobasidium*, *Saprochaete*, *Saccharomyces* and *Fusarium*, respectively. The genera specified here are those with a ratio of more than 2%, and the full flora has a very rich content in terms of genus diversity.

Keywords: Salted Fish, Anchovy, MALDI-TOF MS, METAGENOM, Microbial Flora, Microbiota.

**ERZURUM İLİ NARMAN İLÇESİ BÖLGESİNDEKİ SIĞIRLARIN MERAYA ÇIKMA
ALIŞKANLIKLARININ KOLOSTRUM GAMMA-İMMÜNGLOBÜLİN (IGG) SEVİYESİ
ÜZERİNE ETKİSİ**

**THE EFFECT OF PASTURE HABITS OF CATTLE IN THE NARMAN DISTRICT OF
ERZURUM PROVINCE ON COLOSTRUM GAMMA-IMMUNOGLOBULIN (IgG) LEVELS**

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ÖZET

Yapılan çalışmada Erzurum ilinin Narman ilçesinde bulunan gebe sığırlarda kolostrum kalitesi üzerine mera beslenmesinin etkili olup olmadığı tespit etmek amaçlanmıştır. Buzağılarda yeterli bir bağışıklık sisteminin oluşması için, sadece kolostrum alması yeterli değil aynı zamanda kolostrumdaki immünglobülin konsantrasyonu ve bağırsakların immünglobülinleri emebilme yeteneği de önemlidir. Kolostrumda kalite ölçütü birçok faktörün değerlendirilmesiyle belirlenirken, bu faktörlerden en önemlisi ve son zamanlarda kolostrum kalitesini belirlemede kullanılan özellik kolostrumun içerdiği gamma-immünglobülin (IgG) miktarıdır. Çalışma da ilk önce gebe hayvan sayısı ve bilgileri Narman ilçe tarım müdürlüğü verilerinden tespit edildi. Gebe hayvan sahipleriyle irtibata geçip, hayvan sahiplerinden öncelikle gebe sığırların beslenmesinde çayır ve mera beslenmesi yapılıp-yapılmadığı sorularak tespit yapıldı. Çalışma için toplam 120 adet gebe sığır kullanıldı. Bunların 60 tanesinin de mera beslenmesi uygulanmış, 60 tanesinde ise mera beslenmesi uygulanmamıştır. Tespit edilen bu sığırlardan doğumu takip eden ilk 8 saat içerisinde 10 ml kolostrum numunesi alınmıştır. Alınan kolostrum numuneleri laboratuvar analizi yapılana kadar -20°C de saklandı. Kolostrum gamma-immünglobülin (IgG) seviyesi kit (Biox Diagnostics marka, BIO K 420) protokolüne göre analizler yapıp ölçümler BIORAD ELISA Reader ile yapıldı. Hesaplamalar kitte belirtilen linkten yapılarak elde edildi. Çalışma sonucunda elde edilen veriler SPSS 20.0 paket programında Anova modelinde analizler yapıldı. Yapılan analiz sonucuna göre meraya çıkan hayvanlarda istatistiksel açıdan ($P < 0.05$) önemli olacak seviyede gamma-immünglobülin (77.3 µl) seviyesinin yüksek olduğu tespit edildi. Fakat hayvan ırk ve yaşının kolostrum gamma-immünglobülin seviyesi üzerine önemli bir etkisi olmadığı tespit edildi. Sonuç olarak sığırların beslenmesinde mera kullanımının kolostrum kalitesi üzerine olumlu etkisi olacağı, fakat bu etkinin meraya çıkan hayvan sayısının, mera bölgesinde görülen salgın hastalıklar, hayvanların mera da kalma süresi gibi birçok faktöre bağlı olarak değişebileceği unutulmamalıdır. Bu sebepten ötürü konu hakkında daha fazla çalışma yapılması gerekmektedir. (Yapılan bu çalışma Atatürk Üniversitesi BAP Birimince desteklenmiştir.)

Anahtar Kelimeler: Gamma-immünglobülin, Kolostrum, Mera.

ABSTRACT

In this study, it was aimed to determine whether pasture feeding is effective on colostrum quality in pregnant cattle in Narman district of Erzurum province. For the formation of an adequate immune system in calves, not only colostrum intake is sufficient, but also the immunoglobulin concentration in the colostrum and the ability of the intestines to absorb immunoglobulins. While the quality criterion in colostrum is determined by the evaluation of many factors, the most important of these factors and recently used to determine the quality of colostrum is the amount of gamma-immunoglobulin (IgG) contained in colostrum. In the study, first of all, the number of pregnant animals and their information

were determined from the data of the Narman district agriculture directorate. It was determined by contacting the pregnant animal owners and asking the animal owners whether meadow and pasture nutrition is used in the feeding of pregnant cattle. A total of 120 pregnant cattle were used for the study. Pasture feeding was applied in 60 of them, and pasture feeding was not applied in 60 of them. 10 ml of colostrum sample was taken from these detected cattle within the first 8 hours following the birth. Collected colostrum samples were stored at -20°C until laboratory analysis. Colostrum gamma-immunoglobulin (IgG) level was analyzed according to the protocol of the kit (Biox Diagnostics brand, BIO K 420) and measurements were made with BIORAD ELISA Reader. Calculations were obtained from the link specified in the kit. The data obtained as a result of the study were analyzed in the SPSS 20.0 package program in the Anova model. According to the results of the analysis, it was determined that the level of gamma-immunoglobulin (77.3 µl) was found to be statistically significant ($P < 0.05$) in the animals that went out to the pasture. However, it was determined that animal breed and age did not have a significant effect on colostrum gamma-immunoglobulin level. As a result, it should not be forgotten that the use of pasture in cattle feeding will have a positive effect on colostrum quality, but this effect may vary depending on many factors such as the number of animals that go to the pasture, epidemics in the pasture area, and the length of stay of the animals in the pasture. For this reason, more work needs to be done on the subject. (This study was supported by Atatürk University BAP Unit.)

Keywords: Colostrum, Gamma-immunoglobulin, Pasture.

AMELIORATIVE EFFECT OF BEE POLLEN *CISTUS CRETICUS* L. ON THE OXIDANT-ANTIOXIDANT SYSTEM IN STREPTOZOTOCIN-INDUCED DIABETIC RATS.
STREPTOZOTOCİN İLE DİABET OLUŞTURULMUŞ SIÇANLARDA ARI POLENİ *CISTUS CRETICUS* L.'NİN OKSİDAN-ANTIOKSİDAN SİSTEMİ İYİLEŞTİRİCİ ETKİSİ

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ÖZET

Bal arısı ürünlerinden biri olan polen, geniş biyolojik etkilere sahiptir ve sağlık üzerinde olumlu etkileri olduğu düşüncesiyle eski çağlardan beri kullanılmaktadır. Bu çalışmada streptozotocin (STZ) ile diyabet oluşturulmuş sıçanlarda *Cistus creticus* L. arı polenin (CP) oksidan-antioksidan sistemler ve metabolik parametreler üzerine etkisi araştırıldı. Sıçanlar dört gruba ayrıldı; kontrol grubu (K), kontrol+CP grubu (K+CP); diyabet grubu (D) ve diyabet + CP grubu (D+CP). Diyabet STZ'in (65mg/kg) tek doz intraperitoneal enjeksiyonu ile oluşturuldu. *C.creticus* poleni (350 mg/kg/gün) diyabet oluştuktan sonra 4 hafta içme suyuna katıldı. Deney süresi sonunda alınan kanda serum glukoz, insülin, total kolesterol (TK), trigliserit (TG), yüksek yoğunluklu lipoprotein-kolesterol (HDL-K), alanin aminotransferaz (ALT) ve aspartat aminotransferaz (AST) seviyeleri otoanalizörde ölçüldü. Plazma ve doku (kalp, böbrek, karaciğer *Musculus gastrocnemius*), malondialdehit (MDA) seviyeleri spektrofotometrik yöntemle tayin edildi. Serum paraoksonaz (PON), arilesteraz (ARE), eritrosit süperoksit dismutaz (SOD) ve kan glutatyon peroksidaz (GSH-Px) aktiviteleri ticari kitler kullanılarak ölçüldü.

C. creticus polenin D+CP grubunda serum glukoz, TK ve TG düzeylerini düşürdüğü, insülin düzeylerini artırdığı gözlemlendi. Ayrıca plazma, kalp, böbrek ve karaciğer doku MDA seviyeleri C+CP ve D+CP gruplarında düşük bulundu. C+CP ve D+CP gruplarında serum PON, ARE enzim aktivitelerinde artış saptandı.

Bu bulgular, *C. creticus* polen takviyesinin, deneysel olarak oluşturulmuş diyabette antioksidan sistemi güçlendirdiği, oksidatif stresi ve metabolik bozuklukları düzelttiği hipotezimizi desteklemektedir. Sonuç olarak; arı poleni *C. creticus* poleni diyabet ve aterogenez dahil olmak üzere diyabetin komplikasyonlarını iyileştiren terapötik ve/veya destekleyici bir ajan olarak değerlendirilebilir.

Anahtar Kelimeler: Diyabetes mellitus, oksidatif stres, antioksidan, *Cistus*, arı poleni

ABSTRACT

Pollen, one of the honey bee products, has wide biological effects and has been used since ancient times with the thought of having positive effects on health. This study was designed the effect of *Cistus*

creticus L. bee pollen (CP) on oxidant-antioxidant systems and metabolic parameters in streptozotocin (STZ)-induced diabetic rats. The rats were divided into four groups; control group (C), control+CP group (C+CP); diabetes group (D) and diabetes CP group (D+CP). Diabetes was induced by a single intraperitoneal injection of STZ (65mg/kg). *C.creticus* polen (350 mg/kg/day) was administered in drinking water for four weeks after the induction of diabetes. Serum glucose, insulin, total cholesterol (TC), triglyceride (TG), high-density lipoprotein-cholesterol (HDL-C), alanine aminotransferase (ALT), and aspartate aminotransferase (AST) levels were evaluated using an autoanalyzer. Plasma and tissue (heart, kidney, liver, *Musculus gastrocnemius*) malondialdehyde (MDA) levels were measured by spectrophotometric methods. Serum paraoxonase (PON), arylesterase (ARE), erythrocyte superoxide dismutase (SOD), and blood glutathione peroxidase (GSH-Px) activities were determined using commercial kits.

It was observed that *C. creticus* pollen decreased serum glucose, TC and TG levels and increased serum insulin levels in the D+CP group. In addition, plasma, kidney, liver, and muscle tissue MDA levels were found to be low in the C+CP and D+CP groups. In the C+CP and D+CP groups, serum PON and ARE enzyme activities increased significantly.

These findings support our hypothesis that bee pollen *C. creticus* supplementation strengthens the antioxidant system and corrects oxidative stress and metabolic disorders in experimentally induced diabetes. In conclusion; bee pollen *C. creticus* can be considered a therapeutic and/or supportive agent that ameliorates the complications of diabetes, including atherogenesis.

Keywords: Diabetes mellitus, oxidative stress, antioxidant, *Cistus*, bee pollen.

ACETIC ACID FOLIAR SPRAY ENHANCED DROUGHT STRESS TOLERANCE IN
SOYBEAN

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ABSTRACT

Soybean is one of the most important food legumes with its high protein and oil concentrations. However, soybean is reported to be a drought-susceptible crop. Drought has become more occasional in many agricultural regions. To overcome drought, more interest in the exogenous application of some agents was reported lately as an affordable practice. Acetic acid (AA) is a cheap agent that is previously reported to ameliorate drought, however, no reports on its effect on soybean genotypes that differ in drought tolerance are published. We conducted an experiment in a controlled environment to evaluate the influence of AA on the morphological and physiological traits of two soybean (*Glycine max* (L.) Merr.) genotypes; drought-susceptible 'Coraline' and drought-tolerant 'Speeda'. Drought decreased stomatal conductance, specific leaf area, chlorophyll-a and total carotenoids of both soybean genotypes. However, the foliar spray of 20 mM of AA before drought imposition enhanced these traits significantly. Both the optimal and the actual photochemical efficiency of PSII decreased by drought in 'Coraline', but not in 'Speeda'. Root and shoot length and weight were negatively affected by drought in both genotypes; however, AA-treated plants had better values of these traits in 'Coraline', but not in 'Speeda', indicating that AA application might be more effective on drought-susceptible soybean genotypes.

KULLANILMIŞ KAHVE TELVESİ İLE FONKSİYONEL MAKARNA ÜRETİMİ
FUNCTIONAL PASTA PRODUCTION WITH USED COFFEE GROUND

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ÖZET

Makarna İtalyan mutfağına ait, uzun raf ömrü, kolay taşınması, hızlı hazırlanması ve lezzetli olması nedeniyle çoğu insan tarafından sevilerek tüketilen bir besin kaynağıdır. Makarna mayasız hamurdan elde edilir ve genellikle durum buğdayı, öğütülmüş irmik, yumurta ve tuz gibi temel malzemeler ile hazırlanmaktadır. Toplumun her kesiminde sevilerek tüketilen bu gıda ürününü fonksiyonel hale getirmek, toplum sağlığı açısından önem arz etmektedir.

Dünyada ve ülkemizde artan bir eğilim gösteren kahve tüketiminin sonucu olarak oluşan kullanılmış kahve telvesi, granül ve hazır (instant) kahve tüketiminin ve ev içi tüketimin bir atığı olarak oluşabilmektedir. Kullanılmış kahve telvesi, sahip olduğu antioksidan aktivite, diyet lifi içeriği ve prebiyotik aktivite ile sağlık açısından faydalı bir bileşen olarak gıda endüstrisinde kullanılma potansiyeli barındırmaktadır. Ayrıca gıda endüstrisi ve gastronomi bilminde son yıllarda dikkat çeken atık yönetimi ve sürdürülebilirlik açısından da oldukça büyük bir önem arz etmektedir. Kullanılmış kahve telvesinin, glutensiz ürün formülasyonlarında farklı glutensiz un çeşitlerinin yanı sıra buğday unu ikamesi olarak veya şekerleme ve çikolata ürünlerinin fonksiyonel hale getirilmesinde ve zenginleştirilmesinde değerlendirilebileceği düşünülmektedir.

Makarnanın temel malzemelerinden biri buğday unudur ve fonksiyonel bir makarna geliştirmek için kullanılabilecek çeşitli buğday unu ikameleri bulunmaktadır. Bu çalışmada makarnada bulunan buğday

unu yerine, değişen oranlarda kullanılmış kahve telvesi kullanılarak fonksiyonel makarna geliştirilmiştir. Kullanılmış kahve telvesinin kullanılması sayesinde ürünün besin değeri artmıştır. Ayrıca gıda endüstrisi atıklarının değerlendirilmesiyle hem gıda israfının önüne geçilmiş hem de ekolojik ve ekonomik anlamda bir katkı sağlanmıştır. Makarna hamuru hazırlanırken buğday unu, %5 ve %10 oranlarında kullanılmış kahve telvesi ile ikame edilmiştir. Geliştirilen fonksiyonel makarna örneklerinde 9'lu hedonik skala ile duyu analizi yapılmış ve yeni makarna örneklerinin genel kabul edilebilir düzeyi 6 puan ve üzerinde puanlar almıştır. Ayrıca duyu özellikleri konusunda yapılabilecek çeşitli iyileştirmeler sayesinde endüstriyel üretime uygun olan, sıfır atık mutfak uygulamalarını içinde barındıran, aynı zamanda fonksiyonel bir gıda ürünü olan makarna üretiminin mümkün olacağı düşünülmektedir.

Anahtar Kelimeler: Kullanılmış Kahve Telvesi, Makarna, Fonksiyonel Gıda

ABSTRACT

Pasta belongs to Italian cuisine, which is nutritional and consumed by most people due to its long shelf life, manageable transportation, fast preparation, and meal. Pasta is made from unleavened dough and is usually prepared with basic ingredients such as durum wheat, ground semolina, eggs, and salt. Public health needs to make these food bodies functional due to consumption in every part of society.

The spent coffee grounds as a result of coffee consumption, which has an increasing trend in the world and our country, can be formed as a waste of granulated and instant coffee consumption and domestic consumption. Spent coffee grounds contain antioxidant activity, dietary fiber content, and prebiotic activity, besides food material containing ingredients as a beneficial admission for health. Additionally, it is of great importance from the point of waste management and sustainability, which has attracted attention in the food industry and gastronomy science in recent years. Furthermore, spent coffee grounds can be used instead of wheat flour in addition to different gluten-free flour types in gluten-free products or the finalization and enrichment of confectionery and chocolate groups.

One of the main ingredients of pasta is wheat flour, and various wheat flour substitutes are used to develop functional pasta. A functional pasta is developed by using different ratios spent coffee grounds instead of wheat flour in this pasta. The nutritional value of the product is improved by using spent coffee grounds. In addition, with the evaluation of food industry waste, food waste has been prevented, and an ecological and economic contribution has been made. Wheat flour was replaced with 5% and 10% coffee grounds when the pasta dough was sliced. Sensory analysis was performed on the developed pasta samples with a 9-point hedonic scale, and the generally accepted level of the new pasta samples was 6 points and above. In addition, it is thought that it will be possible to produce pasta, which is suitable for industrial production, includes zero-waste culinary applications, and is also a functional food product, thanks to various improvements that can be made to sensory properties.

Keywords: Spent Coffee Ground, Pasta, Functional Food

**TAVUKLARDA LAKTOBASİLLERİN DAĞILIMI VE MAKROLİD- LİNKOSAMİD-
STREPTOGRAMİN (MLS) ANTİBİYOTİKLERE DİRENÇ PROFİLLERİ**
**DISTRIBUTION OF LACTOBACILLI IN POULTRY AND THEIR RESISTANCE
PROFILES TO MACROLIDE LINCOSAMIDE STREPTOGRAMIN (MLS) ANTIBIOTICS**

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ÖZET

Bu çalışmada; ticari ve halk elinde beslenen tavuklardan alınan kloakal sıvaplardan Laktobasil türlerinin izolasyon ve identifikasyonlarını takiben, türlerin dağılımları belirlendi. Elde edilen izolatların Makrolid-Linkosamid-Streptogramin (MLS) grup antibiyotiklere ait MİK değerlerinin ve dirençten sorumlu belirli genlerin PCR ile saptanması amaçlandı. Numunenin alındığı 12 farklı çiftlik, toplamda 60 adet kloakal sürüntü örneğinden 174 *Lactobacillus* izolatı elde edildi. Bu izolatların 48'i halk elinde beslenen, 57'si yumurtacı ve 69'u broyler yetiştiricilik şekillerine aitti. Sırasıyla halk elinde beslenen, yumurtacı ve broyler yetiştiricilik olmak üzere 10, 12, 9 farklı *Lactobacillus* türü UltrafleXtreme MALDI TOF mass spectrometer cihazıyla identifiye edildi. Farklı Laktobasil türü izolat sayısı bakımından yetiştiricilik şekilleri arasında fark önemli bulunmuştur ($p<0,05$). Broth mikrodilüsyon metoduyla gerçekleştirilen antibiyotik duyarlılık test sonuçlarına göre; eritromisin, klindamisin, linkomisin, tylosin ile virjinamisin antibiyotiklerine direnç oranları sırasıyla halk elinde beslenen %62,5, %72,9, %43,8, %18,8, %37,5, yumurtacı %47,4, %78,9, %77,2, %40,4, %54,4 ve broylerde %87, %92,8, %91,3, %87, %73,9 olarak saptandı. Test edilen tüm antibiyotikler için yetiştiricilik şekilleri arasında fark önemli bulunmuştur ($p<0,05$). Günümüzde Laktobasil türleri için antibiyotik duyarlılıklarının belirlenmesinde standart metod bulunmayışına bağlı olarak fenotipik test, bakteriyel süşların antibiyotik direnç belirleyicilerinin varlığı yönünden tarandığı moleküler yöntemle (PZR) kombine edildi. Bu bağlamda dirençten sorumlu genlerin varlığı [erm(B)-erm(C)] değerlendirmesinde ise oranlar; halk elinde beslenen, yumurtacı ve broyler yetiştiricilikte sırasıyla; %27,1-%37,5, %70,2-%71,9, %76,8-%55,1 olarak bulundu. Erm(A) direnç geni varlığına sadece broyler tavuğa ait 1 *Lactobacillus vaginalis* izolatında rastlanmıştır.

Sonuç olarak; hem ticari hem halk elinde beslenen tavukların mikrobiyomunda, önemli üyelerden olan Laktobasillerde yaygın antibiyotik direnç varlığına rastlanması antimikrobiyallerin kullanımının kontrollü ve sınırlı olması gerekliliğini ortaya koymaktadır.

Anahtar Kelimeler: Tavuk, Laktobasil, Antibiyotik, MLS Direnci

ABSTRACT

In this study; following the isolation and identification of *Lactobacillus* species from cloacal swabs taken from commercial and backyard chickens, the distribution of the species was specified. It was aimed to

determine the MIC values of the isolates belonging to Macrolide-Lincosamide-Streptogramin (MLS) group antibiotics and specific genes responsible for resistance by PCR. A total of 174 *Lactobacillus* isolates were obtained from 60 cloacal swab samples by random sampling from 12 different farms. 48 of these isolates were from backyard chickens, 57 of them belonged to laying hens and 69 of broilers. 10, 12, 9 different *Lactobacillus* species were identified with UltrafleXtreme MALDI TOF mass spectrometer from backyard chickens, laying hens and broilers, respectively. The difference between the breeding methods was found to be significant in terms of the number of different *Lactobacillus* species ($p<0,05$). Antibiotic sensitivity test results performed with the broth microdilution method; resistance rates to erythromycin, clindamycin, lincomycin, tylosin and virginamycin antibiotics were 62.5%, 72.9%, 43.8%, 18.8%, 37.5% in backyard chickens, %47,4, %78,9, %77,2, %40,4, %54,4 in laying hens and 87%, 92.8%, 91.3%, 87%, 73.9% in broilers, respectively. For all antibiotics tested, the difference in breeding method was found to be significant ($p<0,05$). Due to the lack of a standard method for determining antibiotic susceptibility for *Lactobacillus* species, the phenotypic test was combined with the molecular method (PCR) in which bacterial strains were screened for the presence of antibiotic resistance determinants. In this context, in the evaluation of the genes responsible for resistance [erm (B), erm (C)], the rates are; 27.1%-37.5%, 70.2%-71.9%, 76,8%-55,1% in backyard chickens, laying hens and broilers, respectively. The presence of the erm (A) resistance gene was found only in 1 *Lactobacillus vaginalis* isolate from broiler chicken.

As a result; the presence of widespread antibiotic resistance in the microbiome of both commercial and backyard chickens, one of its important members, *Lactobacilli*, reveals the need for controlled and limited use of antimicrobials.

Keywords: Chicken, *Lactobacillus*, Antibiotic, MLS resistance

BİR KEDİDE İDRAR KESESİNDE KAN PIHTISI: OLGU SUNUMU
BLOOD CLOT IN THE URINARY BLADDER OF A CAT: A CASE REPORT

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ÖZET

Bu vaka raporunda bir kedide idrar kesesinde karşılaşılan kan pıhtısı olgusunun sunulması amaçlanmıştır. Olgu materyalini Kafkas Üniversitesi Veteriner Fakültesi İç Hastalıkları Anabilim Dalı Klinikleri'ne getirilen 2 yaşlı, erkek, *Scottish Fold* ırkı, kısırlaştırılmamış kedi oluşturdu. Anamnezde kum kabı etrafında kan damlalarının olduğu, kedinin sık sık idrar yapma pozisyonu aldığı bilgisi verildi. Yapılan klinik muayenede beden sıcaklığı 38,7 °C, nabız frekansının 93/dk ve solunum frekansının 42/dk olduğu belirlendi. Palpe edilebilen lenf yumrularının normal büyüklükte ve mukozaların renginin normal olduğu tespit edildi. Kediden idrar alındığında kanlı olduğu görüldü. Yapılan idrar analizinde

İdrarda kan, lökosit ve protein varlığı belirlendi. İdrar pH'sının 7,5, dansitesinin ise 1025 olduğu kaydedildi. Devamında gerçekleştirilen ultrasonografik muayenede idrar kesesi duvarında kalınlaşma ve içerisinde akustik gölgelenme göstermeyen hiperekoik bir yapı görüntülendi ve kan pıhtısı olduğu düşünüldü. Sistotomi operasyonu yapılarak kan pıhtısı uzaklaştırıldı ve idrar kesesinden histopatolojik muayeneler için örneklemeye yapıldı. İdrar kesesinin mukozal yüzeyinde hiperemi ve multifokal kanama alanları görüldü. Mikroskopik muayenede lamina propria damarların dilate olduğu ve lamina proprianın aşırı hiperemik olduğu tespit edildi. Hipereminin dışında kanama alanlarına, yoğun fibrin ve nekroz varlığına rastlandı. Sonuç olarak idrar kesesinde meydana gelen kan pıhtılarında ultrasonografik muayene bulgularının teşhiste önemli olduğu kanaatine varıldı.

Anahtar kelimeler: Kedi, idrar kesesi, kan pıhtısı, ultrasonografi

ABSTRACT

The aim of this case report is to present a case of blood clot in the urinary bladder of a cat. The case material consisted of 2 years-old, male, Scottish Fold breed, unneutered cat brought to Kafkas University, Faculty of Veterinary Medicine, Department of Internal Medicine Clinics. In the anamnesis, it was reported that there were blood drops around the litter box and the cat was in a position to urinate frequently. Clinical examination revealed a body temperature of 38.7 °C, pulse frequency of 93/min and respiratory frequency of 42/min. Palpable lymph nodes were normal in size and mucous membranes were normal in color. When urine was collected from the cat, it was found to be bloody. Urine analysis revealed the presence of blood, leukocytes and protein in the urine. It was recorded that the urine pH was 7.5 and the density was 1025. Subsequent ultrasonographic examination revealed thickening of the urinary bladder wall and a hyperechoic structure without acoustic shadowing and was thought to be a blood clot. The blood clot was removed by cystotomy operation and the urinary bladder was sampled for histopathological examinations. Hyperemia and multifocal hemorrhage areas were seen on the mucosal surface of the urinary bladder. Microscopic examination revealed that the vessels in the lamina propria were dilated and the lamina propria was extremely hyperemic. Apart from hyperemia, areas of hemorrhage, dense fibrin and necrosis were found. In conclusion, it was concluded that ultrasonographic examination findings are important in the diagnosis of blood clots in the urinary bladder.

Key words: Cat, urinary bladder, blood clot, ultrasonography

GHRELİN ve GASTROİNTESTİNAL SİSTEM ile İLİŞKİSİ
GHRELIN and its ROLE with the GASTROINTESTINAL SYSTEM

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ÖZET

Ghrelin, 1999 yılında sıçan midesinden saflaştırılan, 28 aminoasitten oluşan peptit yapıda ve oreksijenik etkili bir hormondur. Ghrelinin keşfedilmesini ise gıda alımını uyarıcı etkisinden önce, büyüme hormonu üzerindeki stimulan etkisi sağlamıştır. Ghrelin, en fazla gastrik mukozada bulunan enteroendokrin hücrelerden sentezlense de midenin yanı sıra birçok dokuda eksprese edildiği yapılan çalışmalarla kanıtlanmıştır. Ghrelinin GHS-R1a denilen reseptörüne bağlanabilmesi ve metabolik aktivitesini gösterebilmesi için ghrelin-O-açıltransferaz (GOAT) enzimi aracılığıyla bir açılasyon reaksiyonuna uğraması gerekir. Buna rağmen kan dolaşımındaki açıl ghrelin oranının, deaçıl ghrelin oranından çok daha düşük olması deaçıl ghrelinin de organizmada fonksiyonları olduğunu düşündürmektedir. Açılasyon sonucu oluşan açıl ghrelin ise, reseptörünün organizmada yaygın dağılım göstermesiyle paralel olarak, birçok sistem üzerinde çeşitli fonksiyonlara sahiptir. Ekspresyon ve sekresyonu göz önüne alındığında, etkilerinin en yoğun olarak gözlemlendiği dokulardan biri gastrointestinal sistemdir. Ghrelin, gastrik asit sekresyonunu artırır, oreksijenik peptit olarak açlık sinyallerini uyarır ve gastrointestinal motilite üzerinde prokinetik özellik gösterir. Ghrelin ve bağırsak mikrobiyotası arasındaki ilişki ile ilgili çalışmalar da güncelliğini korumaktadır. Ayrıca, sadece oreksijenik değil, aynı zamanda immunomodülatör ve antiinflamatuvar etkileriyle çoklu düzenleyici fonksiyonları olan bir hormondur. Bu fonksiyonlarını merkezi olarak sentezlenerek, *Nervus vagus* aracılığıyla sinyallerini ileterek ve periferik dokulardan salgılanmasının ardından kan-beyin bariyerini geçip beyne ulaşarak gerçekleştirebilir. Ghrelin, gastrointestinal sisteme ilişkin fonksiyonları ve sentez yeri nedeniyle, gastrointestinal sistemde meydana gelen patolojilerden hem etkilenir hem de bu patolojilerin bir biyobelirtici ve/veya terapötik hedefi olabilir. Bu bağlamda ghrelin, inflamatuvar hastalıklar, motilite bozuklukları ve gastrointestinal tümörlerle ilişkilendirilmiştir. Ayrıca, dolaşımdaki yarılanma ömrünün oldukça kısa olması ghrelinin terapötik olarak kullanımını zorlaştırdığından, ghrelin preparatlarının geliştirilmesi kaçınılmaz hale gelmiştir. Ghrelin ile ilgili çalışmaların ve klinik verilerin eksikliği ile ghrelinin periferik formlarının çok çeşitli olmasından kaynaklanan karışıklık nedeniyle, ghrelinin homeostazisi düzenlediği spesifik mekanizmalar belirsizliğini korumaktadır. Bu nedenle, ghrelinin belirli hedeflerinin ve düzenleyici yolların incelenmesi, sonraki araştırmaların ana yönünü teşkil etmektedir.

Anahtar Kelimeler: Açlık Hormonu, Gastrointestinal Sistem, Ghrelin

ABSTRACT

Ghrelin is an orexigenic hormone consisting of 28 amino acids, which was purified from the stomach of rats in 1999. The discovery of ghrelin was provided by its stimulating effect on growth hormone before its stimulating effect on food intake. Although ghrelin is mostly synthesized from enteroendocrine cells in the gastric mucosa, it has been proven by studies that it is expressed in many tissues besides the stomach. For ghrelin to bind to its receptor called GHS-R1a and display its metabolic activity, it must undergo an acylation reaction via the ghrelin-O-acyltransferase (GOAT) enzyme.

However, the fact that the rate of acyl ghrelin in the bloodstream is much lower than the rate of deacyl ghrelin suggests that deacyl ghrelin also has functions in the organism. Acyl ghrelin, which is formed because of acylation, has various functions on many systems in parallel with the widespread distribution of its receptor in the organism. Considering its expression and secretion, one of the tissues in which the effects are observed most intensely is the gastrointestinal tract. Ghrelin increases gastric acid secretion, stimulates hunger signals as an orexigenic peptide, and has prokinetic properties on gastrointestinal motility. Studies on the relationship between ghrelin and gut microbiota are also up to date. In addition, it is a hormone that is not only orexigenic, but also has multiple regulatory functions with its immunomodulatory and anti-inflammatory effects. It can perform these functions by synthesizing centrally, transmitting signals through the *Nervus vagus*, and, after being secreted from peripheral tissues, crossing the blood-brain barrier, and reaching the brain. Because of its gastrointestinal functions and synthesis site, ghrelin is both affected by pathologies occurring in the gastrointestinal tract and may be a biomarker and/or therapeutic target of these pathologies. In this context, ghrelin has been associated with inflammatory diseases, motility disorders, and gastrointestinal tumours. In addition, the development of ghrelin preparations has become inevitable since its short circulating half-life makes it difficult to use ghrelin therapeutically. Due to the lack of studies and clinical data on ghrelin and the confusion caused by the wide variety of peripheral forms of ghrelin, the specific mechanisms by which ghrelin regulates homeostasis remain unclear. Therefore, examining the specific targets and regulatory pathways of ghrelin constitutes the main direction of further research.

Keywords: Hunger Hormone, Gastrointestinal System, Ghrelin

DOSE AND DOSE EFFECT OF SOME DRUGS IN CERTAIN STAGES OF EMBRYONIC DEVELOPMENT OF THE CHICKEN EGG

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ABSTRACT

Different studies have shown that the effect of the the influence of drugs, in addition to having positive effects, they have the negative effects in different organs of the body, where by giving over doses in some cases it can exceed the therapeutic limit and become toxic and produce pathological effects in both experimental animals and man.

Uncontrolled use and drug overdose can lead to macroscopic histopathological changes and give teratogenic, mutagenic and carcinogenic effects.

This paper aims to study the dose and dose effects of some drugs at different stages of embryonic development in chicken eggs.

The research of this paper will consist of the toxic effect of drugs and macroscopic and microscopic histopathological changes in certain stages of embryonic development of chicken eggs.

The given dose of drugs such as: progesterone, digoxin, metronidazole and cytostatics can have negative effects in certain stages of embryonic development in chicken eggs.

The dose given in ampullary form in certain quantities to chicken eggs has inhibited and stagnated the processes of embryonic development at different stages compared to control eggs.

This phenomenon encourages us to conduct even more detailed research in this direction to see the effect of the given dose and to analyze what consequences it can provoke over doses at different stages of embryonic development and within the organism.

Key words: dose effect, drug dosage, histopathological changes, chicken egg, teratogenesis

**YAPAY ZEKÂ ÇAĞINDA HAYVANCILIK İŞLETMELERİNİN SAĞLIK VE VERİMLİLİK
BAĞLAMINDA DÖNÜŞÜMÜ**

**TRANSFORMATION OF LIVESTOCK ENTERPRISES IN THE CONTEXT OF HEALTH
AND PRODUCTIVITY IN THE AGE OF ARTIFICIAL INTELLIGENCE**

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ÖZET

Yapılan çalışmada yapay zekânın hastalık teşhisi kabiliyeti, bu teknolojilere üreticilerin ulaşım imkânı ve maliyeti, elde edilmesi planlanan verimlilik, hasta hayvan sayısının azaltılması açısından önemi literatüre uygun olarak değerlendirilmiştir. Günümüzde hayvancılık işletmelerinde hastalıkların tespiti, hayvan davranışlarının takibi, bireysel tanımlama (yüz ve vücut), gelişim performansının takibi (ağırlık ve vücut yapısı), bulundukları ortamların izlenmesi ve kontrolü noktasında yapay zekâ teknolojileri kullanılmaktadır. Hastalık tespiti konusunda giyilebilir kablosuz sensör teknolojisi ile hayvanların anlık verilerinin izlenmesi, toplanması ve geliştirilen algoritmalar ile farklılıkların tespitinin yapılması mümkündür. Hayvanların artan vücut sıcaklığı, azalan yem tüketimi, hareket azlığı-çokluğu ve farklı sesler çıkarmaları gibi olağan dışı durumların önceden tespiti yapılabilmektedir. Bu tespitler hastalık teşhisi olmayıp üreticiyi hastalık konusunda önceden bilgilendirme sağlayacak bir uyarı sistemi olarak değerlendirilebilmektedir. Ses ile birlikte entegre kamera devrelerinin kullanıldığı gözetim sistemlerinde hayvan kayıplarına neden olan hastalıkların önceden tespiti ve tanımlanması için verimli bir veri madenciliği çözümü uygulamaları da bulunmaktadır. Bu çözümlerin hastalık teşhisi konusundaki başarısının %91 olduğu belirlenmiştir.

Yapay zekânın gelişen teknoloji ile birlikte daha detaylı ve önemli hastalıkların tespitinde başarıları artmaktadır. Yapay zekânın bir alt türü olan makine öğrenmesi yöntemleri, sağlık ve hastalık durumlarının zaman serileri bakımından tespit edilmesini sağlayarak uyarılar üretilebilmekte, veterinerlik uygulamalarında yönetim tavsiyelerine katkıda bulunabilmektedir. Yapay zekâyâ bağlı sensörlerden toplanan verileri analiz ederek vakanın meydana gelişini ve bunların tedavisini öngörmek için modeller oluşturabilmektedir. Dijital teknolojiler hayvanları tekil veya grup olarak izleyebilmekte, enfekte vakaların daha erken saptanmasına ve çiftlik hayvanlarında tedavilerin (antimikrobiyaller dâhil) rasyonelleştirilmesine katkı sunabilmektedir. Ayrıca, makine öğrenimi yöntemleri patojenleri ayırt etmeyi ve böylece farklıysa ilgili iletim yollarını daha iyi anlamayı mümkün kılmaktadır.

Yapay zekâ ile birlikte farklı teknolojilerde kullanılmaktadır. Yüz tanıma sistemi hayvanların birbirinden ayrılması, belli zaman periyotlarında hayvanlarda gerçekleşen değişimi tespit edebilmek için kullanılmaktadır. Yüz tanıma sistemleri özellikle hayvanların iyi oluşlarını kontrol amacıyla kullanılabilir. Yine RFID teknolojisi hayvanlarının kimliğinin tanımlanması, hareketliliklerinin ve günlük yürüyüş miktarının hesaplanması bakımından fayda sağlanmaktadır. GPS teknolojisi de hayvanların hareket alanlarının belirlenmesi ve bulunduğu noktanın tespit edilmesine katkısı bakımından önemli dijital araçlardan biridir. Dijital teknolojilerin hayvan işletmelerinde etkinlik ve verimliliğe etkilerinin tespit edilebilmesi için çok sayıda araştırma yapılmıştır. Bunlardan biri de Rusya'nın Sverdlovsk bölgesinde yapılan bir araştırmadır. Bu araştırma bulgularına göre yapay zekâ kullanımının hayvansal ürünlerin üretimini %26, hayvan refahını %18,5 artırdığı, maliyetler %20,3 düşürdüğü belirlenmiştir. İşletme karlılığının yanı sıra, dijital teknolojiler yardımıyla hastalıkların henüz

ortaya çıkmadan önce tespit edilebilmesi, hayvanların yaşayacağı acıyı azaltması bakımından etik bir öneme de sahiptir. Ayrıca dijital teknolojiler, Covid-19 gibi insandan hayvana ve hayvandan insana geçen salgın hastalıklara müdahale kapsamında da umut vaat etmektedir.

Bütün bu önemine rağmen hayvancılık sektöründe dijital teknoloji kullanımının önünde bir takım engeller bulunmaktadır. İşletme sahiplerinin teknoloji konusunda eğitim almaları gerekliliği, ilk kurulum maliyetlerinin yüksekliği, özellikle küçükbaş hayvanlara uygulanmasının maliyet ve boyut yönünden zorluğu gibi unsurlar, söz konusu engellerden bazılarıdır. Fakat zaman içerisinde söz konusu bu engellerin ortadan kalkacağı, teknolojinin yaygınlaşması ve ucuzlamasıyla bu sistemlerin kullanım oranının artacağı söylenebilir.

Anahtar Kelimeler: Yapay Zekâ, Makine Öğrenmesi, Hayvancılık, Hayvan İşletmeleri, Hayvancılık Teknolojileri

ABSTRACT

In this study, the importance of artificial intelligence in terms of its ability to diagnose disease, the means and cost of access to these technologies, the planned efficiency, and its effect on animal health have been evaluated in accordance with the literature. Today, artificial intelligence technologies can be used in livestock enterprises for the detection of diseases, monitoring of animal behavior, individual identification (face and body), developmental performance (weight and body structure), monitoring and control of environmental conditions. It is possible to monitor and collect instant data of animals with wearable wireless sensor technology in disease detection and to detect differences with developed algorithms. Symptoms such as increased body temperature, decreased feed consumption and mobility, and different sounds of animals can be detected beforehand. These determinations can be considered as a warning system that gives preliminary information about adverse scenarios that may be encountered to the manufacturer, not for the diagnosis of diseases. Studies have shown that the success of these determinations in diagnosing diseases is 91%.

Developing artificial intelligence technology also increases the success of detecting more detailed and important diseases. Machine learning methods, which are a sub-type of artificial intelligence, provide monitoring and detection of health and disease conditions in various scopes, and also alerts can be generated. These practices are important in terms of contributing to veterinary recommendations. Analyzing data collected from sensors connected to artificial intelligence can help identify the cause of diseases and build models to predict their treatment. digital systems can track animals individually or as a group, contributing to earlier detection of infected cases and rationalizing treatments (including antimicrobials) in farm animals. In addition, machine learning methods make it possible to identify pathogen sources and better understand the associated transmission routes. Thus, in the fight against disease agents, the loss of time is eliminated with the wrong method due to detection error and the loss of efficiency is minimized.

It is used in different technologies together with artificial intelligence. The facial recognition system is used to separate animals from each other and to examine the change level of the animal hourly, instantaneously. These systems are important systems that serve the purpose of controlling the well-being of animals. Again, RFID technology provides identification of animals and calculation of daily walking amount. GPS technology is also used for the same purpose. A study was conducted in the Sverdlovsk region of Russia to determine the effect of digital technologies on animal productivity. According to this research data, it was determined that artificial intelligence increased animal production by 26%, animal welfare by 18.5%, and reduced costs by 20.3%. In addition to business profitability, digital technologies are also of ethical importance in terms of detecting diseases before they occur, thus reducing the suffering of animals. It also promises hope within the scope of intervention to epidemic diseases such as Covid-19 that are transmitted from human to animal and from animal to human.

Despite all this importance, there are some obstacles in front of artificial intelligence-based systems. Some of these obstacles are the fact that business owners receive training on technology, the high initial setup costs, and the difficulty of applying it especially to small cattle in terms of cost and size. It is

foreseen that the obstacles in front of digital transformation in animal husbandry will be resolved in time, and these systems will become cheaper and become widespread worldwide in the coming years.

Keywords: Artificial Intelligence, Machine Learning, Animal Husbandry, Animal Businesses, Livestock Technologies.

**KEDİ VE KÖPEK DIŞKILARINDAN İZOLE EDİLEN *E. coli* İZOLATLARINDA β -
LAKTAM, AMİNOGLİKOZİT VE
KİNOLON DİRENCİNİN SAPTANMASI**
**DETERMINATION OF β -LACTAM, AMINOGLYCOSIDE AND QUINOLONE
RESISTANCE IN FAECAL *E. coli* ISOLATES FROM CAT AND DOG**

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ÖZET

Kedi, köpek ve insanlar arasındaki yakın temas antimikrobiyal dirençli bakterilerin türler arası bulaşması açısından önemli bir köprü oluşturmaktadır. Bağırsak florasındaki en yaygın organizmalardan biri olan *E. coli* kronik olarak antibiyotik seçim baskısına maruz kalmaktadır ve bu nedenle de dışkı örneklerinden izole edilen *E. coli* türlerinin ilaç direnci açısından test edilmesi, bağırsak florasındaki direnç seviyesini belirlemede önemlidir. Bu çalışmada İstanbul ilindeki sağlıklı kedi (n=100) ve köpek (n=100) dışkılarından izole edilen *E. coli* suşlarının altı farklı sınıftan dokuz antibiyotiğe karşı

antibiyotik duyarlılıkları ve genişlemiş spektrumlu beta-laktamaz (GSBL) üretimi belirlenmiştir. Ayrıca β -laktam, aminoglikozit ve kinolon grubu antibiyotiklere karşı gelişen direnç genleri PCR ile araştırılmıştır. Hem kedi hem de köpeklerde *E. coli* izolasyon oranı %75 olarak saptanmıştır. Kedi izolatlarının yarısı (%50,7) nalidiksik asite dirençli bulunmuş, bunu tetrasiklin (%48) ve sulfametaksazole trimetoprim (%38,7) direnci takip etmiştir. Köpek izolatlarında ise en yüksek direnç tetrasikline (%56) karşı görülürken bunu sulfametaksazole trimetoprim (%37,3) ve nalidiksik asit (%34,7) direnci takip etmiştir. Üç veya daha fazla antimikrobiyal sınıfa direnç olarak tanımlanan çoklu direnç (MDR) köpeklerin %56,9 (33/58)'unda; kedilerin %60,7 (34/56) 'sinde tespit edilmiştir. GSBL üreten *E. coli* prevalansı kedilerde %46,7 köpeklerde %34,7, Amp C üreten *E. coli* prevalansı kedilerde %2,7, köpeklerde %4 olarak belirlenmiştir. Köpek izolatlarında 18 *bla*_{CTX-M}, 2 *bla*_{OXA}, 5 *bla*_{TEM} saptanırken kedi izolatlarında 22 *bla*_{CTX-M}, 7 *bla*_{OXA}, 3 *bla*_{TEM} geni bulunmuştur. Köpek izolatlarının altısından yedi adet (1 *aac* (6)-*Ib*, 5 *aac* (3) *Ila*, 1 *aphA2*), kedi izolatlarının 16'sından 19 adet (1 *aac* (6)-*Ib*, 17 *aac* (3) *Ila*, 1 *aphA2*) aminoglikozit direnç geni saptanmıştır. Ayrıca köpek izolatlarının 16'sından 19 adet (1 *qnrA*, 7 *qnrB*, 1 *qnrD*, 8 *qnrS*, 2 *qepA*) kedi izolatlarının 11'inden 15 adet (3 *qnrB*, 8 *qnrS*, 2 *qepA*, 2 *aac* (6') *Ib-cr*) plazmid aracılı kinolon direnci (PMQR) determinantı belirlenmiştir. Ülkemizde daha önce yapılan çalışmalara bakıldığında benzer oranlarda MDR görülmesine rağmen ESBL prevalansının özellikle kedilerde çok fazla arttığı gözlemlenmiştir. Sonuç olarak köpekler ve kediler halk sağlığı açısından potansiyel MDR kaynağı olarak kabul edilmeli ve ulusal düzeyde kontrol ve izleme programları oluşturulmalıdır.

Anahtar Kelimeler: *Escherichia coli*, kedi, köpek, antimikrobiyal direnç, GSBL

ABSTRACT

The close contact between cats, dogs and humans provides an important bridge for the interspecies transmission of antimicrobial-resistant bacteria. *E. coli*, one of the most common organisms in the intestinal flora, is chronically exposed to antibiotic selection pressure, and therefore, testing *E. coli* strains isolated from stool samples for drug resistance is important in determining the level of resistance in the intestinal flora. In this study, antibiotic susceptibility and extended-spectrum beta-lactamase (ESBL) production of *E. coli* strains isolated from faeces of healthy cats (n=100) and dogs (n=100) in Istanbul province against nine antibiotics from six different classes were determined. In addition, resistance genes against β -lactam, aminoglycoside and quinolone group antibiotics were investigated by PCR. *E. coli* isolation rate was determined as 75% in both cats and dogs. Half of the cat isolates (50.7%) were found to be resistant to nalidixic acid, followed by tetracycline (48%) and sulfamethoxazole-trimethoprim (38.7%). In dog isolates, the highest resistance was seen against tetracycline (56%), followed by sulfamethoxazole-trimethoprim (37.3%) and nalidixic acid (34.7%). Multiple resistance (MDR), defined as resistance to three or more antimicrobial classes, was found in 56.9% (33/58) of dogs and it was detected in 60.7% (34/56) of cats. The prevalence of ESBL-producing *E. coli* was 46.7% in cats, and 34.7% in dogs, and Amp C-producing *E. coli* prevalence was 2.7% in cats and 4% in dogs. While 18 *bla*_{CTX-M}, 2 *bla*_{OXA}, 5 *bla*_{TEM} were detected in dog isolates, 22 *bla*_{CTX-M}, 7 *bla*_{OXA}, 3 *bla*_{TEM} genes were found in cat isolates. At seven of the six dog isolates (1 *aac* (6)-*Ib*, 5 *aac* (3) *Ila*, 1 *aphA2*), and at 19 of the 16 cat isolates (1 *aac* (6)-*Ib*, 17 *aac* (3) *Ila*, 1 *aphA2*) aminoglycoside resistance genes were detected. In addition, 19 out of 16 dog isolates (1 *qnrA*, 7 *qnrB*, 1 *qnrD*, 8 *qnrS*, 2 *qepA*) and 15 out of 11 cat isolates (3 *qnrB*, 8 *qnrS*, 2 *qepA*, 2 *aac* (6') *Ib-cr*) plasmid-mediated quinolone resistance (PMQR) determinant was determined. When we look at the previous studies in our country, it was observed that the prevalence of ESBL increased especially in cats, although MDR was observed at similar rates. Consequently, dogs and cats should be recognized as potential sources of MDR for public health and control and monitoring programs should be established at the national level.

Keywords: *Escherichia coli*, cat, dog, antimicrobial resistance, ESBL

ÇANKIRI YÖRESİNDE EV YAPIMI VE TİCARİ PEYNİRLERDE FUNGAL FLORA
TESPİTİ

DETERMINATION OF FUNGAL FLORA OF HOMEMADE AND COMMERCIAL
CHEESES IN ÇANKIRI PROVINCE

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ÖZET

Bu çalışmada Çankırı ilinde geleneksel olarak evde yapılan ve ticari olarak satılan toplamda 34 adet peynirin fungal florası, peynirlerin ezilip dilüsyon yöntemi ile PDA besi ortamına ekimi yapılarak incelenmiştir. Kullanılan peynirlerin 14 adedi ev yapımı, 20 adedi ise ticari olarak satılan peynirlerdir. Ev yapımı peynirlerde en çok gelişim gösteren 2 fungus türü tespit edilmiştir. Bu türler *Geotrichum candidum* ve *Penicillium commune*'dir. Bu iki tür dışında az sayıda peynirde *Trichoderma* sp. ve *Rhizopus stolonifer* gelişim göstermiştir. Ticari olarak satılan peynirlerin çoğunda fungal gelişim gözlenmemiş olup, bazı peynirlerde ise *Cladospodium cladosporioides*, *Cladospodium herbarum*, *Penicillium commune* ve *Coprinellus* aff. *radians* türleri tespit edilmiştir. Sık tespit edilen bazı fungusların teşhisinde ribosomal DNA'nın ITS (The internal transcribed spacer) bölgesine dayalı tür teşhisi yapılmış, elde edilen DNA dizileri NCBI'ya blast edilerek fungus türleri ile karşılaştırılmıştır. Geleneksel ev peynirlerinde daha çok fungal gelişim tespit edilirken, ticari peynirlerde bu oran daha az bulunmuştur. Hem ev yapımı hem de ticari olarak satılan peynirlerde en çok bulunan fungus *Penicillium commune* olmuştur. *Geotrichum candidum*, yalnızca ev yapımı peynirlerde tespit edilirken, *Cladospodium* spp. ve *Coprinellus* aff. *radians* ise yalnızca ticari olarak satılan peynirlerde tespit edilmiştir. Bu çalışma ile Çankırı ilinde hem ev yapımı hem de ticari peynirlerde farklı yollarla meydana gelmiş olabileceği düşünülen kontaminasyon nedeni funguslar tespit edilmiştir.

Anahtar Kelimeler: Mikrobiyolojik flora, peynir, fungus

ABSTRACT

In this study, fungal flora of 34 cheeses, which are traditionally made at home and sold commercially in Çankırı province has been investigated. After the cheeses were crushed, they were cultivated in PDA by dilution method. 14 of the cheeses used were homemade and 20 of them were commercially sold cheeses. The 2 fungi species which showed the most growth in homemade cheeses were determined. These species are *Geotrichum candidum* and *Penicillium commune*. Apart from these two species, a few cheeses contain *Trichoderma* sp. and *Rhizopus stolonifer* developed. Fungal growth was not observed

in most of the commercially sold cheeses, while in some cheeses *Cladissporium cladosporiodes*, *Cladosporium herbarum*, *Penicillium commune* and *Coprinellus* aff. *radians* species have been identified. Species were identified based on the internal transcribed spacer (ITS) region of ribosomal DNA of some fungi that were detected frequently, and fungal species were compared by a BLASTn search of the sequence in NCBI. While more fungal growth was detected in traditional house cheeses, this rate was found less in commercial cheeses. *Penicillium commune* was the most abundant fungus in both homemade and commercial cheeses. *Geotrichum candidum* was detected only in homemade cheeses, while *Cladosporium* spp. and *Coprinellus* aff. *radians* was detected only in commercially available cheeses. In this study, fungi, which were thought to have occurred in different ways, in both homemade and commercial cheeses in Çankırı province, were determined.

Keywords: Microbiological flora, cheese, fungus

**İNEKLERİN KİMLİKLENDİRİLMESİ VE TAKİBİNDE YOLOv7 + SORT
BİRLİKTELİĞİNİN KULLANIMI**
IDENTIFICATION AND TRACKING OF COWS USE OF YOLOv7 + SORT ASSOCIATION

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ÖZET

Hayvan hareketlerinin analiz edilmesi, hayvan sağlığının takibi ve üretim verimliliğinin artırılmasında önem arz etmektedir. Hayvanları kimliklendirerek takip etmek, çiftliklerde üretim verimliliğini arttırmak için önemli etkenler arasındadır. Hayvan kimliğinin belirlenmesi ile hareketlerinin izlenmesi için kulak etiketleri, yaka sensörleri ve RFID (Radio-Frequency Identification) etiketleri yaygın olarak kullanılan yöntemlerdendir. Bu yöntemler temasa dayalı yöntemler olup hayvanlarda çeşitli stres durumlarını tetiklemektedir. Son zamanlarda, sensör teknolojileri gibi temasa dayalı yöntemlere alternatif olarak temassız algılama yöntemleri oldukça popüler hale gelmiştir. Bu yöntemler arasında yüz tanıma, iris tanıma, göz yapısı tanıma gibi biometrik yöntemler ve RGB görüntüler, termal görüntüler gibi görüntüleri işleyen bilgisayarlı görüntü işleme yöntemleri yer almaktadır. Bu yöntemlerden nesne algılama, hayvanların görüntülerini analiz ederek hayvanların kimliklerini belirlemektedir. Nesne takibi yöntemlerinde ise hayvanların takibinin yapılması konum, hız veya doğrultu gibi bilgilerin edinilmesini içerir. Hayvan kimliklendirme ve takibinin doğru, hızlı ve temassız bir şekilde yapılması bu yöntemlerin avantajları arasındadır. Aynı zamanda, bu yöntemler, hayvanların kimliklerinin belirlenmesi için kullanılan RFID etiketlerine ve sensör teknolojilerine göre hem daha az maliyetli hem de hayvanlarda strese neden olmamaktadır.

Bu çalışmada, ineklerin kimliklendirilmesi amacıyla nesne algılama yöntemlerinden YOLOv7 ile bir uygulama verisi üzerinden model eğitimi yapılarak elde edilen ağırlıklar, nesne izleme algoritmalarından SORT algoritması ile ineklerin takibinde kullanılmıştır. Elde edilen sonuçlar YOLOv7 nin inek kimliklendirmesinde oldukça başarılı olduğunu, SORT algoritması ile kullanımının inek takibinde kullanılabileceğini göstermektedir. Sonuç olarak, hayvan hareketlerinin izlenmesinde temasa dayalı yöntemlere alternatif olarak derin öğrenme temelli nesne algılama ve nesne takibi yöntemlerinin kullanımı ile hayvanların gerçek zamanlı olarak izlenebileceği ve sağlık durumlarının takip edilerek zamanında müdahale edilebileceği söylenebilir.

Anahtar Kelimeler: İnek, Nesne algılama, Nesne takibi, SORT, YOLO

ABSTRACT

Analyzing animal behavior is important for monitoring animal health and increasing production capacity. Tracking animals by identifying them is among the important factors to increase production capacity on farms. Ear tags, collar sensors and RFID (Radio-Frequency Identification) tags are among the methods commonly used to identify animals and track their behavior. These methods are contact-based methods and cause various stress situations in animals. Recently, non-contact detection methods have become quite popular as an alternative to contact-based methods such as sensor technologies. These methods include biometric methods such as face recognition, iris recognition, eye structure recognition, and computer vision methods that process images such as RGB images and thermal images. Among these methods, object detection identifies animals by analyzing their images. In object tracking

methods, tracking animals involves obtaining information such as position, speed or direction. The advantages of these methods include accurate, fast and contactless animal identification and tracking. At the same time, these methods are both less costly and less stressful than RFID tags and sensor technologies used for animal identification.

In this study, weights obtained by model training on an application data with YOLOv7, one of the object detection methods for cow identification, were used to track cows with SORT algorithm, one of the object tracking algorithms. The results obtained show that YOLOv7 is quite successful in cow identification and its use with the SORT algorithm can be used in cow tracking. As a result, it can be said that deep learning-based object detection and object tracking methods can be used as an alternative to contact-based methods in tracking animal movements, and animals can be tracked in real time and their health conditions can be monitored and intervened in a timely manner.

Keywords: Cow, Object detection, Object tracking, SORT, YOLO

**SIĞIR SÜTÜ LPO (LAKTOPEROKSİDAZ) ENZİM AKTİVİTESİ ÜZERİNE BAZI
FENOLİK BİLEŞİKLERİN İNHİBİSYON ETKİSİ**
**THE INHIBITION EFFECTS OF SOME PHENOLIC COMPOUNDS ON BOVİNE MILK
LPO (LACTOPEROXIDASE) ENZYME ACTIVITY**

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ÖZET

Fenolik bileşikler, bitkilerde aromatik aminoasit metabolizması esnasında sentezlenen yan bileşiklerden meydana gelen fitokimyasallardır. Fenolik bileşikler, fenolik asitler ve flavonoidlerden meydana gelirler ve meyve-sebzelerde ayrıca diğer bitkisel kaynaklı ürünlerde çok az miktarlarda bulunmakla birlikte önemli fonksiyonel etkileri olan bileşenlerdir. Bu bileşenler insan sağlığına olan katkıları, tat ve koku oluşumundaki etkilerinin yanı sıra renk değişiminde var olmaları ve enzim inhibisyonuna sebep olmaları gibi birçok özellik açısından önem taşımaktadırlar. Ayrıca fenolik bileşikler antialerjik, antiaterojenik, antiinflamatuvar, antimikrobiyal, antibakteriyel, antiviral, antimutajenik, antikanserojenik, antiülser, antioksidan ve antiobezite gibi önemli biyolojik ve farmakolojik özelliklere sahiptir.

Laktoperoksidaz (LPO, E.C. 1.11.1.7) oksidoredüktaz aktivitesi olan sütün önemli bileşenlerinden biridir. LPO sistemi doğal antimikrobiyal sistemlerden birini oluşturur ve bu sistemin aktivasyonu tiyosiyanat (SCN^-) ve hidrojen peroksit (H_2O_2) konsantrasyonu ile ilişkilidir. Sütte doğal olarak bulunan LPO enzimi, hidrojen peroksit varlığında, tiyosiyanatın oksidasyonunu katalize eder ve meydana gelen hipotiyosiyanat antibakteriyel özellik gösterir. Enzim yeni doğanların sindirim sistemindeki patojen mikroorganizmalara karşı savunma sisteminde önemli bir işleve sahiptir. Enzim aktivitesi azalırsa, bu bağışıklık sisteminin zayıfladığı anlamına gelir. Bu çalışma gösteriyor ki antioksidan özellik sergileyen fenolik bileşikler LPO enziminin aktivitesini azaltmaktadır.

Bu çalışmada sığır sütü LPO enzimi üzerine inhibitör olarak kullanılan fenolik yapıya sahip (naringin, morin hidrat, eskülin hidrat, homovanilik asit ve floridzin dihidrat) moleküllerin inhibisyon özellikleri araştırıldı. Bu amaç doğrultusunda öncelikle LPO, Sepharose-4B-L-tirozin-sülfanilamid afinite jeli kullanılarak tek basamakta yüksek verimle saflaştırıldı. Yapılan çalışmalar sonucunda elde edilen verilerden Aktivite (%) [Fenolik Moleküller] grafiği çizilerek IC_{50} değerleri belirlendi ve Lineweaver-Burk grafiklerinden faydalanılarak K_i değerleri ve inhibisyon tipleri bulundu. IC_{50} değerleri sırasıyla, Naringin, Morin hidrat, Eskülin hidrat, Homovanilik asit ve Floridzin dihidrat için 0.0024, 0.0315, 0.0373, 0.0506 ve 0.0221 μM olarak tespit edildi. Lineweaver-Burk grafiklerinden K_i değerleri ise sırasıyla 0.0059 ± 0.0012 , 0.0672 ± 0.0247 , 0.0973 ± 0.0369 , 0.0664 ± 0.0190 ve $0.0470 \pm 0.0159 \mu\text{M}$ olarak hesaplandı. İnhibisyon tipleri ise Naringin ve Homovanilik asit yarışmalı, diğer moleküller için ise yarışmasız inhibisyon olarak tespit edildi.

Anahtar Kelimeler: Laktoperoksidaz, Afinite Kromatografisi, İnhibisyon, Fenolik Moleküller

ABSTRACT

Phenolic compounds are phytochemicals that are formed from by-compounds synthesized during aromatic amino acid metabolism in plants. Phenolic compounds are composed of phenolic acids and flavonoids and they are components with important functional effects, although they are found in very small amounts in fruits and vegetables and also in other plant-derived products. In addition, phenolic compounds have important biological and pharmacological properties such as antiallergic, antiatherogenic, anti-inflammatory, antimicrobial, antibacterial, antiviral, antimutagenic, anticancer, antiulcer, antioxidant, and antiobesity.

Lactoperoxidase (LPO, E.C. 1.11.1.7) is one of the important components of milk with oxidoreductase activity. The lactoperoxidase system constitutes one of the natural antimicrobial systems, and the activation of this system is associated with the concentration of thiocyanate (SCN^-) and hydrogen peroxide (H_2O_2). The naturally occurring LPO enzyme in milk catalyzes the oxidation of thiocyanate in the presence of hydrogen peroxide, and the resulting hypothiocyanate shows antibacterial properties. The enzyme has an important function in the defense system against pathogenic microorganisms in the digestive system of newborns. Reducing of LPO enzyme activity by the phenolic molecules means that the immune system is weakened.

This study suggests that the phenolic molecules decreased the activity of LPO. In this study, the inhibition properties of molecules with phenolic structure (naringin, morin hydrate, esculin hydrate, homovanillic acid, and phloridzin dihydrate) used as inhibitors on bovine milk LPO enzyme were investigated. For this purpose, first of all, LPO was purified in one step with high yield using Sepharose-4B-L-tyrosine-sulfanilamide affinity gel. IC_{50} values were determined by plotting the Activity (%) [Phenolic Molecules] graph from the data obtained as a result of the studies, and K_i values and inhibition types were found by using Lineweaver-Burk graphs. IC_{50} values were determined as 0.0024, 0.0315, 0.0373, 0.0506 and 0.0221 μM for Naringin, Morin hydrate, Esculin hydrate, Homovanillic acid and Phloridzin dihydrate, respectively. K_i values from Lineweaver-Burk plots were calculated as 0.0059 ± 0.0012 , 0.0672 ± 0.0247 , 0.0973 ± 0.0369 , 0.0664 ± 0.0190 and 0.0470 ± 0.0159 μM , respectively. Inhibition types were determined as competitive inhibition for Naringin and Homovanillic acid, and non-competitive inhibition for other molecules.

Keywords: Lactoperoxidase, Affinity Chromatography, Inhibition, Phenolic Molecules

KÜLTÜR MANTARI POLİFENOL OKSİDAZ ENZİMİ ÜZERİNE BAZI METAL İYONLARININ ETKİSİ

EFFECT OF SOME METAL IONS ON CULTURE MUSHROOM POLYPHENOL OXIDASE ENZYME

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ÖZET

Meyve ve sebzelerde istenmeyen renk bozulmasına yol açan enzimatik esmerleşme, gıda kalitesini (özellikle görünümü) olumsuz etkilediği ve dolayısıyla tüketici kabul edilebilirliğini düşürdüğü için gıda endüstrisinde önemli bir endişe kaynağıdır. Bu yüzden, istenmeyen enzimatik kararırma, büyük miktarlarda gıda israfına sebep olmaktadır. Bu esmerleşme, doğal fenolik bileşiklerin, melanin (kahverengi, kırmızı veya siyah) pigmentleri oluşturmak üzere polimerize edilen kinonlara dönüştürülmesinden kaynaklanır. Sebze ve meyvelerin esmerleşmesinden sorumlu enzimler polifenol oksidazlardır (PFO'lar). PFO'lar (EC 1.10.3.1), mikroorganizmalar, bitkiler ve hayvanlar arasında dağılan iki çekirdekli bakır merkezli enzimlerdir. Bitki PFO'ları genellikle mitokondri, peroksizomlar ve kloroplast tilakoidler gibi hücre organel zarlarında bulunur; enzimatik reaksiyonlar, hücreler parçalandığında başlar. Aktif bölgedeki bakır atomları, moleküler oksijen varlığında monofenollerin hidroksilasyonu (monofenolaz aktivitesi) ve o-difenollerin o-kinonlara oksidasyonu (difenolaz aktivitesi) olmak üzere iki farklı reaksiyonu katalize etmeye yardımcı olur. Difenolaz aktivitesi tarafından oluşturulan kinonlar, enzimatik olmayan bir reaksiyonla kahverengi pigmentlere polimerize edilir.

Çevre toksikolojisinin en önemli sorunlarından biri ağır metal iyonlarına maruz kalmadır. Bunun bir sonucu olarak, bitkilerde başta ürün kaybı olmak üzere birçok olumsuzluğa neden olur. Bitkiler; atmosferden, gübrelerden, atık sulardan veya tarımda kullanılan inorganik pestisitlerden toprağa bulaşmış olan ağır metalleri biriktirme eğilimindedir. Doğada yüksek konsantrasyonda bulunan bazı ağır metaller, bitkileri ve bitkilerle beslenen insan ve hayvanları olumsuz yönde etkilemektedir. Metal kirliliği çeşitli kaynaklardan dolayı olmaktadır. Birçok metal, hava, su ve besinler vasıtasıyla organizmaya alınır. Organizmaya alınan bu metaller, metabolizma üzerinde değişik yollarla toksik etkiler gösterirler. Metal iyonlarının proteinlerin farklı bölgelerine bağlanmaları sonucu, enzimin yapısını farklı şekilde etkileyebilirler, bu yüzden aktivasyona veya inhibisyona sebep olma gibi durumlar değişkenlik gösterir.

Bu çalışmada, Bakır (Cu^{+2}), Civa (Hg^{+2}), Demir (Fe^{+3}), Kobalt (Co^{+2}), Kalsiyum (Ca^{+2}), Nikel (Ni^{+2}) ve Lityum (Li^{+}) gibi bazı metal iyonlarının kültür mantarı PFO enzim aktivitesi üzerine in vitro etkileri araştırıldı. Bu amaçla, öncelikle PFO enzimi, yeni bir afinite jeli olan Sepharose-4B-L-tirozin-4-amino-2-metilbenzoik asit kullanılarak saflaştırıldı. Metallerin inhibisyon etkilerini belirlemek için katekol substratının varlığında 420 nm'de sepektrofotometrik olarak ölçümler yapıldı. Sonuçlara göre Cu^{+2} , Hg^{+2} , Fe^{+3} , Co^{+2} ve Ca^{+2} metallerinin PFO enzimini aktive ettiği belirlendi. Ni^{+2} ve Li^{+} metalleri ise yarışmalı inhibisyon etkisi sergiledi ve K_i değerleri sırasıyla 0,004 mM ve 0,656 mM olarak bulundu.

Anahtar Kelimeler: Polifenol oksidaz, Kültür mantarı, 4-amino-2-metilbenzoik asit, Metal.

ABSTRACT

Enzymatic browning, which causes undesirable discoloration of fruits and vegetables, is a major concern in the food industry as it adversely affects food quality (especially appearance) and therefore reduces consumer acceptability. Thus, unwanted enzymatic darkening results in large amounts of food waste. This browning is caused by the conversion of native phenolic compounds to quinones which are

polymerized to constitute melanin (brown, red or black) pigments. The enzymes responsible for the browning of vegetables and fruits are polyphenol oxidases (PPOs). PPOs (EC 1.10.3.1) are enzymes with a dinuclear copper center which distributed throughout microorganisms, plants, and animals. The plant PPOs are generally located in cell organelle membranes such as mitochondria, peroxisomes, and chloroplast thylakoids; the enzymatic reactions start when the cells are broken. The copper atoms in active site help to catalyze two different reactions, the hydroxylation of the monophenols (monophenolase activity) in the presence of molecular oxygen and the oxidation (diphenolase activity) of o-diphenols to o-quinones.

One of the most important problems of environment toxicology is exposure to heavy metal ions. As a result of this, it causes many negativities, especially product loss in plants. Plants tend to accumulate heavy metals contaminated with soil from the atmosphere, fertilizers, wastewater, or inorganic pesticides used in agriculture. Some heavy metals, which are found in high concentrations in nature, adversely affect plants, humans, and animals that feed on plants. Metal pollution is caused by various sources. Many metals are taken into the organism through air, water, and nutrients. These metals taken into the organism have toxic effects on metabolism with different ways. As a result of the binding of metal ions to different parts of the proteins, they can affect the structure of the enzyme differently, so situations such as causing activation or inhibition shows variable.

In this study, such as Copper (Cu^{+2}), Mercury (Hg^{+2}), Iron (Fe^{+3}), Cobalt (Co^{+2}), Calcium (Ca^{+2}), Nickel (Ni^{+2}), and Lithium (Li^{+}) in vitro effects of some metal ions on culture mushroom PPO enzyme activity were investigated. For this purpose, firstly, the PPO enzyme was purified using a new affinity gel, Sepharose-4B-L-tyrosine-4-amino-2-methylbenzoic acid. To determine the inhibition effects of metals, measurements were made spectrophotometrically at 420 nm in the presence of the catechol substrate. According to the results, it was determined that Cu^{+2} , Hg^{+2} , Fe^{+3} , Co^{+2} , and Ca^{+2} metals activated the PPO enzyme. Ni^{+2} and Li^{+} metals exhibited competitive inhibition effect and K_i values were found as 0.004 mM and 0.656 mM, respectively.

Keywords: Polyphenol oxidase, Cultured mushroom, 4-amino-2-methylbenzoic acid, Metal.

**SENTETİK VE BİYOBOZUNUR POLİMERLERDEN ÇEVRECİ ÖZELLİKLERİ
İYİLEŞTİRİLMİŞ KOMPOZİT GIDA AMBALAJ MALZEMELERİNİN GELİŞTİRİLMESİ
DEVELOPMENT OF COMPOSITE FOOD PACKAGING MATERIALS FROM SYNTHETIC
AND BIODEGRADABLE POLYMERS WITH IMPROVED ENVIRONMENTAL
PROPERTIES**

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ÖZET

Parçalanamayan petrol bazlı plastik ürünlerin neden olduğu ciddi çevre sorunları nedeniyle biyolojik olarak parçalanabilen polimerlerden biyomalzemelerin geliştirilmesi parçalanabilir, yenilenebilir ve çevre dostu özelliklerinden dolayı kompozit biliminde dünya çapında artan ilgi ile karşılaşmıştır. Biyobozunur polimerler özellikle son yıllarda birçok çalışmada yeni araştırma ve geliştirme konusu olmuştur. Yenilenebilir kaynaklardan elde edilen polimerler, ağırlıklı olarak iki ana nedenden dolayı son yıllarda ilgi çekmiştir: çevresel kaygılar ve petrol kaynaklarımızın sınırlı olması.

PLA ve nişasta, yenilenebilir kaynaklardan elde edilen biyolojik olarak parçalanabilen polimerlerdir. Hidrofilik yenilenebilir bir polimer olan nişasta, çevre dostu plastikler için dolgu maddesi olarak kullanılmaktadır. PLA biyolojik olarak parçalanabilen bir polimerdir. Düşük yoğunluklu polietilen (LDPE) matrisinin içindeki nişasta bozunabilirliğini artırabildiği için bozunabilir dolgu görevi görür.

Biyobozunur polimerlerin sürdürülebilir ve çevreye duyarlı bir malzeme tabanına doğru ilerleyen bir toplumda giderek daha önemli bir rol oynaması bekleniyor. Geleneksel biyobozunur olmayan polimerlere olası bir alternatif sunarlar. Termoplastik nişasta bazlı polimerler ve alifatik polyesterler, yakın vadede en büyük potansiyele sahip iki biyolojik olarak parçalanabilir malzeme sınıfıdır. Biyobazlı içerik ve biyolojik olarak parçalanabilirlik, tek kullanımlık, kısa ömürlü tek kullanımlık ambalajlar ve tüketici plastikleri için gelecekte ilk sırada yer alan temel tercih unsurları olacaktır.

Anahtar Kelimeler: Polilaktik Asit, Nişasta, Biyobozunur, Kompozit, Ambalaj, Polietilen

ABSTRACT

Due to the serious environmental problems caused by non-degradable petroleum-based plastic products, the development of biomaterials from biodegradable polymers has encountered increasing interest in composites science worldwide due to their degradable, renewable and environmentally friendly properties. Biodegradable polymers have been the subject of new research and development in many studies, especially in recent years. Polymers obtained from renewable sources have attracted attention in recent years mainly for two main reasons: environmental concerns and the fact that our oil resources are limited.

PLA and starch are biodegradable polymers obtained from renewable sources. Starch, a hydrophilic renewable polymer, is used as a filler for environmentally friendly plastics. PLA is a biodegradable polymer. It acts as a degradable filler because the starch inside the low density polyethylene (LDPE) matrix can increase its degradability.

Biodegradable polymers are expected to play an increasingly important role in a society that is moving towards a sustainable and environmentally responsible material base. They offer a possible alternative to traditional non-biodegradable polymers. Thermoplastic starch-based polymers and aliphatic polyesters are the two classes of biodegradable materials with the greatest potential in the near term. Biobased content and biodegradability will be the main elements of choice for single-use, short-lived disposable packaging and consumer plastics in the first place in the future.

Keywords: Polylactic Acid, Starch, Biodegradable, Composite, Packaging, Polyethylene

**GAYRİ MEVKUT OLARAK YAYIMLANAN “TÜRK BAYTARLAR CEMİYETİ
MECMUASI” ÜZERİNE BİR ARAŞTIRMA**
**A RESEARCH ON THE “TÜRK BAYTARLAR CEMİYETİ MECMUASI” NOT PUBLISHED
PERIODICALLY**

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ÖZET

Türkiye’de veteriner hekimliği alanında ilk dernek 1908 yılında faaliyete geçmiş, ilk bilimsel dergi aynı yıl Mecmua-i Fün’un-i Baytariye adıyla yayımlanmıştır. Günümüzde Veteriner Hekimler Derneği adını alan Türk Baytarlar Cemiyeti ise 6 Şubat 1930 tarihinde İstanbul’da kurulmuştur. Derneğin yayın organı olarak ilk kez 1 Birinci Teşrin (Ekim) 1930 tarihinde çıkartılan Türk Baytarlar Cemiyeti Mecmuası, 14 sayı boyunca periyodik olarak yayımlanmadığı için “gayri mevkut” olarak nitelendirilmiştir. Her sayının kapağında Derneğin kuruluş tarihi, derginin ilk sayısının basım tarihi ve “İlmî Meslekî Gayri Mevkut Mecmua” ifadesi yer almaktadır. Derginin derneğin kuruluşundan kısa bir süre sonra yayın faaliyetlerine başladığı görülmüştür. Dergide meslekle ilgili haberler, Türk Baytarlar Cemiyeti Kongresi zabıtları, uluslararası kongreler, Türkiye Tiftik Cemiyeti, Cumhuriyetin 10. yılı kutlamaları, Türk veteriner hekimliğinin gelişimiyle ilgili haberlere yer verilmiştir. Hayvan ıslahı, atıcılık ve haralar, tavukçuluk, koyun ve keçi yetiştiriciliği, et ve süt hijyeni, sığır vebası ve aşı geliştirilmesi, theileria, parazitlerle mücadele, keçi çiçeği, pullorum, distofajin gibi konuları içeren bilimsel makaleler de tespit edilmiştir. Bazı makalelerde yazar bilgilerinin eksik olmasına ve bazı ardışık makalelerin birbirinden tam olarak ayrıştırılamamasına rağmen, mizanpajın dönemine göre iyi seviyede olduğu düşünülebilir. Makalelerin hemen hepsinin tek yazarlı olduğu ve her sayıda benzer yazarların varlığı dikkat çekmiştir. Gerek kapak sayfalarında gerekse metin içinde çeşitli fotoğraf, şekil ve tabloların –açıklamaları ile- yer alması mizanpajın özenli olarak hazırlandığının bir göstergesi olabilir. 14 sayının ardından periyodik olarak yayımlanmaya başlayan dergi, günümüzde TÜBİTAK-ULAKBİM Yaşam Bilimleri Veri Tabanı, Türkiye Atıf Dizini ve CAB Abstract indekslerinde Veteriner Hekimler Derneği Dergisi adıyla taranmaktadır. Sonuç olarak, gayri mevkut sayılarda; sosyal, kültürel ve bilimsel birçok makalenin yer aldığı, dönemine göre mizanpaj ve baskı kalitesinin iyi düzeyde olduğu söylenebilir. Derginin 1930 yılından itibaren veteriner hekimliğine bütünsel olarak katkı sunduğu savunulabilir.

Anahtar Kelimeler: dergi, dernek, tarih, Türk Baytarlar Cemiyeti Mecmuası, Veteriner Hekimler Derneği, veteriner hekimliği

ABSTRACT

The first association of veterinary medicine in Turkey was established in 1908, and the first scientific journal was published in the same year as “Mecmua-i Fün'un-i Baytariye”. Türk Baytarlar Cemiyeti, which known as the Turkish Veterinary Medical Society today, was founded on February 6, 1930 in İstanbul. Türk Baytarlar Cemiyeti Mecmuası, which was first published on October 1, 1930, was described as "not published periodically" for 14 issues. The cover of each issue has included the establishment date of the association, the publication date of the first issue and the expression "Scientific, Professional and Not Published Periodically". It was seen that the journal started publishing activities shortly after the foundation of the association. The journal has included articles about the profession, the decisions of the association’s general assembly, international congresses, the Turkish Mohair Society, the celebrations of the 10th anniversary of the Republic, and the developments of Turkish veterinary medicine. Scientific articles on animal breeding, horse breeding and stud farms, poultry, sheep and goat breeding, meat and milk hygiene, rinderpest and vaccine development, theileria,

antiparasitic treatment, goat pox, pullorum disease, and “distofajin” were also identified. Although the author information was missing in some articles and some consecutive articles was not differentiated from each other, the layout can be considered to be at a good level for its period. It is noteworthy that almost all articles had a single author, and there were similar authors in every issue. The presence of various photographs, figures and tables –with their explanations- both on the covers and in the text can be an indication that the layout has been carefully prepared. The journal, which started to be published periodically after 14 issues, is now indexed under the name of Journal of the Turkish Veterinary Medical Society in TÜBİTAK-ULAKBİM Life Sciences Database, Turkey Citation Index and CAB Abstract. It can be said that there are many social, cultural and scientific articles in the journal, and the layout and printing quality is at a good level compared to the period. It can be claimed that the journal has contributed holistically to veterinary medicine since 1930.

Keywords: association, history, journal, Journal of the Turkish Veterinary Medical Society, Türk Baytarlar Cemiyeti Mecmuası, veterinary medicine

**GENEL ANESTEZİ ÖNCESİ VE SONRASI KÖPEKLERDE YÜZ TERMAL
PENCERELERİNİN DEĞERLENDİRİLMESİ**
**EVALUATION OF FACIAL THERMAL WINDOWS IN DOGS BEFORE AND AFTER
GENERAL ANESTHESIA**

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ÖZET

Kızılötesi termografi fizyolojik süreçler sonucu yayılan kızılötesi radyasyonu ölçüp bunu renkli bir görüntüye dönüştürür. İnvaziv olmayan temassız bir şekilde yüzey sıcaklığındaki değişiklikleri ölçen bir tekniktir. İnflamatuvar süreçler, neoplazi, stres, ağrı ve nöropatiler gibi pek çok alanda tanıya yardımcı bir araç olarak kullanılmaktadır. Yüz bölgesiyle ilgili termal pencereler; lakrimal kıkırdak, göz küresi ve kulak olarak tanımlanmıştır. Bazı araştırmacılar yüzün tüm alanının değerlendirilmesini de önermektedir. Bununla birlikte köpeklerde en yaygın analiz edilen termal pencereler lakrimal kıkırdak ve kulak medial yüz orta noktasıdır. Bu çalışma ile hayvanlarda rutinde kullanılan yüz termal pencerelerinin anestezi öncesinde ve sonrasında değişiklikleriyle, bu değerlerin rektal sıcaklık ile ilişkisinin beraber incelemesi amaçlandı. Çalışma prosedürü, rutinde kastrasyon operasyonu için kliniğe gelen 5 köpekte gerçekleştirildi. Öncelikle kliniğe gelen her hayvan ortalama 20 dakika ortam sıcaklığına alışması için ölçümlerin yapılacak olduğu odada bekletildi. 20. dakikanın sonunda sırasıyla rektal sıcaklık ve termografik lakrimal kıkırdak ve kulak medial yüz orta noktası sıcaklık değerleri ölçüldü. Ölçümlerin ardından ksilazin HCL (1-3 mg/kg), ketamin HCL (2-4 mg/kg) ile genel anestezi uygulandı. Genel anestezi sonrası 3. dakika ve 20. dakikalarda sırasıyla rektal sıcaklık ve termografik lakrimal kıkırdak ve kulak medial yüz orta noktası sıcaklık değerleri ölçüldü. Alınan veriler istatistiki olarak bonferroni testine tabi tutuldu. Verilerde lakrimal kıkırdaktan alınan termografik değerlerin rektal sıcaklıklardan daha fazla olduğu belirlendi. Bunun yanında sağ lakrimal kıkırdaktan 20. dakikada alınan sıcaklığın anestezi öncesine göre anlamlı bir şekilde arttığı tespit edildi. Literatür taraması yapıldığında sağ göz verilerinin beden sıcaklığı ile korelasyonu olduğu ve bu yüzden değerlendirilmesi gereken bir bölge olduğu bildirilmiştir. Bizim çalışmamızda da indüksiyon sonrası 20. dakikada anlamlı bir artışın belirlenmesi literatürü desteklemiştir ancak bu bulgunun detaylandırılması ve göz bölgesinin her açıdan termografik ölçümlerinin yapılması gerekmektedir.

Anahtar Kelimeler: Anestezi, Köpek, Rektal sıcaklık, Termal Pencereler, Termografi.

ABSTRACT

Infrared thermography measures the infrared radiation emitted as a result of physiological processes and converts it into a color image. It is a technique that measures changes in surface temperature in a non-

invasive non-contact way. It is used as an auxiliary diagnostic tool in many areas such as inflammatory processes, neoplasia, stress, pain and neuropathies. Thermal windows related to the facial region have been defined as lacrimal cartilage, eyeball and ear. Some researchers also recommend evaluating the entire area of the face. However, the most common analyzed thermal windows in dogs are the lacrimal cartilage and midpoint of the medial surface of the ear. With this study, it was aimed to examine the changes of facial thermal windows used in routine in animals before and after anesthesia, as well as the relationship of these values with rectal temperature. The study procedure was performed on 5 dogs who came to the clinic for castration operation in the routine. First of all, each animal that came to the clinic was kept in the room where measurements were to be made for an average of 20 minutes to get used to the ambient temperature. 20th at the end of the minute rectal temperature and thermographic temperature of lacrimal cartilage and midpoint of the medial surface of the ear values were measured, respectively. After the measurements, general anesthesia was performed with xylazine HCL (1-3 mg/kg), ketamine HCL (2-4 mg/kg). Rectal temperature and thermographic temperature of lacrimal cartilage and midpoint of the medial surface of the ear values were measured at the 3rd and 20th minutes, respectively. The data obtained were subjected to Bonferroni test statistically. In the data, it was determined that the thermographic values taken from the lacrimal cartilage were higher than the rectal temperatures. In addition, it was determined that the temperature taken from the right lacrimal cartilage at the 20th minute increased significantly compared to pre-anesthesia. When the literature review was conducted, it was reported that the right eye data had a correlation with body temperature and therefore it was a region that should be evaluated. In our study, the determination of a significant increase in the 20th minute after induction supported the literature, but this finding should be detailed and thermographic measurements of the eye region should be made from every angle.

Keywords: Anesthesia, Dog, Rectal temperature, Thermal Windows, Thermography.

DERİN ÖTEKTİK ÇÖZÜCÜLER VE GIDA BİLEŞENLERİNİN EKSTRAKSİYONUNDA KULLANIMI

DEEP EUTECTIC SOLVENTS AND UTILIZATION IN EXTRACTION OF FOOD COMPONENTS

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ÖZET

Derin ötektik çözücü, iki veya daha fazla bileşiğin karışması esnasında, karışımı oluşturan bileşiklerin erime noktalarından daha düşük değere sahip karışım oluşmasıdır. Karışımın oluştuğu noktaya ötektik nokta denmektedir. Derin ötektik çözücülerin oluşumunda bileşikler arasında hidrojen bağı oluşmaktadır bu nedenle bileşiklerden biri hidrojen bağı alıcısı olurken diğeri hidrojen bağı donörü görevi görmektedir. Derin ötektik çözücüler genellikle iki bileşikten oluşurken daha fazla sayıda bileşikten oluşan derin ötektik çözücü karışımları da bulunmaktadır. Geleneksel ekstraksiyon sistemlerinde yaygın olarak kullanılan organik çözücülerin çevre üzerindeki olumsuz etkileri sebebiyle alternatif ekstraksiyon sistemleri arayışına girilmiştir. Kolayca sentezlenebilmesi, kararlı olması, doğada bozunabilir olması ve düşük toksisite değerine sahip olması gibi avantajları sayesinde yeşil çözücü olarak değerlendirilen derin ötektik çözücüler son yıllarda gıdalardan çeşitli bileşenlerin ekstraksiyonu amacıyla sıklıkla tercih edilmektedir. Ayarlanabilir viskozite ve polarite özellikleri, elektron alma/verme kabiliyetleri, yüksek çözme yetenekleri ile farklı amaçlar için çok sayıda derin ötektik çözücü hazırlanabilmektedir. Ekstrakte edilmesi istenen bileşenin özelliklerine göre uygun derin ötektik çözücü karışımları hazırlanarak gıdalardan pek çok farklı bileşenin ekstraksiyonu mümkün olmaktadır. En yaygın kullanılan derin ötektik çözücüler kolin klorür:organik asit karışımlarından oluşan derin ötektik çözücülerdir. Ekstraksiyon geleneksel yöntemlerle yapılmanın yanı sıra modern ekstraksiyon sistemleri kullanılarak da yapılmaktadır. Bunlardan en yaygın kullanılanları ultrases ya da mikrodalga destekli ekstraksiyon sistemleridir. Derin ötektik çözücüler gıdalardan pek çok farklı bileşeni ekstrakte etmek amacıyla kullanılabilir. Literatürde polifenoller, flavonoidler, kateşinler, antosiyaninler, palmitik asit, saponinler, lignin, çeşitli pigmentler, sesamol, pestisitler, bazı biyolojik açıdan aktif elementler, ağır metaller gibi pek çok bileşenin ekstraksiyonuna yönelik çalışmalar bulunmaktadır. Geleneksel organik çözücülü ekstraksiyon sistemlerinin kullanıldığı yöntemlere kıyasla derin ötektik çözücü ekstraksiyonu daha kısa sürede daha verimli ve çevreye zararı olmayan ekstraksiyon prosesi sağladığından daha fazla tercih edilmeye başlanmıştır.

Anahtar Kelimeler: Derin ötektik çözücü, ekstraksiyon, yeşil çözücü, gıda bileşeni

ABSTRACT

A deep eutectic solvent is the formation of a mixture with a lower value than the melting points of the compounds that make up the mixture, during the mixing of two or more compounds. The point where the mixture is formed is called the eutectic point. In the formation of deep eutectic solvents, hydrogen bonding occurs between compounds, so one of the compounds acts as a hydrogen bond acceptor while the other acts as a hydrogen bond donor. While deep eutectic solvents usually consist of two compounds, there are also deep eutectic solvent mixtures consisting of more compounds. Due to the negative effects of organic solvents, which are widely used in traditional extraction systems, on the environment, alternative extraction systems have been sought. Deep eutectic solvents, which are considered as green solvents due to their advantages such as being easily synthesized, stable, biodegradable and having low toxicity value, have been frequently preferred for the extraction of various components from foods in recent years. Many deep eutectic solvents can be prepared for different purposes with their adjustable viscosity and polarity properties, electron accepting/donating capabilities, and high solubility

capabilities. It is possible to extract many different components from foods by preparing suitable deep eutectic solvent mixtures depending on the properties of the component to be extracted. The most widely used deep eutectic solvents are deep eutectic solvents consisting of choline chloride:organic acid mixtures. Extraction can be done not only by traditional methods, but also by using modern extraction systems. The most commonly used of these are ultrasound or microwave assisted extraction systems. Deep eutectic solvents can be used to extract many different components from foods. In the literature, there are studies on the extraction of many components such as polyphenols, flavonoids, catechins, anthocyanins, palmitic acid, saponins, lignin, various pigments, sesamol, pesticides, some biologically active elements, and heavy metals. Compared to the methods using traditional organic solvent extraction systems, deep eutectic solvent extraction has started to be preferred more because it provides a more efficient and environmentally friendly extraction process in a shorter period of time.

Key words: Deep eutectic solvent, extraction, green solvent, food component

**VETERİNER KLİNİKLERİNE DERİ BOZUKLUĞU ŞİKAYETİ İLE GETİRİLEN
KÖPEKLERDE EKTOPARAZİTLERİN YAYGINLIĞI**
**THE PREVALENCE OF ECTOPARASITES IN DOGS BROUGHT TO VET CLINICS WITH
COMPLAINTS OF SKIN DISORDER**

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ÖZET

Bu çalışmanın amacı Kırıkkale ve Ankara'daki Özel Veteriner Kliniklerine ve Kırıkkale Üniversitesi Veteriner Fakültesi Hayvan Hastanesine deri bozukluğu şikâyeti ile getirilen köpeklerde ektoparazitlerin yaygınlığının araştırılmasıdır. Bu amaçla ilgili kliniklere başvuran toplam 200 köpek, bit, pire ve kene varlığı yönünden makroskobik olarak muayene edilmiştir. Tespit edilen keneler penset yardımıyla, pireler ise eter ile bayıldıktan sonra toplanmış ve %70'lik alkol içerisine alınmıştır. Kene ve pire örnekleri stereomikroskop altında değerlendirilmiştir. Daha sonra vücuttaki lezyonlu bölgelerden bistüri ucu yardımıyla usulüne uygun olarak deri kazıntısı örnekleri alınmıştır. Alınan deri kazıntısı örnekleri bir petri kutusu içerisinde laboratuvara ulaştırılmıştır. Deri kazıntısı örnekleri bir lam üzerine alınmış ve üzerine 1-2 damla %10'luk potasyum hidroksit (KOH) eklendikten sonra bir lamın kenarı ile iyice ezilmiştir. Kaba dokular bir lamel aracılığı ile uzaklatılarak, şeffaf kısmın üzerine lamel kapatılmış ve ışık mikroskopunda x10 objektifte uyuz etkenleri ve diğer akarların varlığı yönünden incelenmiştir. İncelenen 200 köpeğin %52,5'inde ektoparaziter etkene rastlanmıştır. Muayene edilen köpeklerin %34'ünde *Demodex* spp., %8,5'nde *Sarcoptes* spp., %5'inde pire, %2'sinde *Demodex* spp.+pire, %1'de kene, %1'inde *Demodex* spp. + kene, %0,5'inde *Sarcoptes* spp.+*Demodex* spp. ve yine %0.5'inde *Sarcoptes* spp.,+pire tespit edilmiştir. Sahiplik durumuna göre karşılaştırıldığında, sahipli köpeklerin %50'inde, sahipsiz köpeklerin ise %56,1'inde ektoparazit tespit edilmiştir. Düzenli ektoparaziter tedavi alan köpeklerin %44,1'i, tedavi almayan köpeklerin ise %56,8'i enfeste bulunmuştur. 1 yaş ve altı köpeklerde paraziter enfestasyon oranı (%56,3), 1 yaşın üzerindeki köpeklere (%47,7) göre daha yüksek bulunmuştur. Cinsiyete göre bakıldığında dişi köpeklerdeki enfestasyon oranı (%59,3) erkeklere göre (%47,9) daha yüksek bulunmuştur. Örneklerin alındığı şehir bakımından kıyaslandığında ise Kırıkkale'de yetiştirilen köpeklerdeki enfestasyon oranı %53,3 iken, Ankara'da yetiştirilen köpeklerdeki oran %51,6'dır. Tespit edilen kene türleri *Rhipicephalus sanguineus* ve *Hyalomma marginatum*, pire türleri ise *Ctenocephalides canis* ve *C. felis*'tir. Sonuç olarak deri bozukluğu şikayeti ile kliniklere başvuran köpeklerin mutlaka ektoparazit yönden muayene edilmelidir. Ektoparaziter mücadelenin Veteriner Hekimlerin önerdiği şekilde gerçekleştirilmesi ve ektoparazitler ve ektoparaziter mücadele konusunda hayvan sahiplerinin bilinçlendirilmesi, köpeklerde ektoparaziter enfestasyonların azalması ve ortadan kaldırılması açısından büyük önem arz etmektedir.

Anahtar Kelimeler: Demodex, Deri bozukluğu, Ektoparazit, Kene, Köpek, Pire, Sarcoptes.

ABSTRACT

The aim of this study is to investigate the prevalence of ectoparasites in dogs brought to Kırıkkale and Ankara Private Veterinary Clinics and Kırıkkale University Veterinary Faculty Animal Hospital with complaints of skin disorders. For this purpose, a total of 200 dogs, it applied to the relevant clinics, were examined macroscopically for the presence of lice, fleas and ticks. The detected ticks were collected with the help of forceps and the fleas were collected after they were stunned with ether and placed in 70% alcohol. Tick and flea samples were evaluated under a stereo microscope. Then, skin scraping samples were duly taken from the lesioned areas of the body with the help of a scalpel tip. The skin scraping samples taken were delivered to the laboratory in a petri dish. Skin scraping samples were taken on a slide and after 1-2 drops of 10% potassium hydroxide (KOH) were added, they were thoroughly crushed with the edge of a slide. The coarse tissues were removed by means of a coverslip, a coverslip was closed on the transparent part and examined for the presence of scabies and other mites under a light microscope with a x10 objective. Ectoparasit were found in 52.5% of the 200 dogs examined. *Demodex* spp. in 34%, *Sarcoptes* spp. in 8.5%, fleas in 5%, *Demodex* spp.+flea in 2%, ticks in 1%, *Demodex* spp. in 1% + ticks, *Sarcoptes* spp.+*Demodex* spp. 0.5% and *Sarcoptes* spp.,+fleas 0.5% were detected of examined dogs. When compared according to ownership status, ectoparasites were detected in 50% of owned dogs and 56.1% of stray dogs. 44.1% of dogs that received regular ectoparasitic treatment and 56.8% of dogs that did not receive treatment were found to be infested. Parasitic infestation rate (56.3%) was higher in dogs 1 year old and younger than dogs over 1 year old (47.7%). In terms of gender, the infestation rate in female dogs (59.3%) was found to be higher than in males (47.9%). When compared in terms of the city where the samples were taken, the infestation rate in dogs bred in Kırıkkale was 53.3%, while the rate in dogs bred in Ankara was 51.6%. The detected tick species are *Rhipicephalus sanguineus* and *Hyalomma marginatum*, while the flea species are *Ctenocephalides canis* and *C. felis*. As a result, dogs who apply to clinics with the complaint of skin disorders should be examined for ectoparasites. Carrying out ectoparasitic control as recommended by Veterinarians and raising awareness of animal owners about ectoparasites and ectoparasitic control are of great importance in terms of reducing and eliminating ectoparasitic infestations in dogs.

Keywords: Demodex, Skin disorder, Ectoparasite, Tick, Dog, Flea, Sarcoptes.

EDİRNE YÖRESİNE AİT İŞLETMELERDE YETİŞTİRİLEN SIĞIRLARDA *ESCHERICHIA COLI* O157:H7 YAYGINLIĞININ REAL-TIME PCR İLE ARAŞTIRILMASI
INVESTIGATION OF *ESCHERICHIA COLI* O157:H7 PREVALENCE IN CATTLE RAISED IN EDİRNE REGION (TÜRKİYE) BY REAL-TIME PCR

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ÖZET

Escherichia coli, insanlarda, memeli hayvanlarda ve kanatlılarda gastrointestinal sistemde bulunan flora bakterisidir. Çoğu patojen olmayan bu bakterinin *E. coli* O157:H7 gibi bazı serotipleri birçok hayvan türünde enfeksiyonlara yol açmakta ve zoonotik özelliği ile insanlara bulaşabilmektedir. Asıl konakları sığırlar olan bu serotip, insanlara dışkı ile kontamine et ve süt gibi hayvansal ürünler ile bulaşmakta ve trombositopeni, hemorajik kolitis ve hemolitik üremik sendrom gibi komplikasyonlara yol açmaktadır. Bu çalışmada, Edirne yöresine ait işletmelerde yetiştirilen sığır dışkılarında *E. coli* O157:H7 varlığının RT-PCR ile araştırılması amaçlandı. Çalışmada, 25 farklı yerleşim yerinden açık, yarı açık ve kapalı işletmelerde yetiştirilen buzağı (n= 120), dişe (n= 80) ve ergin (n= 200) olmak üzere toplam 400 adet taze dışkı örneği analiz edildi. Dışkı örnekleri öncelikli olarak *E. coli* O157 yönünden ticari Real-time PCR kiti (BS-DTC-113-100, Bio-Speedey) ile analiz edildi. Pozitif sonuç veren örneklerin daha sonra *E. coli* O157:H7 yönünden Real-time PCR analizleri gerçekleştirildi. Çalışmada 400 dışkı örneğinin 4 (%1)'ünde *E. coli* O157 ve 2 (%0,5)'sinde *E. coli* O157:H7 tespit edildi. Yaygınlığı az olsa da dışkı ile atılımı takiben oluşabilecek olası insan bulaşları açısından sığır dışkılarında etken varlığının ortaya konulması *E. coli* O157:H7'nin eko-epidemiolojisinin aydınlatılmasında önem arz etmektedir.

Anahtar Kelimeler: Edirne, Sığır, Dışkı, *E. coli* O157:H7, Real-time PCR

ABSTRACT

Escherichia coli is a flora bacterium found in the gastrointestinal tract of humans, mammals and poultry. Some serotypes of this mostly non-pathogenic bacterium, such as *E. coli* O157:H7, cause infections in many animal species and can be transmitted to humans with its zoonotic aspect. This serotype, whose main hosts are cattle, is transmitted to humans through animal products such as meat and milk contaminated with feces and causes complications such as thrombocytopenia, hemorrhagic colitis and hemolytic uremic syndrome. The aim of this study was to investigate the presence of *E. coli* O157:H7 in feces of cattle raised in Edirne region (Türkiye) by RT-PCR. A total of 400 fresh fecal samples of calves (n= 120), heifers (n= 80) and adult cattle (n= 200) raised in intensive, semi-intensive and extensive breeding farms from 25 different settlements were analyzed. Fecal samples were first analyzed for *E. coli* O157 using a commercial Real-time PCR kit (BS-DTC-113-100, Bio-Speedey). The samples with positive results were then analyzed by Real-time PCR for the presence of *E. coli* O157:H7. As a result, *E. coli* O157 and *E. coli* O157:H7 were detected in 4 (1%) and 2 (0.5%) of 400 fecal samples, respectively. Although the prevalence of *E. coli* O157:H7 is low, it is important to reveal the presence of the causative agent in cattle feces in terms of possible human transmission following fecal excretion in order to clarify the eco-epidemiology of *E. coli* O157:H7.

Keywords: Edirne, Cattle, Feces, *E. coli* O157:H7, Real-time PCR

**SIĞIR KARKASLARINDAN *ARCOBACTER* SPP. İZOLASYONU, İZOLATLARIN
MOLEKÜLER TİPLENDİRİLMESİ VE ANTİBİYOTİK DUYARLILIKLARI***
**ISOLATION OF *ARCOBACTER* SPP. FROM CATTLE CARCASSES, MOLECULAR
TYPING AND ANTIBIOTIC SUSCEPTIBILITY OF ISOLATES**

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ÖZET

Arcobacter cinsi insanların gastroenteritis olguları ile hayvanlarda abortus, enterit, sepsisemi, mastitis gibi çeşitli hastalık tablolarıyla ilişkilendirilmiş önemli mikrobiyal tehlikelerden birisidir. Bu mikroorganizmalar su ve gıda kökenli bakteriler olarak tanımlanmaktadır. Cins içerisinde enteropatojenik ve potansiyel zoonotik karakterleriyle dikkati çeken *A. butzleri*, *A. cryaerophilus* ve *A. skirrowii* insan sağlığını tehdit eden önemli patojenlerdir. Bu çalışmada; Kayseri’de çeşitli mezbahanelerde kesim sonrası sığırlardan 100 adet karkas sıvap örneği alınarak sığır karkaslarından *Arcobacter* spp.’nin izolasyonu, izolatların moleküler tekniklerle tiplendirilmesi ve belirlenen antibiyotiklere karşı direnç durumunun tespiti amaçlanmıştır. Etken izolasyonunda membran filtrasyon yönteminden yararlanılmış ve izolasyon sonucu 22 (%22) karkas örneğinden *Arcobacter* spp. izolatu elde edilmiştir. Yapılan multipleks (mPCR) PCR sonucu bu izolatların 13’ü *A. cryaerophilus*, 6’sı *A. butzleri* ve 3’ü *A. skirrowii* olarak tanımlanmıştır. Antibiyotik duyarlılıkları belirlemek için yapılan disk difüzyon yöntemi sonunda izolatların 18 (%81)’inin rifampine, 15 (%68)’inin ampisiline, 11(%50)’inin sefuroksim sodyuma ve amoksisillin/klavulanik asite, 10 (%45.45)’unun danafloksasine ve azitromisine, 9 (%40)’unun neomisine, 8 (%36)’inin eritromisine, 7 (%31)’inin gentamisine ve tetrasikline, 6 (%27)’inin enrofloksasine ve 5 (%22.72)’inin ise streptomisine dirençli olduğu tespit edilmiştir. ERIC-PCR sonucunda izolatlar 8 ana grup (A, B, C, D, E, F, G ve H), bir adet (h1) alt grup ve üç adet (I-III) singleton oluşturmuştur. Oniki *A. cryaerophilus* izolatu A, B, D, E, F ve H gruplarında yer alırken, bir *A. cryaerophilus* izolatının single tone (I) oluşturduğu; 5 *A. butzleri* izolatu C, F ve H gruplarında yer alırken, bir adet *A. butzleri* izolatının single tone (III) oluşturduğu ve 3 *A. skirrowii* izolatının ise D, E ve G gruplarında yer aldığı görülmüştür. Sonuç olarak sığır karkaslarının arkobakterlerle kontamine olması hayvan sağlığı kadar insan sağlığı açısından da bir risk

oluşturmaktadır. Dolayısıyla *Arcobacter* spp.'nin sığır karkaslarına primer bulaşının önlenmesi ve sonrasında gıdaların üretimi, işlenmesi, depolanması ve satışı sırasında çapraz kontaminasyonun engellenmesi ve ilgili personelin eğitilmesinin, özellikle halk sağlığı açısından önemli rol oynayacağı düşünülmektedir.

Anahtar Kelimeler: *Arcobacter* spp., sığır, mPCR, ERIC-PCR, antibiyotik duyarlılık.

ABSTRACT

Arcobacter genus members, which are considered one of the important microbial hazards, have been associated with gastroenteritis cases in humans and various diseases such as abortion, enteritis, septicemia, and mastitis in animals. These microorganisms are defined as water and foodborne bacteria. *A. butzleri*, *A. cryaerophilus* and *A. skirrowii*, which attract attention with their enteropathogenic and potentially zoonotic characteristics, are important pathogens that threaten human health. In this study, it was aimed that isolation of *Arcobacter* spp. from cattle carcasses and typing by molecular techniques and determine the resistance status against determined antibiotics of isolates by taking 100 carcass swab samples from carcasses of cattle after slaughter in various slaughterhouses in Kayseri. The membrane filtration method was applied for agent isolation and *Arcobacter* spp. isolation was performed from 22 (22%) carcass samples. As a result of multiplex (mPCR) PCR, out of 22 isolates 13, 6, and 3 were identified as *A. cryaerophilus*, *A. butzleri* and *A. skirrowii*, respectively. At the end of the disc diffusion method in order to find the antibiotic susceptibility of the isolates, it was determined that out of isolates 18 (81%), 15 (68%), 11 (50%), 10 (45.45%), 9 (40%), 8 (36%), 7 (31%), 6 (27%), 5 (22.72%) were resistant to rifampin, ampicillin, cefuroxime sodium and amoxicillin/clavulanic acid, danofloxacin, and azithromycin, neomycin, erythromycin, gentamicin and tetracycline, enrofloxacin, streptomycin, respectively. As a result of ERIC-PCR, the isolates formed 8 main groups (A, B, C, D, E, F, G, and H), one (h1) subgroup, and three (I-III) singletons. It was observed that while 12 *A. cryaerophilus* isolates are in A, B, D, E, F, and H groups, one *A. cryaerophilus* isolate formed a single tone (I) and 5 *A. butzleri* isolates were in groups C, F, and H, one *A. butzleri* isolate formed single tone (III) and 3 *A. skirrowii* isolates were in groups D, E and G. As a result, contamination of cattle carcasses with arcobacters poses a risk for human health as well as animal health. Therefore, it is thought that the prevention of primary contamination of cattle carcasses with *Arcobacter* spp. and following the prevention of cross-contamination during the production, processing, storage, and sale of foods and the training of relevant personnel will play an important role, especially in terms of public health.

Keywords: *Arcobacter* spp., cattle, mPCR, ERIC-PCR, antibiotic susceptibility.

SCHMALLEMBERG VIRUS INFECTION
SCHMALLEMBERG VİRUS ENFEKSİYONU

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ÖZET

Almanya-Hollanda sınır bölgesinde bulunan Schmallemburg kasabasında 2011 sonbaharında bir işletmenin sütçü ineklerinde, anormal vücut ısı artışı, süt verimi azalması ve diyare klinik bulgularının saptandığı bir epidemi olmuştur. Bu hastalık bulgularına anormal doğum vakalarının da eklendiği açıklanmıştır. Bu epidemi sonucunda klinik bulguları gösteren 3 sığırdan alınan kan serumundan DNA ve RNA izolasyonu ile genetik materyal çalışması yapılmıştır (Hoffmann, vd., 2012). İncelemeler sonucunda bulunan hastalık etkeni ilk pozitif numunenin saptandığı bölgenin adını (Schmallemburg virus, SBV) almıştır (Tuncer ve Yeşilbağ, 2012). Filogenetik analizler sonucu SBV'nin, Peribunyaviridae familyasını Orthobunyavirus cinsinde yer aldığı Simbu serogrup içinde bulunduğu tespit edilmiş olup virusun zarlı, segmentli, tek iplikçikli bir RNA virusu olduğu bildirilmiştir (Yanase, vd., 2012). Schmallemburg hastalığı Almanya-Hollanda sınırında görülmesinin ardından birçok Avrupa ülkesine yayılmıştır (Conraths, vd., 2013). Avrupa kıtası dışında Schmallemburg hastalığı Afrika'da (Mozambik, Nijerya, Tanzanya) yayılım göstermiştir (Blomström, vd., 2014; Mtenga, vd., 2015; Oluwayelu, vd., 2015). Schmallemburg virus hastalığı Culicoides türündeki kan emici sineklerle bulaşan arboviral bir enfeksiyondur (Hoffmann, vd., 2012). Simbu serogrubu içinde bulunan viruslar konakçı genişliği fazla olması nedeniyle sonraki yıllarda SBV'ye duyarlılığı olan çok fazla hayvan tespit edileceği ihtimalini arttırmaktadır (Tuncer ve Yeşilbağ, 2012). Bu sunumun amacı Schmallemburg virusun etiyolojik, epidemiyolojik özellikleri, klinik patolojik bulguları, patogenezi, teşhis, koruma ve kontrolü hakkında genel bakış ve bilgiler vermektir.

Anahtar kelimeler: Schmallemburg virus, Simbu serogrup virusları, Yeni orthobunyavirus

ABSTRACT

In the autumn of 2011 in the town of Schmallemburg, located in the German-Dutch border region, there was an epidemic in dairy cows of a farm in which clinical signs of abnormal body temperature increase, decreased milk yield and diarrhea were detected. It has been explained that abnormal birth cases are also added to these disease findings. As a result of this epidemic, genetic material study was performed by isolation of DNA and RNA from the blood serum of 3 cattle showing clinical findings. (Hoffmann, et al., 2012). The cause of disease found as a result of the examinations was named after the region where the first positive sample was detected (Schmallemburg virus, SBV) (Tuncer and Yeşilbağ, 2012). As a result of phylogenetic analysis, it was determined that SBV is in the Simbu serogroup, which is in the Orthobunyavirus genus of the Peribunyaviridae family, and it has been reported that the virus is a membrane, segmented, single-stranded RNA virus (Yanase, et al., 2012). Schmallemburg's disease has spread to many European countries after it was seen on the German-Dutch border. (Conraths, et al., 2013). Outside of the European continent, Schmallemburg's disease has spread in Africa (Mozambique, Nigeria, Tanzania) (Blomström, et al., 2014; Mtenga, et al., 2015; Oluwayelu, et al., 2015). Schmallemburg virus disease is an arboviral infection transmitted by bloodsucking flies of the Culicoides species. (Hoffmann, et al., 2012). The viruses in the Simbu serogroup increase the probability that many animals with susceptibility to SBV will be detected in the following years due to the large host size (Tuncer and Yeşilbağ, 2012). The aim of this presentation is to give an overview and information about the etiological, epidemiological features, clinical pathological findings, pathogenesis, diagnosis, prevention and control of Schmallemburg virus.

Keywords: Schmallemburg virus, Simbu serogroup viruses, New orthobunyavirus

USE OF MUSTARD OIL CAKE AS ALTERNATIVE PROTEIN SOURCE TO FISH MEAL
IN PRACTICAL DIETS FOR FINGERLING *HETEROPNEUSTES FOSSILIS* (BLOCH)

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ABSTRACT

A feeding trial was conducted to replace the fish meal protein by mustard oil cake protein in the feeds for fingerling *Heteropneustes fossilis*. Five practical diets (40% crude protein; 16.94 kJ g⁻¹ gross energy) replacing 0% (Diet 1), 20% (Diet 2), 40% (Diet 3) 60% (Diet 4) and 80% (Diet 5) fishmeal protein by mustard oil cake protein were prepared. The diets were fed to triplicate groups of fish near to satiation for 8 weeks. The growth and conversion efficiencies in terms of absolute weight gain, specific growth rate, feed conversion ratio, protein retention efficiency did not show any significant difference up to the 40% replacement of fishmeal by mustard oil cake. However, further replacement resulted into significant decrease of weight gain and conversion efficiencies. Haematological parameters in fish fed diets 1 (0%), 2 (20%) and 3 (40%) did not show any significant differences. However, further replacement of fishmeal by mustard oil cake beyond 40% resulted in significant fall (P<0.05) in above parameters. Activities of digestive as well as antioxidant enzymes also showed the similar pattern with increasing levels of replaced fishmeal in the diets. The results of present study indicate that fish meal could be replace by mustard oil cake up to 40% without hampering the growth, conversion efficiencies, activities of digestive enzymes and antioxidant status of fish . Data generated during this study would be useful in formulating cost-effective commercial feeds for the intensive culture of this fish.

Keywords: Replacement, Fish meal, Mustard oil cake, *Heteropneustes fossilis*, Sustainable feeds

**TUZ STRESİ ALTINDA YETİŞTİRİLEN BUĞDAY (*Triticum aestivum* L. Ceyhan-99)
BİTKİSİNE SİLİKON UYGULAMASININ MAKRO VE MİKRO ELEMENTLER ÜZERİNE
ETKİSİ**

**EFFECT OF SILICONE APPLICATION ON MACRO AND MICRO ELEMENTS OF
WHEAT (*Triticum aestivum* L. Ceyhan-99) GROWN UNDER SALT STRESS**

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ÖZET

Abiyotik streslerin en önemlilerden biri olan tuz stresi, bitkilerin gelişimini etkileyerek morfolojik, fizyolojik, biyokimyasal ve moleküler seviyede pek çok aksaklıklara neden olmaktadır. Bu çalışmada, tuz stresi koşullarında yetiştirilen bir ekmeklik buğday (*Triticum aestivum* L.) çeşidi olan Ceyhan-99'a silikon uygulamasının element içeriğine etkisi araştırılmıştır. Ceyhan-99 tuza toleransı düşük bir ekmeklik buğday çeşididir. Tuz stresi için bitkiler birinci hafta 100 mM, ikinci hafta 200 mM NaCl sulama suyuna katılarak strese maruz bırakılmıştır. Silikon (0.08 mM) bitkilere toplamda 2 defa sulama suyuna katılarak uygulanmıştır.

Çalışmamızda yapraklarda ve köklerde makro elementlerden potasyum (K) ve fosfor (P) tuz uygulanan bitkilerde yüzde olarak kontrole göre azalırken, Si uygulaması bu iki elementin miktarlarını artırmış ve kontrole yakın düzeyde tespit edilmiştir. Kalsiyumun (Ca), stres uygulanan bitkilerde yüzde miktarı artarken, Si uygulanmasıyla azalmıştır. Kükürt (S) oranında hem kök de hem de yaprakta tuz stresi uygulandığında önemli değişiklik olmazken, kontrol grubuna göre sadece Si uygulanan bitkilerde önemli artış meydana gelmiştir. Mikro elementlerden Si, kontrol grubu ve tuz stresindeki bitkilerde birbirine yakın seviyede, Si eklenen bütün bitkilerde önemli derecede artış görülmüştür. Fe, tuz stresinde kontrole göre azalmış ve stres durumunda bitkilere uygulanan Si, önemli bir değişim meydana getirmemiştir. Cu ve Zn miktarları, tuz stresine maruz kalan bitkilerde kontrole göre önemli derecede düşüş gösterirken, stres durumlarında bitkilere Si uygulanması, seviyelerini bir miktar artırsa da önemli düzeyde etki etmemiştir.

Makro ve mikro besin elementlerinin buğdayda kök ve yaprakta miktarları değişiklik göstermiştir. Makro elementlerden K kökte yüzde miktarı fazlayken, P ve Ca yaprakta daha yüksek seviyede, S ise bitkinin her iki kısmında da birbirine yakın seviyede olduğu tespit edilmiştir. Mikro elementlerin ise tamamının kökte daha yüksek seviyede olduğu tespit edilmiştir.

Araştırma sonucunda silikon uygulamasının besin elementleri üzerine, tuz stresinin zararlı etkilerinin azaltılmasına yardımcı olduğu, tuzluluğun neden olduğu yarı kurak bölgelerde su kıtlığının şiddetini azaltarak buğday bitkisinin gelişmesini indükleyebileceği görülmektedir.

Anahtar Kelimeler: Buğday, Tuz Stresi, Silikon, Besin Elementleri

ABSTRACT

Salt stress, which is one of the most important abiotic stresses, affects the development of plants and causes many disruptions at morphological, physiological, biochemical and molecular levels. In this study, the effect of silicon application on element content of Ceyhan-99, a bread wheat (*Triticum aestivum* L.) cultivar grown under salt stress conditions, was investigated. Ceyhan-99 is a bread wheat

variety with low salt tolerance. For salt stress, plants were exposed to stress by adding 100 mM NaCl in the first week and 200 mM NaCl in the second week. Silicon (0.08 mM) was applied to the plants by adding it to the irrigation water 2 times in total.

In our study, the macro elements potassium (K) and phosphorus (P) in the leaves and roots decreased in percentages in plants treated with salt compared to the control, while Si application increased the amounts of these two elements and were found at a level close to the control. While the percentage amount of calcium (Ca) increased in plants under stress, it decreased with the application of Si. While there was no significant change in the sulfur (S) ratio when salt stress was applied to both roots and leaves, there was a significant increase only in plants with application of Si compared to the control group. While Si, one of the microelements, was close to each other in the control group and plants under salt stress, a significant increase was observed in all plants with Si added. Fe decreased in salt stress compared to the control, and Si applied to the plants under stress did not cause a significant change. While the amounts of Cu and Zn decreased significantly in plants exposed to salt stress compared to the control, the application of Si to plants in stress conditions did not have a significant effect, although their levels increased slightly. While the amounts of Cu and Zn decreased significantly in plants exposed to salt stress compared to the control, the application of Si to plants in stress conditions did not have a significant effect, although their levels increased slightly.

The amounts of macro and micro nutrients in root and leaf of wheat varied. Of the macro elements, it was determined that the percentage of K was higher in the root, P and Ca were higher in the leaf, and S was close to each other in both parts of the plant. It was determined that all of the microelements were at a higher level in the root.

As a result of the research, it is seen that the application of silicon helps to reduce the harmful effects of salt stress on nutrients, and can induce the development of wheat plants by reducing the severity of water scarcity in semi-arid regions caused by salinity.

Keywords: Wheat, Salt Stress, Silicon, Nutrients.

**OFF-SEASON PRODUCTIVITY FROM BLACKBERRY CULTIVARS IN REGIONS WITH
LITTLE CHILLING: promising management for application in Mozambique and African
regions**

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ABSTRACT

The production of fruits dependent on specific climatic conditions, has been greatly reduced in nowadays due to climate changes, such as the need for chilling time to reach the intrinsic factors of production in plants. Blackberry (*Rubus* spp.) is a promising species in expansion, particularly in developing countries, due to high levels of yields, processing easiness and high economic return. Therefore, the growing expansion of the species is notable, especially in non-traditional regions. However, introduction of blackberry in unfavorable conditions, depends on the use of different techniques in cultural management, with emphasis on drastic pruning. These techniques generate an extemporaneous production, with fruit supply in the period lower productive concentration between different geographic regions, ensuring greater profitability for the farmers. However, although drastic pruning techniques have many advantages, there is no clear definition of how to introduce or to move the season the blackberry production in regions with little predominance of chilling, such as subtropics and high-altitude areas, to be applied in Mozambique and other African regions. The aimed was evaluate staggered production of the blackberry cultivars “Tupy” and “Brazos”, in a climate with little predominance of chilling, using four management of pruning. The experiment was carried out in a Cwa climate location, 910 m altitude, at 21°14” S, 45°00” W. The treatments consisted of four pruning management, the first conventional pruning and others three drastic pruning managements, was carried out in the first fortnights of January, March and May, with application of 10% urea and 3% hydrogen cyanamide five months after drastic pruning for each treatment. The experimental design was in randomized blocks, in factorial arrangement 2 x 4 (two cultivars and four pruning managements), all treatment was run out in quadruplicate. The vegetative and reproductive phenology, production and physicochemical quality of the fruits were evaluated. Plants managed under drastic pruning in January showed a growth of 44.6% higher when compared to those pruned in May. Plants pruned in May showed the onset of more delayed yield, this treatment started production in October. The production cycle in the drastic pruning seasons of January, March and May was 50 to 58 days, which means, more than 100% reduction in harvest time when compared to conventional pruning. The cultivar Brazos had higher fruit production and 'Tupy' had better fruit quality, both in the drastic pruning of January.

Keywords: *Rubus* spp. Pruning scaling. Out of season. Hight production. Fruit Quality.

HAYVAN BESLEMEDE METİL SÜLFONİL METANIN KULLANIM OLANAKLARI
POTENTIAL USE OF METHYL SULFONYL METHANE IN ANIMAL NUTRITION

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ÖZET

Oksidatif stres, biyolojik sistemlerde prooksidanlar ve antioksidanlar arasında doku hasarına yol açan ve etkilenen hayvanların sağlığını olumsuz etkileyen bir dengesizlik olarak tanımlanmaktadır. Bu dengesizlik serbest radikal miktarının artışından olabileceği gibi antioksidan sistemlerin yetersizliğinden de kaynaklanabilmektedir. Hayvanlar, oksidatif strese neden olan serbest radikallerin (reaktif oksijen ve nitrojen ajanların) etkileriyle mücadele etmek için endojen antioksidan sistemlere sahiptirler. Ancak stresin fazla olduğu ve endojen antioksidan sistemlerin etkilerinin azaldığı durumlarda rasyonlara antioksidan etkili başka ürünlerin/maddelerin ilave edilmesi gerekmektedir. Rasyonlara antioksidanların ilavesi oksidatif stresin neden olduğu hasarı iyileştirerek veya önleyerek hayvanın performansını, sağlığını ve refahını iyileştirmektedir. Bu amaçla pek çok madde geçmiş yıllardan beri kullanılmakta olup son zamanlarda bilim insanlarının metil sülfonil metanın (MSM) antioksidan etkisi üzerine yoğunlaştığı gözlenmiştir. MSM; çeşitli bitkisel ve hayvansal dokular içerisinde doğal olarak bulunan bir organosülfür bileşiğidir. Ayrıca bu bileşik algler veya diğer deniz mikroorganizmaları kullanılarak doğal veya kimyasal yolla sentezlenebilmektedir. Bu bileşik ağırlık bazında %34 kükürt içermektedir. Kükürt hayvanlarda önemli bir mineral olup organizmadaki birçok besinin (amino asitler, proteinler, enzimler ve mikro besinler) yapısına katılır. Yapılan çalışmalarda MSM'nin antiinflamatuvar ve antioksidan özellikler dâhil olmak üzere çeşitli biyolojik etkilere sahip olduğu tespit edilmiştir. Buna ilaveten hayvanlarda yapılan bazı çalışmalarda oksidatif stresi azaltması sayesinde; osteoartrit vakalarında kas ve eklem ağrısını hafiflettiği, yangıyı iyileştirdiği ve karaciğerin fonksiyonunu etkileyerek verim performansını iyileştirdiği gözlenmiştir. MSM; metiyonin, sistein, homosistein ve taurin dâhil olmak üzere makromolekül için bir kükürt donörüdür ve etkilerini bu mineral sayesinde gösterir. Kükürt içeren amino asitler; serbest radikalleri ve toksik maddeleri detoksifiye etme yeteneğini artırmaktadır. Böylece hücresel sistemlerin korunmasını ve bütünlüğünü önemli ölçüde etkilemiş olurlar. Günümüzde stresin, özellikle oksidatif mekanizma ile olan, hayvanlar için kaçınılmaz olduğu bilinmekte olup stres ile mücadele yollarının artırılması ve etki yollarının tespit edilmesi gelecek için önem taşımaktadır. Biz, bu antioksidan etkili madde ile ilgili daha fazla çalışma yapılması gerektiğine, kükürtün ve dolayısıyla MSM'nin etki mekanizmalarının gerekli hallerde moleküler düzeydeki çalışmalar ile aydınlatılması gerektiğine inanmaktayız.

Anahtar Kelimeler: Antioksidan, hayvan, kükürt, MSM.

ABSTRACT

Oxidative stress is defined as an imbalance between prooxidants and antioxidants in biological systems that causes tissue damage and negatively affects the health of the animals. This imbalance can result from an increase in free radical levels or from the inadequacy of antioxidant systems. Animals have endogenous antioxidant systems to combat the effects of free radicals (reactive oxygen and nitrogen agents) that cause oxidative stress. However, when stress is excessive and endogenous antioxidant systems are diminished, other products/substances with antioxidant effects must be supplemented to the diets. The dietary supplementation of antioxidants improves the yield performance, health, and well-being of animals by repairing or preventing damage caused by oxidative stress. Numerous substances have been used for this purpose over the years, but more recently, scientists have been attracted to the antioxidant properties of methylsulfonylmethane (MSM). MSM is a naturally occurring organic sulfur compound found in various plant and animal tissues, and can be synthesized organically or chemically using algae or other marine microorganisms. It contains 34% sulfur by weight- based and sulfur is an important mineral in animals that participates in the structure of many nutrients (amino acids, proteins, enzymes, and micro-nutrients). Studies have found that MSM has various biological effects including anti-inflammatory and antioxidant properties. Also, animal studies have demonstrated that MSM due to reducing oxidative stress relieve muscle and joint pain in osteoarthritis cases, enhance inflammation, improve liver function and yield performance. MSM is a sulfur donor for macromolecules, including methionine, cysteine, homocysteine, and taurine, and it utilizes sulfur to illustrate its action mechanism. Sulfur-containing amino acids increase the ability to detoxify free radicals and toxic substances, thus greatly affecting the protection and integrity of cellular systems. It is known that stress, especially with oxidative mechanism, is inevitable for animals in modern world, and it is crucial for the future to develop strategies for dealing with stress and pinpoint its sources. We are believed that more research on substances with antioxidant properties is required, and molecular studies should be used to provide understanding into the mechanisms of action of sulfur, indirectly MSM.

Keywords: Animal, antioxidant, MSM, sulfur.

**TARIM VE HAYVANCILIK GÖSTERGELERİNE GÖRE TÜRKİYE'DEKİ ŞEHİRLERİN
KÜMELENMESİ**
**CLUSTERING OF CITIES IN TURKEY BASED ON AGRICULTURE AND LIVESTOCK
INDICATORS**

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ÖZET

Türkiye sahip olduğu coğrafi konum, arazi ve iklim çeşitliliği ile tarım ve hayvancılık için elverişli koşullara sahip bir ülkedir. Ülkemizde her şehir kendi potansiyeli çerçevesinde tarım ve hayvancılık alanında ülke ekonomisine farklı düzeylerde katkı sağlamaktadır. Araştırmada, TÜİK veri tabanı üzerinden, 2021 yılında elde edilen, 81 şehir için 7 adet tarım ve hayvancılık alanına ait gösterge (Bitkisel üretim değeri (1000 TL), Canlı hayvanlar değeri (1000 TL), Toplam işlenen tarım alanı (hektar), Kümes hayvanı (baş), Koyun (baş), Keçi (baş) ve Sığır (baş)) kullanılmıştır. Bu çalışmada Hiyerarşik (Ward) ve Hiyerarşik olmayan (Yoğunluk tabanlı, Model tabanlı, Bulanık kümeleme ve K-Ortalamlar) kümeleme teknikleriyle elde edilen küme yapıları incelenerek şehirlerin tarım ve hayvancılık potansiyeli bakımından birbirleriyle benzerlikleri ve kümeleme tekniklerinin karşılaştırılması amaçlanmıştır. Hiyerarşik kümeleme yöntemiyle şehirler tarım ve hayvancılık potansiyeli bakımından 2 kümeye (ilk kümede 21 ve ikinci kümede 60 şehir) ayrılmıştır. Hiyerarşik olmayan kümeleme yöntemlerinden K-ortalamlar yöntemine göre uygun küme sayısı 2 (ilk kümede 68 ve ikinci kümede 13 şehir), yoğunluk-tabanlı kümeleme yöntemine göre tek (68 şehirden oluşan), bulanık kümeleme yöntemine göre 2 (ilk kümede 59 ve ikinci kümede 22 şehir) ve model-tabanlı kümeleme yöntemine göre ise 4 (ilk kümede 14, ikinci kümede 7, üçüncü kümede 28 ve dördüncü kümede 32 şehir) olarak belirlenmiştir. Kümeleme tekniklerinde, kullanılan algoritmalara göre kümelerdeki şehir sayısı ve şehirler farklılık göstermekle birlikte Mersin, Antalya, Manisa, Van, Şanlıurfa, Diyarbakır, İzmir, Balıkesir, Ankara, Konya ve Erzurum şehirlerinin Yoğunluk tabanlı kümeleme tekniği haricinde tüm kümeleme tekniklerinde aynı kümede yer aldığı saptanmıştır. Bu şehirler, Yoğunluk tabanlı kümeleme tekniğinde ise, aykırı değer olarak küme dışında yer almıştır. Literatür incelendiğinde, bu şehirlerin Türkiye'de tarım ve hayvancılık konusunda farklı sektörlerde (tahıl, zeytin, büyükbaş hayvancılık, vb.) ilk sıralarda yer aldıkları bilinmektedir. Her kümeleme tekniği, farklı algoritmaları kullandığından dolayı farklı sonuçların ortaya çıkması muhtemel görülmüştür. Ayrıca analizde kullanılan göstergeler, elde edilen sonuçta belirleyici olduğundan Türkiye'nin coğrafi koşulları dikkate alınarak tarım ve hayvancılık alanında farklı ekonomik göstergeler de dahil edilip başka tahmin metodları kullanılarak çalışmalar yapılabilir.

Anahtar Kelimeler: Kümeleme teknikleri, Tarım, Hayvancılık, Bulanık kümeleme, Yoğunluk tabanlı kümeleme, Model tabanlı kümeleme

ABSTRACT

Turkey is a country with convenient conditions for agriculture and livestock with its geographical location, terrain and climate diversity. In our country, each city contributes to the economy of the country at different levels in the field of agriculture and livestock within the framework of its own potential. The principal aim of this study is to show that clustering 81 cities in Turkey with using 7 indicators (*Crop production value (1000 TL)*, *Live animals value (1000 TL)*, *Total cultivated agricultural area (hectares)*, *Poultry (head)*, *Sheep (head)*, *Goat (head)* and *Cattle (head)*) related with agriculture and livestock in 2021 years via Hierarchical and non-hierarchical clustering methods, including K-means clustering, Fuzzy clustering, Model-based clustering, and Density-based clustering methods. The secondary aim of this study is comparing this clustering methods. The data obtain from TUIK database. According to the clustering analysis, we determined the number of optimal clusters as 2 in Hierarchical clustering method using Ward technique (21 cities in cluster-1 and 60 cities in cluster-2). Regarding to the non-hierarchical clustering methods, the number of optimal clusters were determined as 2 in K-means clustering (13 cities in cluster-1 and 68 cities in cluster-2), 1 in Density-based clustering (68 cities in cluster-1 and 13 cities determined as outliers), 2 in Fuzzy clustering (22 cities in cluster-1 and 59 cities in cluster-2), and 4 in Model-based clustering methods (14 cities in cluster-1, 7 cities in cluster-2, 28 cities in cluster-3, and 32 cities in cluster-4). Although the number of cities and cities included in clusters showed difference according to the algorithms used in clustering techniques, Mersin, Antalya, Manisa, Van, Şanlıurfa, Diyarbakır, İzmir, Balıkesir, Ankara, Konya, and Erzurum were included in the same cluster in all clustering techniques except for the density-based clustering technique of the cities. These cities were located outside to the cluster since they determined as outliers in the Density-based clustering technique. In the literature, it is known that these cities rank first in different sectors in terms of agriculture and livestock in Turkey. Since each clustering technique uses different algorithms, different results are likely to occur. In addition, since the indicators used in the analysis are decisive in the results obtained, studies can be carried out by using different estimation methods by including different economic indicators in the field of agriculture and livestock, taking into account the geographical conditions of Turkey.

Keywords: Clustering techniques, Agriculture, Livestock, Fuzzy clustering, Density-based clustering, Model-based clustering

GIDA TEKNOLOJİSİNDE ENKAPSÜLASYON UYGULAMALARI ENCAPSULATION APPLICATIONS IN FOOD TECHNOLOGY

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ÖZET

Enkapsülasyon gıda bileşenlerinin, enzimlerin, hücre ve diğer maddelerin, protein veya karbonhidrat esaslı minyatür kapsüller içerisinde tutularak stabilite ve kontrollü salınımı için kullanılan bir yöntemdir. Başka bir deyişle kapsüllenecek aktif materyalin nano, mikro veya milimetrik ölçülerdeki kaplama materyallerinin içinde tutulmasıdır.

Enkapsülasyon teknolojisinin gıda endüstrisi için büyük bir potansiyeli vardır. Bu teknikte kullanılan biyoaktif bileşiklerin fonksiyonelliğinden yararlanımın artırılması, dış etkenlerden korunması, raf ömrü boyunca kontrollü salınımı, istenmeyen tat ve aroma bileşenlerini maskelemek hedeflenir.

Değerli kimi gıda bileşenlerini, esansiyel yağlar, aromatik hidrokarbonlar, tatlandırıcılar, renklendiriciler, lipitler, vitaminler, enzimler, mikrobiyal metabolitler ve mikroorganizmalar gibi bazı bileşenler farklı teknikler kullanılarak enkapsüle edilebilmektedir.

Enkapsülasyon metotları arasında püskürterek kurutma ve soğutma, liyofilizasyon, hava ve döner süspansiyon kaplama, ekstrüzyon, moleküler tutuklama, emülsiyon gibi fiziksel veya koaservasyon, lipozom gibi kimyasal çeşitli yöntemler uygulanmaktadır.

Bu tekniklerden uygun olan tercih edilirken, uygulanacak proses, kapsüllenecek biyoaktif bileşenin yapısı yada kaplama materyalinin özellikleri gibi faktörler göz önünde bulundurulmaktadır.

Gıda endüstrisinde kaplama materyali olarak genellikle nişasta, selüloz, alginat, pektin, karragenan gibi polisakkaritler, peynir altı suyu, kazein, jelatin gibi protein ve yağ asitleri, gliseritler, hidrojene bitkisel yağlar gibi lipit yapıları kullanılmaktadır.

Enkapsülasyon, gıda endüstrisinde farklı alanlarda kullanım olanağı bulmuştur. Özellikle süt endüstrisinde büyük ilerlemeler kaydetmiş organoleptik özellikleri daha yüksek ürünlerin elde edilmesi, peynir gibi ürünlerde olgunlaşma sürelerinin kısaltılması, dondurulmuş süt ürünlerinde tat ve aromanın korunması sağlanmaktadır.

Et ürünlerinde probiyotik ve starter mikroorganizmaların kapsüllenmesi ile depolama boyunca hem canlılıkları en üst düzeyde tutulmuş hemde ürünün fonksiyonelliği geliştirilmiştir. Ayrıca antimikrobiyal, antioksidan ve emülsifiye edici ajanların enkapsüle edilmiş formları, enkapsüle edilmemiş formlarına kıyasla depolama süresi boyunca daha uzun süre aktivite göstermektedir.

Probiyotik bakterilerin enkapsülasyonunda çeşitli teknolojik işlemler, sindirim ortamları ve depolama süresince mikrokapsüllerden kontrollü salınımına izin vererek canlılıklarının muhafazasının sağlanması amaçlanmaktadır.

Bir başka kullanım alanı olarak fenolik, aromatik gibi uçucu bileşenler, yine vitamin ve mineral gibi oksidatif stabilitesi düşük ürünler için de enkapsülasyon teknolojisinden yararlanılmaktadır.

Enkapsülasyon teknolojisinin, bilinçlenen tüketicilerin artan fonksiyonel ürün talepleri doğrultusunda gıda endüstrisinde her geçen gün daha önemli hale geldiği söylenebilir. Bu konuda yapılacak akademik çalışmalarında gıda sektöründeki uygulamalar için yol gösterici olabileceği düşünülmektedir.

Anahtar Kelimeler: Gıda, Enkapsülasyon, Aktif Materyal, Kaplama, Kontrollü Salınım.

ABSTRACT

Encapsulation is a method used for the stability and controlled release of food components, enzymes, cells and other substances by keeping them in protein or carbohydrate-based miniature capsules. In other words, it is the retention of the active material to be encapsulated in nano, micro or millimeter coating materials.

Encapsulation technology has great potential for the food industry. It is aimed to increase the functionality of the bioactive compounds used in this technique, to protect them from external factors, to release them in a controlled manner during the shelf life, to mask the undesirable taste and aroma components.

Some valuable food components such as essential oils, aromatic hydrocarbons, sweeteners, colorants, lipids, vitamins, enzymes, microbial metabolites and microorganisms can be encapsulated using different techniques.

Among the encapsulation methods, various physical methods such as spray drying, spray cooling, lyophilization, air suspension coating, rotary suspension coating, extrusion, molecular arresting, emulsion or chemical methods such as coacervation, liposome are applied.

While choosing the appropriate one among these techniques, factors such as the process to be applied, the structure of the bioactive component to be encapsulated or the properties of the coating material are taken into consideration.

Polysaccharides such as starch, cellulose, alginate, pectin, carrageenan, protein and fatty acids such as whey, casein, gelatin, glycerides, lipid structures such as hydrogenated vegetable oils are generally used as coating materials in the food industry.

Encapsulation has found use in different areas in the food industry. It has made great progress especially in the dairy industry. It is ensured that products with higher organoleptic properties are obtained, shortening of maturation times in products such as cheese, and preservation of taste and aroma in frozen dairy products.

By encapsulating probiotic and starter microorganisms in meat products, their vitality is kept at the highest level and the functionality of the product is improved during storage. In addition, encapsulated forms of antimicrobial, antioxidant and emulsifying agents show longer activity during storage compared to unencapsulated forms.

In encapsulation of probiotic bacteria, it is aimed to maintain their viability by allowing controlled release from microcapsules during various technological processes, digestive environments and storage.

As another usage area, encapsulation technology is also used for volatile components such as phenolic and aromatic products, as well as products with low oxidative stability such as vitamins and minerals.

It can be said that encapsulation technology is becoming more and more important in the food industry in line with the increasing demands of conscious consumers for functional products. It is thought that academic studies on this subject can be a guide for applications in the food sector.

Keywords: Food, Encapsulation, Active Material, Coating, Controlled Release.

RELATIONSHIP BETWEEN THE YELLOW COLOUR INDEX (B^*) AND THE β -CAROTENE CONTENT IN JERSEY COW CREAM

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ABSTRACT

The color of dairy products, such as cream or cheese, is one of the most important factors to consider when purchasing them. Carotene content in milk strongly influence the quality of this characteristics [1]. In turn the level of carotenes highly depend on both the intake of feed rich in carotene, e.g. green fresh forage, and animal genetic factors. Regarding genetic factors, Jersey cows, compared to other cow breeds, tends to produce milk with higher carotenes and thus more yellow. In this study, 63 cream samples (standardized to 30% fat content) from Jersey cows feed diets with different amounts of carotenes were used. The cream was analyzed for instrumental color and β -carotene content. Then the yellowness (b^* value) or the reflectance at the different spectra wavelengths were correlated with carotene content using Pearson correlation. The b^* value of the cream samples analysed was between 0.147 and 11.40 (mean standard deviation: 3.65 ± 2.40), and β -carotene content was between 4.40 and 342.0 μg carotene/100 g fat (108.6 ± 71.3). The correlation of b^* with carotene content resulted in the following equation $b^* = 8.722 + 0.659 \text{ g carotene/100 g fat}$ ($R = 0.736$; $p < 0.001$). The reflectance of wavelength more correlated with b^* was 500 nm with an R coefficient of -0.804 ($p < 0.001$).

Keywords: yellowness, β -carotene, Cream

INVESTIGATION OF LENTIVIRUS INFECTION IN SHEEP IN DENİZLİ PROVINCE

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ABSTRACT

Small ruminant lentiviruses (SRLVs) infections lead to chronic diseases and remarkable economic losses undermining health and welfare of animals and the sustainability of farms. SRLVs, which comprise maedi-visna virus (MVV) and caprine arthritis encephalitis virus (CAEV), belong to the genus Lentivirus and the family Retroviridae. SRLVs can cause progressive multisystem disease in sheep involving joints, lungs and the central nervous system. Strategies to control SRLV are based on the identification of seropositive animals since no vaccine is available, despite profuse trials. Molecular diagnosis by PCR may add diagnostic value to serodiagnosis since seronegative animals may show PCR positive results due to low antibody production. The present study aimed to reveal the status of lentivirus infection in the sheep in Denizli province and determine the circulating genotypes by conducting the sequence analysis of the samples detected positive by a molecular method. To this end, 384 sheep blood samples were used. The sampled animals were selected randomly, and the sampled animals belonged to different flocks. A commercially available Enzyme-Linked Immuno Sorbent Assay (ELISA) kit was used to detect MVV-specific antibodies. The ELISA test was applied and the results were evaluated according to the protocol specified by the manufacturer. Based on sampling results of the ELISA test and Polymerase Chain Reaction (PCR) tests, 3.12% (12/384) and 3.91% (15/384) positivity rates were found in sheep, respectively. Consequently, we revealed to the conclusion that lentivirus infection has been less common seen in sheep in small family-owned businesses located around Denizli province and precautions needed to be taken so as to struggle against this infection.

Keywords: Small ruminant lentiviruses, maedi-visna virus, sheep, ELISA, PCR

YUMURTACI BILDIRCINLARDA (*Coturnix coturnix japonica*), YEM KATKI MADDESİ OLARAK AŞOTU (*Cymbocarpum anethoides*) İLAVESİNİN KARACİĞER DOKUSU ÜZERİNDEKİ HİSTOLOJİK ETKİSİ

HISTOLOGICAL EFFECT OF THE ADDITION OF ASHOT (*Cymbocarpum anethoides*) AS A FEED ADDITIVE ON LIVER TISSUE IN LAYER QUAILS (*Coturnix coturnix japonica*)

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ÖZET

Bitkisel kökenli yem katkı maddeleri, sistemik fonksiyon düzenleyici, yumurta verimliliği ve çevresel etkilerin olumsuz yönlerinin minimize edilmesi açısından kanatlı beslenmesinde kullanılmaktadır. Apiaceae familyasına mensup olan *Cymbocarpum* cinsinin türleri Anadolu coğrafyasında Aşotu, Öz aşotu yada Kızıl aşotu olarak tanınmaktadır. Dağ anıği yada aşotu olarak bilinen *Cymbocarpum anethoides* ilkbahar mevsiminde yaygınlık gösteren ve yemeklerde de kullanılan aromatik bir bitkidir. Çalışmamızda bıldırcın (*Coturnix coturnix japonica*) türünden her bir grupta 48 adet bıldırcın olmak üzere biri kontrol ikisi deneme olarak 3 grup oluşturuldu. Deneme gruplarındaki bıldırcınların canlı ağırlıklarına oranla 1 g/kg ve 2 g/kg dozunda rasyonlarına dağ anıği ilavesi yapılarak beslenmeye tabi tutuldular. 8 haftalık uygulama süresi sonunda servikal dislokasyonla öldürülen bıldırcınlardan karaciğer dokusu alınarak %10 luk formaldehit ve bouin solüsyonlarında tespit edildikten sonra rutin doku takip aşamalarından geçirilmiş ve parafin bloklara gömülmüş doku örneklerinden mikrotomla 4-5 µm'lik seri kesitler lamlara alınmıştır. Hazırlanan karaciğer doku preparatları hematoksilin-eozin boyamaya tabi tutulmuştur. Işık mikroskopik inceleme sonucunda karaciğerin tek parça olan lobus dexter hepatis ve pars lateralis ile pars medialis denilen 2 kısımdan oluşan lobus sinister hepatis olmak üzere 2 ana parçadan oluşmuş olduğu gözlemlendi. Preparatların ışık mikroskobu altında incelemesi sonucu; kontrol grubu karaciğer dokusu lopçuğun merkezinde Vena centralis, lopçukların köşelerinde intersitisyumun azlığına bağlı olarak dağınık halde Vena interlobularis, Arteria hepatica ve Ductus biliferus'dan oluşan karaciğer üçlüsü mevcut idi. Hepatositlerde az miktarda yağ vakuollerine rastlandı. Rasyona dağ anıği ilavesi yapılan deneme gruplarında kullanılan doza bağlı olarak sentral ve portal bölgede homojen olarak dağılmış lipit vakuollerinde artış gözlemlenmiştir. Dağ anıği ilaveli bazal diyetle beslenen gruplardan alınan karaciğer doku örneklerinde histolojik görünümün hepatik makroveziküler steatoz şeklinde olduğu, hepatositlerde lipidin vakuoller halinde biriktiği gözlemlenmiştir. Çalışmanın

sonucunda rasyona dađ anıđı ilavesinin trigliserit ve kolesterol artışına bađlı olarak hepatositlerde lipit birikimine sebep olduđu kanısındayız.

Anahtar kelimeler: *Cymbocarpum anethoides*, *Coturnix coturnix japonica*, Karaciđer, Yem katkı maddeleri

ABSTRACT

Plant-based feed additives are used in poultry nutrition in terms of systemic function regulator, egg productivity and minimizing the negative aspects of environmental effects. The species of the genus *Cymbocarpum*, which is a member of the Apiaceae family, are known as Aşaotu or Red Ashot in Anatolian geography. *Cymbocarpum anethoides*, also known as mountain stigma or achote, is an aromatic plant that is widespread in the spring season and is also used in cooking. In our study, 3 groups of quail (*Coturnix coturnix japonica*) were formed, 48 quails in each group, one control and two experimental. Achote was added to the diets of the quails in the experimental groups at a dose of 1 g/kg and 2 g/kg in proportion to their live weight. At the end of the 8-week application period, liver tissue from quails killed by cervical dislocation was taken and fixed in 10% formaldehyde and bouin solutions, then they were passed through routine tissue follow-up stages and 4-5 µm serial sections from tissue samples embedded in paraffin blocks were taken on slides. Prepared liver tissue preparations were stained with the hematoxylin-eosin method. As a result of light microscopic examination, it was observed that the liver consisted of one piece lobus dexter hepatis and two pieces lobus sinister hepatis. Lobus sinister hepatis was observed to consist of 2 parts called pars lateralis and pars medialis. As a result of the examination of the preparations under the light microscope; In the control group liver tissue, there is Vena centralis in the center of the lobule. In the corners of the lobules, it was observed that they were composed of Vena interlobularis, Arteria hepatica and Ductus biliferus in scattered form due to the scarcity of interstitium. In the portal region, the liver triad was present in scattered form. A small amount of fat vacuoles were found in hepatocytes. Depending on the dose of ashot used in the experimental groups, an increase in dispersed lipid vacuoles was observed in the central and portal regions. It was observed that histological appearance was hepatic macrovesicular steatosis in liver tissue samples taken from the experimental groups, and lipid accumulated in hepatocytes as vacuoles. As a result of the study, we believe that the addition of ashot to the basal diet causes lipid accumulation in hepatocytes due to the increase in triglycerides and cholesterol.

Keywords: *Cymbocarpum anethoides*, *Coturnix coturnix japonica*, Liver, Feed additives

İgY VE HAYVAN SAĞLIĞINDAKİ ÖNEMİ
İgY AND ITS IMPORTANT OF ANIMAL HEALTH

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ÖZET

Bağışlık sistemi veya immün sistem organizmanın kendi kalıtsal yapısına yabancı olan (antijen) maddelere karşı yanıt oluşturan ve organizmayı hastalıklara karşı koruyan sistemdir. Bu sistemin bir parçası olan antikorlar (immunglobülin) memelilerde IgA, IgD, IgE ve IgG, kanatlılarda ise IgM, IgA ve IgY olarak isimlendirilmektedir. Kanatlılarda bulunan IgY ayrıca sürüngenlerde, amfibilerde ve akciğer balıklarında bulunur. IgY antikorları, tavukların yumurta sarısında ve serumunda bulunan, enfeksiyonel durumlarda mikroorganizmalara karşı çoğalan spesifik bir antikordur. İnsan ve hayvan sağlığını korumak amacıyla teşhis ve tedavilerde yaygın olarak kullanılan antikorların kemirgenler ve memelilerden üretilmesi ağrı ve sıkıntıya neden olmaktadır. IgY teknolojisinin kullanıldığı alanlar ve bu teknolojinin çok yönlülüğü açıkça göstermiştir ki kanatlılardan elde edilen IgY antikorunun memeli IgG'sine göre teknik ve ekonomik anlamda çok daha fazla avantajlıdır. IgY antikorunu insan ve veteriner sağlığında hem terapötik hem de teşhis aracı olarak kullanılabilir.

Anahtar Kelimeler: Antikor, immunité, IgY, kanatlı.

ABSTRACT

The immune system is a system that responds to foreign substances (antigens) that are not the organism's own hereditary structure and protects the organism against diseases. Antibodies (immunoglobulin) that are a part of this system are called IgA, IgD, IgE, and IgG in mammals and IgM, IgA and IgY in poultry. The IgY, found in poultry, is also found in reptiles, amphibians, and lungfish. The IgY antibodies are specific antibodies found in the egg yolk and serum of chickens, which multiply against microorganisms in infectious conditions. The production of antibodies, widely used in diagnosis and treatment to protect human and animal health from rodents and mammals, causes pain and distress. The fields in which IgY technology is used and the versatility of this technology clearly demonstrate that the IgY antibodies obtained from poultry are much more technically and economically advantageous than mammalian IgG. The IgY antibodies can be used as a therapeutic and diagnostic tool in human and veterinary health.

Keywords: Antibody, immunity, IgY, poultry.

**KANATLI ENDÜSTRİSİNDE ALTERNATİF STRATEJİ: GENOM DÜZENLEME
AN ALTERNATIVE STRATEGY IN POULTRY INDUSTRY: GENOME EDITING**

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ÖZET

Dünya nüfusunun her geçen gün artması gıda arzına ilişkin endişeler uyandırmaktadır. Bu durum, insan beslenmesi için kalıcı, sürdürülebilir, sağlıklı ve yeterli miktarda gıda ürünlerinin arzına büyük oranda ihtiyaç duyulacağı anlamına gelmektedir. Bu talebin karşılanması yönünde dünyada gıda ürünleri üretiminde verimi artırmaya ilişkin çalışmalar yapılmakta ve moleküler düzeyde farklı teknolojiler denenmektedir. Transgenik hayvanlar temel araştırmaların yanı sıra fonksiyonel genomik çalışmalarda, hastalık modellerinde ve terapötik protein üretiminde yaygın bir şekilde kullanılmaktadır. (CRISPR)-Cas9 gibi genom düzenleme tekniklerindeki yaşanan son gelişmeler, özel genoma sahip çiftlik hayvanlarının üretilmesinde hızlı ilerlemeye yol açmıştır. Yapılan çalışmalar incelendiğinde kanatlı hayvanlarda genom düzenleme çalışmaları memeli hayvanlara kıyasla nispeten geride kalmıştır. Bu derlemede, kanatlı hayvanlarda genomik modifikasyon, transgeniz ve genom düzenleme ile ilgili yapılan çalışmalar ele alınmış ve gelecekteki potansiyelleri tartışılmıştır

Anahtar Kelimeler: Kanatlı Hayvan, Genom Düzenleme, Genetik Modifikasyon, Transgenetik

ABSTRACT

The increasing world population raises concerns about food supply. This means that there will be a great demand for a permanent, sustainable, healthy, and sufficient supply of food for human consumption. To meet this demand, studies are being conducted to increase the efficiency of food production in the world, and various technologies are being tried at the molecular level. In addition to basic research, transgenic animals are being used extensively for functional genomic studies, disease models, and therapeutic protein production. Recent advances in genome editing techniques such as (CRISPR)-Cas9 have led to rapid progress in the production of genome-specific livestock. In the evaluation of studies, genome editing in poultry is relatively far behind compared to mammals. Here, we summarise the studies on genome modification, transgenesis, and genome editing in poultry and evaluate their future potential.

Key Words: Poultry, Genome Editing, Genetic Modification, Transgenetic

1. GİRİŞ

Kanatlı hayvan ürünleri dünya çapında insan beslenmesindeki en önemli protein kaynaklarından. Yapılan projeksiyon çalışmalarında Dünya nüfusunun 2050'li yıllarda yaklaşık 9,1 milyara (FAO, 2022) ulaşacağı tahmin edilmektedir. Bu durum pazarda kalıcı, sürdürülebilir, sağlıklı ve yeterli miktarda kümes hayvanı ürünlerinin arzına büyük oranda ihtiyaç duyulacağı anlamına gelmektedir. Bu nedenle, üretimde ürünlerin besin değerleri korunup potansiyel sağlık tehlikeleri en aza indirilirken aynı zamanda hızlandırılmış üretim süreçlerinin de kullanılması gerekmektedir.

Pek çok çiftlik hayvanı binlerce yıldır evcilleştirme sürecinden geçerken, uygulanan ıslah programları verimlilikte çarpıcı gelişmeler sağlamıştır. Örneğin, 1957'den 2005'e kadar et tavuğunun büyüme hızı % 400'den fazla artarken yemden yararlanma oranı % 50 azalmıştır (Zuidhof ve ark., 2014). Bununla birlikte tavuklarda 2 kg canlı ağırlık için gereken süre 100 günden 40 güne düşmüştür. Bu süreç içerisinde göğüs eti % 12'den % 20'ye çıkmış yıllık yumurta verimi ise % 30 artmıştır (Van der Steen ve ark., 2004).

Tavuk genomu ilk kez 2004 yılında yayımlanmış ve bu gelişmeye paralel olarak kanatlı hayvan ıslahı ile ilgili bilimsel çalışmalar büyük bir ivme kazanmıştır. Bununla birlikte, farklı kümes hayvanlarında ekonomik açıdan önemli özelliklerin genetik arka planları hala keşfedilmeyi beklemektedir (Lee, 2021). Yeni moleküler tekniklerin gelişmesiyle birlikte araştırmacılar, hayvanların genetik potansiyellerini ortaya koyabilmek adına kümes hayvanlarının genomuna ilişkin araştırmalarda ciddi bir ilerleme kaydetmişlerdir. Ancak, bu değişiklikler hala insan gereksinimlerini karşılamak için yeterli düzeyde değildir. Bu nedenle, kanatlı ıslahı ve genetiği ile ilgili daha ileri tekniklere ve çalışmalara ihtiyaç duyulmaktadır.

Çiftlik hayvanlarında pedigreeye dayalı yetiştirme programları artık günümüzde yerini hayvanların genomuna ait bilgileri de içeren genomik seleksiyona bırakmaktadır. Genomik seleksiyon, genomik tahmin denklemi aracılığı ile bireylerin genomik damızlık değerlerini tahmin (GEBV) etmek için genom çapında genetik markör verilerinin kullanılmasını içermektedir (Meuwissen ve ark., 2001; Haley & Visscher, 1998). Genomik damızlık değer, genotip ve fenotip verilerinin bulunduğu "referans populasyon" kullanılarak genomik tahmin denklemi aracılığıyla hesaplanmaktadır. Genomik damızlık değer tahminini takiben diğer popülasyonlarda uygun adaylar markör işaretleyicilerle ortaya konan genotip bilgisine göre seçilmektedir. Bu amaçla geliştirilen genomik araçlar arasında yeni, pratik ve daha ucuz dizileme teknolojileri modern hayvan yetiştiriciliğinde çiftlik hayvanlarının verimlerini artırmaya yönelik ciddi katkılarda bulunmaya devam etmektedir (Loman & Watson, 2015; Watson, 2014; Houston ve ark., 2014). Kullanılan ıslah yöntemlerinde başarı, ilgili tür veya popülasyondaki kalıcı genetik varyasyon ve novo mutasyonlardan kaynaklanan yeni varyantlar tarafından kısıtlanmaktadır. Transgenik ve genom düzenleme teknolojileri, gen akışı ile ilişkili bağlantı sürüklemesinin sonuçları olmadan, yeni ve faydalı alleller meydana getirerek veya diğer ırklardan ya da türlerden bilinen arzu edilen allelleri tanıtarak genetik iyileştirme için yeni fırsatlar sunmaktadır (Tait-Burkard ve ark., 2018).

Genom düzenleme teknolojilerindeki ilerlemeler ve çok sayıda hayvan türüne ait mevcut genom sekansları çiftlik hayvanlarında genomu yeniden düzenlenmiş (Generate Genome-Edited, GE) verimi yüksek, hastalıklara dayanıklı bireyler tasarlayabilmeyi olanaklı hale getirmiştir (Lee ve ark., 2020; Lamas-Toranzo ve ark., 2017). Farklı türlerdeki genomu düzenlenmiş çiftlik hayvanları, insanlarla fizyolojik uyumlulukları nedeniyle bilimsel ve biyomedikal araştırmalarda avantajlı hayvan modelleri olarak hizmet etmektedir. Bu bağlamda insanlarda dişi üreme sistemini incelemek için sığırların; akciğer fonksiyonu ve hastalıklarını incelemek için koyunların; diyabet, immun yetmezlik ve kanser dahil olmak üzere birçok hastalığı incelemek için ise domuzların kullanıldığı bilinmektedir (Polejaeva ve ark., 2016). Ayrıca, endüstriyel anlamda fayda sağlamak amacıyla genom düzenleme teknolojisi kullanılarak sığır ve koyunlarda et, süt ve yapağı gibi arzu edilen özelliklerde verim artışı sağlanmıştır (Lamas-Toranzo ve ark., 2017).

Kanatlı türlerinde genom düzenleme, hem biyolojik araştırmalara hem de kanatlı hayvan endüstrisine fayda sağlamak için büyük bir ilgi görmektedir. Kanatlı hayvanlarda genom düzenleme teknolojisi büyük bir öneme sahip olmasına rağmen, kanatlı genom düzenlemesindeki ilerlemenin, memeli genom düzenlemesine kıyasla nispeten yavaş olduğu bildirilmiştir (Lee ve ark., 2020). Bu derleme, kanatlı

yetiştiriciliğinde mevcut yaklaşımlar, genom düzenleme teknolojisinin avantajları ve sınırlılıkları ile genom düzenleme teknolojilerinin gelecekteki potansiyel etkilerine yönelik bilgiler sunmak üzere hazırlanmıştır.

2. GENETİK MODİFİKASYON VE TRANSGENETİK

Çiftlik hayvanlarında genetik modifikasyon verim artışı sağlamak, hayvan sağlığını ve refahını artırmak, aynı zamanda ekolojik ayak izini azaltmak için onlarca yıldır birçok çalışmaya konu olmuştur. Bazı durumlarda ise genom düzenleme ile birleştirilen transgenik teknoloji, insan beslenmesinde potansiyel faydalar sağlayabilecek hayvansal proteinlere yeni ve istenilen özelliklerin eklenmesine olanak tanımıştır (Tait-Burkard ve ark., 2018).

Hayvanlarda hastalıklara karşı artan direnç, uzun yıllardır hem ıslahın hem de genom mühendisliğinin bir hedefi olmuştur. Kuş gribi, dünya çapında kümes hayvanı üretimi için devam eden bir tehdittir. Büyük kuş gribi salgınlarında ekonomik etkiler ciddi boyutlara ulaşmaktadır (Ramos ve ark., 2017). İnsanlarda pandemik grip enfeksiyonlarının gelişme potansiyeli ise günümüzde devam eden önemli bir risktir (Donatelli ve ark., 2017). Kümes hayvanları yetiştiriciliğinde, hayvanları kuş gribine karşı aşılama veya yüksek biyogüvenlik önlemleri ile hastalık kontrol edilebilse de etkili aşılar henüz geliştirilmemiştir. Yüksek biyogüvenlik önlemleri almak her zaman küçük ölçekte üretim yapan yetiştiriciler tarafından pek mümkün olmayabilir. Kuş gribine karşı direnç kazandıracak bir transgenin tanıtılmasıyla ilgili bir çalışma Lyall ve ark. (2011) tarafından yürütülmüştür. Luo ve ark (1997) tarafından yapılan çalışmada ise tasarıma dayalı olarak transgenik tavuklar geliştirilmiştir. Çalışmada tasarlanan RNA molekülü, kuş gribi virüsü polimerazını bloke eden ve sonuç olarak viral yayılmayı engelleyen bir tuzak görevi görecektir şekilde tasarlanmıştır. Transgenik kanatlılara yüksek oranda patojenik kuş gribi virüsü uygulanmış ve kanatlılar ilk tehdide yenik düşseler de enfeksiyonun transgenik ve kontrol grubundakilere bulaşması önlenmiştir.

Bu çalışmalar, genom düzenleme teknolojilerinin ortaya çıkışından öncesine dayanmaktadır. Çinko-Parmak Nükleazları (ZFN), Efektör Nükleazlar (TALEN) gibi transkripsiyon aktivatörü ve CRISPR-Cas9 ile genom düzenlemenin, transgenezden daha doğru ve verimli sonuçlar verdiği daha sonrasında yapılan çalışmalarda ortaya konmuştur (Tait-Burkard ve ark., 2018).

3. GENOM DÜZENLEME

Çiftlik hayvanlarında arzu edilen özellikleri geliştirmek için genom düzenleme teknolojileri, transgenlerin dahil edilmesine dayanan genetik modifikasyonla karşılaştırıldığında, verimi ve hastalık direncini artırmak için bir hayvanın genomunda spesifik ve kesin değişiklikler yapma fırsatı sunmaktadır (Tait-Burkard ve ark., 2018).

Diğer hayvancılık endüstrilerinde olduğu gibi, bulaşıcı hastalıklar kanatlı endüstrisinde de ciddi sorunlara ve maddi kayıplara neden olmaktadır, bu nedenle hastalıklara dirençlilik tavuklarda arzu edilen özelliklerden biridir. Bununla birlikte, virüse dirençli bir fenotip kolaylıkla ayırt edilemediğinden, geleneksel seleksiyon yöntemleri ile hastalık direncine sahip bireylerin ayırt edilmesi zordur. Bu sorunu ortadan kaldırmak adına, hayvancılık endüstrisinde hastalık direncini artırmak için genom düzenleme yöntemleri yaygın bir şekilde kullanılmaktadır (Proudfoot ve ark., 2019). Genetiği değiştirilmiş hayvanların hastalık kontrolünde başarısı, örneğin popülasyondaki genetiği değiştirilmiş hayvanların oranı ve bunların çiftlikler içinde veya çiftlikler arasında nasıl dağıldığı gibi birçok faktörden etkilenmektedir. Epidemiyolojik teoriye göre, genleri düzenlenmiş hayvanların yalnızca bir kısmı, sürü bağışıklığına ulaşmak, yani hastalığın yerel popülasyonlar içinde yayılmasını önlemek için yeterli olmaktadır (Anderson & May, 1992). Gelişmiş, hastalığa özgü epidemiyolojik modeller, popülasyon yapısından, demografik özelliklerden, çeşitli çevresel faktörlerden ve genom düzenlemenin etkinliğinden etkilenmekte ve her hastalık için gerekli olan geni düzenlenmiş hayvanların tam oranını tanımlamaya yardımcı olmaktadır. Genom düzenleme bazen hayvanların enfeksiyona karşı direncinden ziyade enfeksiyona karşı toleransını artırabilir. Toleransın genetik olarak iyileştirilmesinin, direncin genetik olarak iyileştirilmesinden daha yüksek virülansa doğru patojen evrimi için daha az risk yüklediği düşünülse de genetik olarak toleranslı bireyler hastalığın yayılmasını durdurmaz. Aslında, karışık bir popülasyonda, enfekte olduklarında semptom geliştirmeyen genetik olarak toleranslı bireylerin varlığı, hastalık insidansını ve prevalansını artırabilir (Tait-Burkard ve ark., 2018). Spesifik bir enfeksiyöz

hastalığa dirençli ilk kanatlı modeli olarak, tümör oluşturan avian lökoz virüsüne karşı dirençli tavuklar NHE1 geninin modifiye edilmesiyle üretilmiştir (Chai & Bates, 2006).

Broyler üretiminde geleneksel ıslah yöntemleriyle yapılan damızlık seçimi, yemden yararlanma oranı ve daha yüksek büyüme hızı oranlarına odaklanmıştır (Zuidhof ve ark., 2014). Ancak, moleküler biyoteknolojide yaşanan hızlı gelişmeler neticesinde, çiftlik hayvanlarında geleneksel seleksiyon yöntemlerinin başarısına ek olarak, ıslah programlarına genetik bilgilerin de eklenmesi kaçınılmaz olmuştur.

Broyler yetiştiriciliğinde büyüme hızı, yem verimliliği ve hastalık direnci gibi diğer arzu edilen özelliklerde daha fazla iyileştirme için genetik belirteçler kullanmak önem kazanmıştır. Bu nedenle, tavuklar da dahil olmak üzere çeşitli hayvan türlerinde istenen özellikler için genom düzenleme yaygın olarak kullanılmıştır. Kanatlı sektöründe et verimini yükseltmek ekonomik olarak işletme karlılığını büyük oranda etkilemektedir. Bu bağlamda, miyostatin (MSTN) geni dikkat çekmektedir, çünkü MSTN, kas büyümesinin negatif bir düzenleyicisidir ve MSTN genindeki mutasyon, memelilerde ve balıklarda kas kütlelerinin artmasına neden olmaktadır (McPherron ve ark., 1997). Kanatlı türlerinde MSTN'nin anti-miyojenik fonksiyonunu araştırmak için, adenovirüs ve PGC-aracılı yöntem kullanılarak MSTN knockout bıldırcın ve tavuklar kullanılmıştır (Kim ve ark., 2020; Lee ve ark., 2017; Shin ve ark., 2009). Hem MSTN knockout bıldırcın hem de tavukta göğüs ve bacak kası kütlelerindeki önemli artış, MSTN'nin daha yüksek et verimine sahip kümes hayvanları hatları için potansiyel bir markör olabileceğini göstermiştir (Lee ve ark., 2020).

Kas büyümesine ek olarak, yemden yararlanmayı artırmak, ekonomik karlılık için bir başka önemli özelliktir. Çünkü kümes hayvanları endüstrisinde yem maliyeti işletme için en önemli giderlerin başında gelmektedir. Yemden yararlanmayı artırmak için, karkas kompozisyonunda yağı azaltmak ve kas kütlelerini artırmak önemlidir, bu bağlamda alınan besin maddelerinin daha çok kas dokusuna çevrilmesi önem arz etmektedir (Tallentire ve ark., 2018). Vücutta yağ depolaması, lipid sentezi ve hidroliz arasındaki denge ile düzenlenir ve lipid hidrolizindeki artış genel vücut yağ içeriğini azaltır. Lipit hidrolizi, lipaz adı verilen bir enzim tarafından gerçekleştirilir ve adipoz trigliserit lipaz (ATGL), vücut yağının ana bileşenleri olan trigliseridin parçalanmasını başlatır (Zimmermann ve ark., 2004). ATGL, trigliserit parçalanmasında hız sınırlayıcı bir enzim olmakla birlikte ATGL enzim aktivitesi, G0/G1 anahtar 2 (G0S2) geni tarafından kodlanan protein tarafından inhibe edilmektedir (Yaqng ve ark., 2010). Yapılan çalışmalarda, G0S2'nin aşırı ekspresyonu, farelerde ve bıldırcınlarda adipoz lipolizini inhibe ederken (Heckman ve ark., 2014) G0S2 knockout farelerde lipolizi artırmaktadır (Zhang ve ark., 2014). Bu nedenle, yemden yararlanma oranı açısından potansiyel endüstriyel uygulama amacıyla tavuklarda lipit metabolizmasını araştırmak üzere PGC aracılı bir yöntem kullanılarak CRISPR/Cas9 yoluyla karında yağ birikiminde azalma gösteren bir G0S2 knockout tavuk üretilmiştir (Park ve ark., 2019).

Etlik piliç sektörünün yanı sıra yumurtacı sanayinde de yumurta üretiminde yerli tavuk ırklarından yararlanılmaktadır. Yumurta endüstrisinde erkek cinsiyet istenmez ve bu nedenle, yetiştirme maliyetini azaltmak için erkek civcivler taranır ve yumurtadan çıktıktan hemen sonra ötenazi yapılır. Günlük civciv itlafına ek olarak, yumurtalarda erken cinsiyet tayini kuluçkahanedeki maliyetleri azaltabileceği ve civciv itlafının etik sorununa bir çözüm sağlayabileceği için in-ovo cinsiyet tayini yöntemleri geliştirilmiştir (Galli ve ark., 2018). Bu bağlamda, bir cinsiyet kromozomundaki genetik modifikasyon gelecekte bu soruna çözüm olabilir. Yapılan çalışmalarda, in-ovo cinsiyet tayininde cinsiyet kromozomunda genom düzenlemesini uygulamak üzere yeşil flüoresan proteinini (GFP) ifade eden gen sekansları, tavuklarda CRISPR/Cas9 aracılığı ile Z kromozomuna yerleştirilmiştir. Böylelikle floresan algılama cihazları kullanılarak cinsiyet ayrımı in-ovo olarak tanımlanabilecektir. (Lee ve ark., 2019).

Günümüzde ilaç sektöründe protein bazlı ilaçların kullanımı giderek yaygınlaşmaktadır. Bugün ABD Gıda ve İlaç Dairesi (FDA) tarafından klinik olarak kullanım onayı alan yaklaşık 130'dan fazla protein bazlı ilaç mevcuttur (Pham, 2018). Protein bazlı ilaçların üretimi için bakteriyel ve memeli hücre kültürü sistemleri başlıca yöntemler arasında gelmektedir. Geleneksel olarak, bakteriyel ve memeli hücre kültürü sistemleri, protein bazlı ilaçların üretimi için başlıca yöntemler olmuştur (Sanchez-Garcia ve ark., 2016). Ancak, bakteri hücre kültürü sistemlerinin glikozilasyon ve rekombinant proteinin translasyon sonrası modifikasyonu üzerinde sınırlamaları vardır. Memeli hücre kültürü sistemlerinde büyük miktarda rekombinant proteinlerin üretimi oldukça pahalıdır (Overton, 2014). Bu nedenle,

transgenik hayvanlardan protein bazlı ilaçların üretimi, mevcut hücre kültürü sistemine göre daha uygun maliyetli bir alternatif olarak dikkat çekmektedir (Houdebine, 2018). Bu bağlamda, rekombinant proteinlerin üretimi için şu ana kadar bildirilen sistemler arasında (süt, kan, yumurta akı, seminal plazma, idrar) en umut verici ve dikkat çeken sistem olarak yumurta akı kabul edilmiştir. Çünkü yumurta beyazındaki yüksek oranda protein varlığı nedeniyle sürekli bir şekilde üretilmesine olanak sağladığı bildirilmiştir (Sheridan, 2016). Tavukların özellikle biyoreaktörler olarak kullanılmasının tavuk başına yumurta üretimi, kolay çiftleşme, transgenik hatların generasyon süresinin kısa olması ve düşük bakım maliyeti gibi birçok önemli avantajı vardır. Şimdiye kadar, birçok transgenik tavuk, rekombinant protein ekspresyon vektörünün genomlarına rastgele entegrasyonunu indükleyerek biyoreaktörler olarak kullanıldığı bildirilmiştir (Woodfint ve ark., 2018). Ancak, yumurtalarda rekombinant protein ifadeleri transgenik tavuklar arasında farklılık göstermektedir (Farzaneh ve ark., 2017). Bununla birlikte, transgenin ektopik ekspresyonu veya istenmeyen araya giren mutajenez, bazı transgenik tavuklarda ciddi sağlık sorunlarına ve hatta ölümlere neden olmuştur (Koo ve ark., 2017).

Günümüzde, çiftlik hayvanlarında genom düzenlemesi, esas olarak, arzu edilen özelliklere sahip üstün hayvan soyları oluşturmaya yönelik hedef genlerin işlevini araştırmak için kullanılmaktadır. Genomu düzenlenmiş hayvanların ticari kullanımı şu an mevcut olmasa da, FDA genetiği değiştirilmiş somon balığını insan tüketimi için ilk kez 2015 yılında onaylamıştır (Waltz, 2017). Gelecekte, genomu düzenlenmiş daha farklı türlerde hayvan FDA tarafından onaylanırsa, genomu düzenlenmiş kümes hayvanları ticari olarak endüstriyel sektöre fayda sağlayacaktır. Ancak, hükümet düzenlemelerine ek olarak, etik ve biyogüvenlik konuları açısından GE hayvanlara ilişkin tüketici bakış açılarının dikkatle ele alınması gerektiği unutulmamalıdır (Ormandy ve ark., 2011). Buna karşılık, yumurtalarda protein bazlı ilaçların üretimi için GE tavukların biyoreaktör olarak kullanımı da 2015 yılında FDA tarafından onaylanmıştır (Sheridan, 2016).

Yukarıda açıklanan örnekler, doğal olarak, genom düzenlemeye uygun, büyük etkiye sahip tek allelleri içerir. Bu basit örneklerin ötesinde, birçok özellik karmaşıktır. Yani, her biri küçük etkiye sahip birçok allel tarafından yönetilirler. Karmaşık bir özellik için mevcut genetik varyasyondan yararlanarak genom düzenlemesinden önemli bir etki elde etmek için, kişinin birden çok alleli aynı anda düzenlemesi gerekir ve düzenleme yaklaşımlarının rutin olarak ticari ıslah programlarına entegre edilmesi gerekir. Simülasyonlar, karmaşık özelliklerde bile genom düzenlemenin, genomik seçilime dayalı bir ıslah programının bir parçası olarak uygun allellerin sıklığını artırarak (Jenko ve ark., 2015) veya zararlı allelleri ortadan kaldırarak çiftlik hayvanlarının geliştirilmesinde bir rolü olabileceğini göstermektedir (Johnsson ve ark., 2019).

SONUÇ

Genom düzenleme teknikleri neticesinde elde edilen başarı yukarıda da bahsedildiği üzere transgenezden oldukça farklıdır. Dünya’da genomu düzenlenmiş hayvanlar için yasal düzenleme yolları oluşturulmamış ve burada ele alınan tüm örnekler için yapılan çalışmalar henüz erken bir aşamadır. Hızla gelişen ve değişen dünyada, genom düzenlemenin kesin ve hızlı olduğunu düşünürsek, gelecekte genom düzenleme hedeflerinin belirlenmesine odaklanılabilir. Koordineli bir şekilde yapılabilecek uluslararası araştırma programları hayvancılık sektörüne büyük faydalar sağlayabilecek hedefleri belirleme konusunda ciddi potansiyele sahiptir. Ancak, bu teknolojilerin endüstriyel olarak kullanımı zaman alabilir. Bu hayvanların doğrudan gıda olarak tüketimi konusunda insanlarda endişe yaratabilmektedir. Genomu düzenlenmiş hayvanlardan elde edilen ürünlerin insan sağlığı açısından bir risk oluşturup oluşturmayacağına karşın ciddi ve geniş çapta araştırma yapılmasına da ihtiyaç vardır.

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ASSESSMENT OF GENETIC DIVERSITY AND CONSERVATION STRATEGIES IN
SMALL RUMINANTS REARED IN TURKEYTÜRKİYE'DE YETİŞTİRİLEN KÜÇÜKBAŞ HAYVANLARDA GENETİK ÇEŞİTLİLİK VE
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Science, Aydın, Turkey³ORCID ID: <https://orcid.org/0000-0002-5658-8558>**ABSTRACT**

The first step in the conservation of genetic resources is to determine the current situation, in other words, to reveal the genetic characterisation of these genotypes and to determine the population structures. Based on population structures, the second phase of conservation studies is to define the genotypes to be safeguarded. Since Turkey is a part of the Fertile Crescent, its animal genetic resources are quite diverse genetically. This diversity is manifested through a range of animals, ranging from sheep, goats, cows, and pigs to poultry. Genetic variation is one of the most important factors in animal breeding and identifying breeds at risk in conservation studies of animal genetic resources. Saving genetic diversity is important for ensuring that animal populations will remain healthy and productive in the long term. Genetic characterization studies provide important information on breed distribution and genetic diversity, which are crucial for developing conservation strategies. In this review, genetic characterization studies of sheep and goat breeds in Turkey are discussed and conservation strategies are evaluated.

Key Words: Genetic diversity, conservation, breeding, sheep, goat

1.INTRODUCTION

The cultural, social, and economic prosperity of Turkey's rural communities can be directly attributed to the country's thriving sheep and goat industries. Indigenous breeds have played a significant socioeconomic role in the survival strategies of impoverished farmers, especially those in rural and difficult-to-reach places. In addition to their usefulness as livestock, sheep and goats are prized for their high production, versatility, and resilience to disease.

Due to being a part of the Fertile Crescent during the domestication process, Turkey possesses a significant genetic diversity potential since its domestic sheep and goat populations comprise diverse breeds and various variations (Karaca & Cemal, 1998). The historical evolution of the diversity of farm animals and breeds that contribute to agriculture and food production has resulted in its current form (Cemal et al., 2013). Domestic sheep are raised in areas across the world for meat, milk, fiber production, and conservation purposes. Breeders' use of non-systematic crossbreeding to increase the productive

capacity of domestic animals is one of the most significant issues in Turkey's animal husbandry (Karaca et al., 2009).

To protect livestock animals, genetic characterization is crucial (Visser and Marle-Koster, 2018). Characterization, which describes an animal's phenotype and genotype, is the description of features that are normally inherited (FAO, 2011). Genetic diversity analysis helps identify the linkages between breeds and the differences within breeds that make up their sustainable use and the order of importance for conservation (Toro et al., 2009). Through genetic diversity research, the application of genetic and genomic technologies can help identify populations for conservation and features that are important for the economy (Frankham, 2010). The new findings make it possible to identify certain genes and variations, as well as to ascertain their roles within the genome and the relationships between phenotype and genotype in response to selective and environmental pressures. For sustainable production, this knowledge can be applied to breeding and in-breed improvement (Allendorf et al., 2010).

Genomic variation in each livestock breed has a distinct structure that is due to a lengthy evolutionary process. Human activities, along with environmental conditions, have influenced this evolution. Evolutionary processes have resulted in the development of regionally adapted breeds, which can adjust to the environment and develop a resistance to various diseases. Considering this, the loss of these one-of-a-kind animal gene resources makes it challenging to re-create locally suited breeds (Özmen et al., 2020).

Allelic frequencies that are typically impacted by phenotypic traits are used in genetic characterization to assess the level of polymorphisms prevalent in populations (Toro et al., 2009). Nevertheless, environmental factors affect both genetic and phenotypic traits (Monau et al., 2019). The likelihood of two alleles being randomly selected from a population is a typical metric used to assess the variation in genetic diversity research (Chokoe et al., 2020). Additionally, the fixation index (F_{st}), which demonstrates the genetic differentiation between populations, can be used to estimate the degree of allele fixation (Toro and Caballero, 2005). This is a common statistical technique for defining population structure and diversity (Allendorf et al., 2010). Technology advancements and the current state of characterization and conservation of indigenous sheep and goat breeds in Turkey will be covered in this assessment, with a focus on setting priorities for preservation and sustainable use.

2. SHEEP AND GOAT MANAGEMENT IN TURKEY

There are over 3 million animal farms in Turkey, of which 95% are sheep and goat farms. Mixed farms are prevalent in the central, eastern, and southeastern regions of Anatolia. Extensive systems sheep farmers prefer include goats and sheep that are easy to control and manage. Farmers also keep goats to meet the needs of their families, such as income, meat, and milk products (Daşkiran et al., 2018). Most farms have relatively small flocks of sheep and goats that are cared for and managed by members of the same family. The primary components of these systems are the native breeds used in these systems. These breeds are the product of natural selection that has taken place over a long period of time. They have a high tolerance for unfavorable climatic circumstances, drought endurance, and adaptability to low and changing nutrient supplies, among other desirable traits. They are also resistant to diseases and parasites and have a strong flocking instinct. Depending on environmental and societal variables, various management techniques may be utilized in sheep and goat husbandry. One of these is extended production, which involves the continuous management of a large amount of poor pasture or harvested grain paddocks by a hired shepherd or a family member. A small portion of the produce is consumed by the family, while the remainder is primarily sold as cheese on the local market.

In Turkey, extensive production systems for sheep and goats are prevalent. Goat flock sizes range from 50 to 500 heads. This type of production is seen mainly in the rural areas of Turkey, where many shepherds have turned to this form of agribusiness as a source of income. Because the economic situation of most goat breeders is low, farmers are frequently unable to purchase supplemental feed during harsh winter conditions. This lack of feed supply may result in poor animal health and productivity, resulting in a lower income for the shepherd. If flock size is greater than 300 heads, goat herders in Turkey may employ shepherds; however, family members are typically preferred (Daşkiran et al., 2018; Daşkiran & Ceyhan, 2013).

Using contemporary methods, semi-intensive systems are seen as more evolved than extensive systems. This style of farmer seeks to utilize more contemporary feeding, housing, and management techniques. They want to genetically improve their flock and provide concentrated nourishment to the animals throughout the winter months. Some semi-intensive farms use limited animal registration systems and synchronized mating to better manage their goat flocks. Some semi-intensive goat farms have established themselves in the southeast Anatolia and eastern Mediterranean regions of Turkey (Daşkıran et al., 2018; Daşkıran & Ceyhan, 2013). Intensive farms in Turkey often employ modern breeding and housing techniques as well as veterinary services to improve animal health. The farms are equipped with comprehensive animal registration systems and employ software to improve flock management. Milking systems are fully or partially automated and generate a variety of goat cheese varieties for value addition. They normally have a huge flock consisting of over a thousand animals. Intensive goat farms rely on animal welfare, and the design of their barns is determined by age, sex, and other important husbandry factors. Their feeding system is entirely controlled, and their animals do not graze. Utilizing current selection and mating techniques, they attempt to enhance genetic features such as meat and milk supply and quality. During the past decade, private sector investment has expanded, particularly in Turkey's western. In Turkey, the private sector is motivated by consumer demand for goat goods to invest in modern goat farms and goat milk products (Daşkıran et al., 2018; Daşkıran & Ceyhan, 2013).

3. STUDIES ON THE GENETIC DIVERSITY OF SHEEP AND GOATS IN TURKEY

With the advancement of novel molecular genetic tools, research on sheep and goats has changed. In earlier research on animals in Turkey, particularly genetic diversity and characterization studies, microsatellite markers were used for the first time.

Using microsatellites, the study by Alarslan et al. (2021) established the genetic variation between four commercial sheep breeds (Kıvrıkcık, Yalova, Tahirova, Eşme). The population's phenotypic data also differed from those of other breeds; hence, Eşme is now registered as a breed based on these findings. Besides, a relatively high FIS score for the Yalova type indicates that a rise in inbreeding within the population would result from an increase in selective pressure. Another study stated in their study that although there was a clearer distinction between Sakız, Çine Capari, and Karya populations, there was a higher level of admixture among the remaining other breeds. Researchers have implied that these intriguing discoveries may have been brought about by substantial animal migration from a grazing area located in the eastern region of Turkey. The Karya and the Çine Capari populations were very different from one another. Their findings emphasized that many years of breeding of the Karya population and the genetic conservation program that has been used for Çine Capari since 1994 were carried out in the correct manner (Yilmaz et al., 2014, 2013). Different varieties of Akkaraman sheep have been identified such as Şavak, Kangal, Karakaş, and Güney Karaman and investigations have proved the genetic difference between the Akkaraman sheep population and other populations (Ozmen et al., 2020; Karşlı et al., 2020). Despite the population declines over the past three decades, Karşlı et al. (2020) reported that the Kangal, Güney Karaman, Norduz and Karakaş populations still possess sufficient genetic diversity. Nonetheless, Kangal and Güney Karaman were found to have high inbreeding coefficients, necessitating the implementation of strategies to reduce inbreeding. Genetic differentiation coefficients and phylogenetic analysis demonstrated that the Karaman and Norduz populations, which are known to be Akkaraman variants, have diverged genetically from the Akkaraman breed. Another study showed that significantly higher levels of genetic variation were found in the gene pool of the Güney Karaman sheep breed. Important for sheep farmers and other conservation projects is the strong inference that the Güney Karaman has not experienced substantial bottlenecks. (Akay et al., 2020).

The use of microsatellites allowed Gul et al. (2020) to investigate the genetic variations among hair, Damascus, Kilis and Hatay goat breeds. It is said that the Kilis goat breed was created by farmers in many years ago by non-systematically crossing the Damascus (Shami) and Hair goat varieties. Additionally, the Yayladag breed of goats, also known as the Hatay goat genotype, is native to the mountainous regions of the province of Hatay and was developed through a combination of the Kilis and Hair goat types (Keskin et al., 2017; Keskin & Biçer 1997). Gül et al., (2020) emphasized that the breeds that were studied in their study have a high level of genetic diversity, and they obtained genetic relationships that will play an important role in the registration of the Hatay goat as a national breed, even though it had not been included in the national breeds catalog in the past. In another study, it was

believed that the favorable geographical structure of Hatay province for goat breeding and the existence of numerous populations may have contributed to the establishment of a new genotype (Bulut et al., 2016). Karşlı et al. (2020), in their study due to its breeding history, the Norduz goat breed was shown to be genetically distinct from earlier research. Additionally, this investigation demonstrated that the Kabakulak goat breed, which is now considered a hair goat variety, has diverged genetically from the hair goat breed. The researchers emphasized the significance of genetic variation not only in breeds but also in the varieties that comprise a breed.

These findings contribute to the genetic characterization of indigenous sheep and goat populations in Turkey. Additionally, the results of this study can be used to develop strategies for flock and breeding management, given that crossbreeding is one of the most significant threats to livestock genetic diversity. Several studies (Table 1 and Table 2) defining indigenous populations of sheep and goats using microsatellites to characterize their genetic diversity and population dynamics have been conducted yet.

However, due to their low genome-wide variance, microsatellite markers face disadvantages when it comes to genetic characterization and the assessment of the phylogenetic connection (Visser et al., 2004). Later, the goat Single-Nucleotide Polymorphism (SNP) array was commercially accessible and quickly rose to prominence as the marker of choice for genomic research on animals (Mrode et al., 2018). SNPs are now the preferred markers and constitute a trustworthy tool for examining the genetic diversity of animals over the entire genome since they are more informative (Mrode et al., 2018; Ritland, 1996). These markers have made it possible to measure allele frequencies in populations and estimate the degree of genetic diversity (Edea et al., 2013). Breed distinction, genome-wide association studies, and the identification of markers and genes of economic significance have all been made possible by the SNP BeadChip's accessibility (Mrode et al., 2018). As the need for food rises, so does the need for breeders to boost productivity. Genetic characterization helps to safeguard the unique traits of indigenous populations, in contrast to genetic diversity, which has a direct impact on genetic-trait selection techniques and the management of inbreeding (Allendorf et al., 2010).

Table 1. Genetic diversity studies of sheep with microsatellite markers in Turkey

Populations	Location	Marker Density (Microsatellite loci)	n	Ho	He	References
Kıvırcık	Kırklareli	20	54	0.81	0.88	Alarslan et al., 2021; Ameer et al., 2019; Yılmaz et al., 2016, 2015; Öner et al., 2014; Doğan 2009; Meydan, 2008; Koban, 2004
	Aydın	14	30	0.58	0.81	
	Aydın-Bandırma-Uşak	21	246	0.81	0.85	
	Uşak	17	69	0.74	0.81	
	Bursa-Manisa-İstanbul	15	100	0.71	0.80	
	Kırklareli	20	36	0.65	0.78	
	Bandırma	7	60	0.48	-	
	Tekirdağ	5	23	0.72	0.77	
Tahirova	Çanakkale	20	51	0.84	0.84	Alarslan et al., 2021
Yalova	Yalova	20	55	0.75	0.87	Alarslan et al., 2021
Eşme	Uşak	20	63	0.82	0.84	Alarslan et al., 2021
Akkaraman	Sivas	14	30	0.78	0.80	Ameer et al., 2019; Doğan 2009; Koban, 2004
	Konya	20	39	0.65	0.78	
	Konya-Ankara-Erzurum-Ağrı	5	52	0.67	0.79	
Şavak	Elazığ	29	291	0.57	0.81	Özmen et al., 2020
Kangal	Sivas	29	60	0.32	0.67	Özmen et al., 2020; Karlı et al., 2020; Koban, 2004
	Sivas	21	30	0.60	0.81	
	Sivas	5	22	0.73	0.75	
Karakas	Diyarbakır	29	58	0.28	0.64	Özmen et al., 2020; Karlı et al., 2020; Yılmaz et al., 2014
	Van	21	30	0.66	0.78	
	Van	18	16	0.67	0.74	
Güney Karaman	Antalya	21	30	0.61	0.78	Karlı et al., 2020; Akay et al., 2020; Ameer et al., 2019
	Konya	16	119	0.81	0.84	
	Konya	14	30	0.72	0.74	
Morkaraman	Elazığ-Bingöl Border	29	60	0.18	0.66	Özmen et al., 2020; Yılmaz et al., 2014; Doğan 2009; Koban, 2004
	Erzurum	18	20	0.60	0.80	
	Erzurum	20	50	0.68	0.76	
	Erzurum-Kars-Ağrı-Iğdır	5	35	0.70	0.77	
Norduz	Van	29	58	0.25	0.66	Özmen et al., 2020; Karlı et al., 2020; Yılmaz et al., 2014; Koban, 2004
	Van	21	30	0.66	0.79	
	Van	18	15	0.68	0.78	
	Van	5	26	0.75	0.76	

Table 1. Genetic diversity studies of sheep with microsatellite markers in Turkey (cont.)

Populations	Location	Marker Density (Microsatellite loci)	n	Ho	He	References
Awassi	Şanlıurfa	29	67	0.23	0.66	Özmen et al., 2020; Yılmaz et al., 2014; Doğan 2009; Meydan, 2008; Koban, 2004
	Diyarbakır	18	22	0.72	0.82	
	Şanlıurfa	20	38	0.59	0.75	
	Diyarbakır	7	60	0.28	-	
	Konya	5	35	0.71	0.79	
Karayaka	Samsun-Ordu-Giresun-Tokat	9	64	0.30	0.89	Kırıkçı et al., 2020; Yılmaz et al., 2014; Doğan 2009; Koban, 2004
	Samsun-Tokat	18	18	0.69	0.79	
	Ordu-Tokat	20	44	0.68	0.77	
	Samsun-Ordu	5	57	0.75	0.79	
Karacabey Merino	Bandırma	14	30	0.67	0.76	Ameur et al., 2019; Yılmaz et al., 2015; Öner et al., 2014
	Bandırma	17	91	0.57	0.78	
	Bursa	15	34	0.72	0.75	
Konya Merino	Konya	5	29	0.70	0.75	Koban, 2004
Sakız (Chios)	Aydın	13	61	0.62	0.84	Yılmaz et al., 2018, 2015, 2014; Meydan, 2008
	Bandırma	17	41	0.66	0.75	
	Aydın	18	37	0.69	0.78	
	Bandırma	7	30	0.37	-	
Gökçeada (İmroz)	Bandırma	13	30	0.65	0.74	Yılmaz et al., 2018, 2015; Doğan 2009; Meydan, 2008
	Bandırma	17	49	0.64	0.73	
	Çanakkale	20	31	0.68	0.71	
	Bandırma	7	30	0.31	-	
Çine Çapari	Aydın	13	30	0.72	0.70	Yılmaz et al., 2018, 2014, 2013; Cemal et al., 2013
	Aydın	18	30	0.70	0.71	
	Aydın	10	123	0.73	0.78	
	Aydın	10	123	0.73	0.78	
Karya	Aydın	18	30	0.71	0.80	Yılmaz et al., 2014, 2013
	Aydın	10	117	0.76	0.77	
Tuj	Erzurum	18	16	0.62	0.80	Yılmaz et al., 2014
Pırlak	Eskişehir	15	31	0.63	0.78	Öner et al., 2014
Hemşin	Artvin-Ardahan	5	34	0.69	0.77	Koban, 2004
Dağlıç	Afyon	20	42	0.70	0.78	Doğan 2009; Koban, 2004
	Denizli-Muğla-Burdur-Afyon	5	64	0.76	0.77	
Hamdani	Van	5	22	0.71	0.71	Koban, 2004
Türk Geldi	Tekirdağ	5	24	0.68	0.69	Koban, 2004

Table 2. Genetic diversity studies of goats with microsatellite markers in Turkey

Populations	Location	Marker Density (Microsatellite loci)	n	Ho	He	References
Hair	Aydın, Denizli	18	100	0.78	0.84	Tefiel et al., 2020; Karşı
	Antalya	20	60	0.75	0.85	et al., 2020; Gül et al.,
	Hatay	22	60	0.82	0.87	2020; Gümüş, 2018;
	Denizli, Muğla, Antalya, Burdur	9	43	0.75	0.83	Bulut et al., 2016; Gürler
	-	11	32	0.70	0.73	and Bozkaya, 2013;
	Siirt	3	40	0.89	0.84	Ağaoğlu and Ertuğrul,
	Denizli	20	52	0.78	-	2012
Damascus (Shami)	Gaziantep	18	40	0.77	0.88	Tefiel et al., 2020; Gül et
	Hatay	22	62	0.81	0.86	al., 2020; Bulut et al.,
	-	11	32	0.73	0.78	2016; Gürler and
	Şanlıurfa	3	40	0.83	0.84	Bozkaya, 2013
Kilis	Kilis	22	64	0.74	0.84	Gül et al., 2020; Gümüş,
	Gaziantep, Kilis	9	41	0.78	0.77	2018; Bulut et al., 2016;
	Kilis	11	32	0.65	0.75	Gürler and Bozkaya,
	Kilis	3	40	0.81	0.84	2013; Ağaoğlu and
	Kilis	20	51	0.78	-	Ertuğrul, 2012
Ankara (Angora)	Ankara	9	50	0.70	0.79	Gümüş, 2018; Bulut et al.,
	-	11	43	0.72	0.77	2016; Ağaoğlu and
	Ankara	20	50	0.78	-	Ertuğrul, 2012
Honamlı	Antalya	20	30	0.69	0.83	Karşı et al., 2020;
	Konya, Antalya, Burdur	9	50	0.79	0.81	Gümüş, 2018; Bulut et al.,
	-	11	32	0.72	0.72	2016; Ağaoğlu and
	Konya, Burdur	20	49	0.79	-	Ertuğrul, 2012
Norduz	Van	20	21	0.70	0.80	Karşı et al., 2020;
	Van	20	49	0.79	-	Ağaoğlu and Ertuğrul,
Hatay (Yayladağ)	Hatay	22	60	0.76	0.87	Gül et al., 2020; Bulut et
	Hatay	11	32	0.69	0.73	al., 2016
Kabakulak	Antalya	20	30	0.73	0.83	Karşı et al., 2020
Saanen	-	11	28	0.62	0.68	Bulut et al., 2016
Alpine	-	11	13	0.70	0.72	Bulut et al., 2016

When we consider the number of studies that have been carried out in Turkey using an SNP array, we find that they are limited to the most recent studies. These studies have generally focused on Genome-Wide Association Studies (GWAS) rather than genetic characterization. The genetic architecture of growth and linear type features in Akkaraman sheep was examined by Kızılaslan et al. (2022). A highly favorable genetic/phenotypic association was found between height and body type, they reported. In addition, animal mixed-model-based genome-wide association analysis located two SNPs across the entire genome and nineteen across individual chromosomes that were significantly associated with the traits of interest. By conducting genome-wide association studies, Arzik et al. (2022a) wanted to determine the heritability of the genome and the effect of genetic background on blood parameters in Akkaraman sheep. Using genomic heritability estimations and genome-wide association studies, the same team of researchers looked at the genetics of resistance to gastrointestinal parasites (nematodes, *Moniezia* spp., *Eimeria* spp.) in Akkaraman sheep. Two genome-wide significant SNPs related to the *TNEM3* and *ATRNL1* genes and ten chromosome-wide significant SNPs were proposed as candidates for parasite resistance features at the conclusion of the study (Arzik et al., 2022b). Investigation on preweaning growth and in vivo carcass composition parameters in Esme sheep identified three genome-wide and fourteen chromosome-wide relevant SNPs, as determined by Yılmaz et al. (2021). Some of the detected SNPs were found to be shared by weaning weight, average daily weight gain, and *L. dorsi* muscle depth, which is regarded as evidence of a shared genetic background between the two trait groups in their study. In addition, 18 candidate genes were proposed to direct further research into their possible relevance to preweaning growth and in vivo carcass composition features in sheep. In another study, to identify novel SNPs and genes associated with mastitis resistance in Assaf sheep, a genome-wide association study was performed using the Illumina Ovine Infinium® HD SNP BeadChip (Öner et al. (2021). In the study of population structure, the existence of a population substructure in the Karayaka sheep breed was explored. Phylogenetic analysis revealed that the fixation index (F_{ST}) and genetic distance between Karayaka subpopulations are comparable to those reported between certain Turkish sheep breeds. At the end of the analysis, researchers concluded that Karayaka sheep have a considerable population substructure. This result could likely be generalized to other ovine breeds given that breeds do not behave as single panmictic populations and notably, population substructure can have negative consequences on the maintenance of breed diversity and is a significant confounding variable in genome-wide association analyses (Kırıkçı et al., 2018).

4. CONSERVATION STRATEGIES

Livestock conservation studies should be undertaken on a breed-by-breed basis. This allows for a more complete picture of the genetic variety and structure among populations, and hence the ability to formulate effective conservation policies.

Animal genetic diversity is the result of a very lengthy evolutionary process. Some animal species divide into distinct reproductive groups within their geographic range as a result of domestication. The artificial or natural selection causes reproductively isolated groups to diverge over many generations. As a member of the Fertile Crescent, Turkey holds a significant position in domesticating the native populations of the region. Therefore, the diversity of indigenous sheep and goat breeds is substantial (Karaca et al., 2011).

High genetic diversity is related to being close to the center of domestication, as well as to the loci. It also occurs because of mixing resulting from migrations, or in the absence of absolute isolation between breeds, or because some breeds are being held under less selection pressure. For example, two breeds with similar genetic diversity may exhibit high genetic diversity, while one is an extension of the ancestral breed, while the other is a crossbreed of two breeds of domestication of two sheep domesticated at different times, with weakened genetic diversity. In such a case, preserving the first breed, which is more likely to have non-missing alleles in general, especially rare alleles, due to its long presence in the domestication center and its adaptation to these regions, may take precedence over the preservation of alleles that are thought to be present at the center and have potential to be used (Bruford et al., 2003).

The term "breed at risk" refers to any animal population that faces extinction unless certain threats are mitigated. There are several possible causes that could lead to the extinction of a breed. A factor contributing to the increased likelihood of extinction is the shrinking size of the population. The direct

and indirect effects of agricultural policies implemented on the farm, on the country or at international levels such as lack of proper breeder organization, lack of adaptation to market demands or perceived as low yield crossbreeding pose the risk of extinction of breeds. Breeds are categorized according to their risk status according to the actual numbers of male and/or female breeding individuals and the percentage of pure breed female, individuals, among others (Soysal et al., 2020).

Because of production-oriented genetic modifications, a significant number of livestock breeds are extinct or on the verge of extinction as of this day. Transferring genetic variation between breeds into the future is of tremendous cultural, scientific, and economic importance. In Turkey's animal husbandry, sheep have a high genetic potential, a large population, and a wide variety of breeds and local types that have developed in response to various ecological situations. Recently, considerable genetic changes have been discovered in sheep populations in Western Anatolia. These changes, along with the continued strengthening of agricultural practices, have posed a threat to the continued existence of native breeds. The most common cause of genetic change is the mating of such breeds with genotypes that are more prevalent (Karaca et al., 2011).

Sheep in Turkey's animal husbandry have a lot of genetic potential thanks to the country's high sheep population and the wide variety of breeds and local types that have developed there because of the country's varied culture. The survival of indigenous Turkish sheep breeds has been in jeopardy for decades due to the rapid genetic shifts seen in Western Anatolia's sheep

Populations due to agricultural intensification have been declining in recent years. Some breeds, such as the Odemis, have become extinct or endangered (Daglic, Cine Capari, Sakiz, Kivircik) in just the last two or three decades. The efforts made to characterize and conserve the Cine Capari sheep breed is an excellent example of conservation efforts. With the help of Adnan Menderes University researchers and the Ministry of Food, Agriculture, and Animal Husbandry, the decreasing trend in animal populations has been reversed. Continued research has halted the process of the breed going extinct and ensured that the breed will continue to exist in the future. (Karaca et al., 2011; Karaca & Cemal, 1998).

The Ministry of Agriculture and Forestry, the General Directorate of Agricultural Research and Policies (TAGEM, in Turkish abbr.) The Breed Registration Commission, and the Animal Genetic Resources Protection Commission cooperate to conserve genetic resources in our nation. In the "National Project for the On-Site Protection and Development of Animal Genetic Resources," which was initiated by the Ministry of Agriculture and Forestry in 2005 and is ongoing, pure breeding and breed-based breeding of sheep and goats are conducted. Conservation and sustainable use of Animal Genetic Resources involves ex situ in vivo preservation in special conservation herds outside their natural habitat, in situ preservation in the hands of the public in their natural habitat, and ex situ in vitro freezing of genetic material in gene banks.

The objective of the project, which was developed to protect native gene resources, is to protect the samples representing our indigenous breeds, which are at risk of extinction using current methods, to keep these genotypes out of the extinction process, and to provide identification data for our breeds (Soysal et al., 2020). Domestic small ruminants account for most of our 45 million head of total sheep and 12 million head of goat assets (TUİK, 2021). In terms of genetic diversity among animals, sheep breeds are the most diverse, and 45 breeds have been recorded in Turkey through various registry systems (Anonymous, 2004). However, some of our sheep and goat breeds, particularly those that are significant for the preservation of pure breeding lines, are under danger and are thus protected. During the in situ conservation of our domestic animal breeds, the Chios, Çine Çapari, Gökçeada, Kivircik, Herik, Karagül, Norduz, Hemsin, Dağlıç, Karakacan, Tuj sheep breeds, and Ankara, Kilis, Abaza, İspir, Kackar, Gürcü, Halep and Honamlı goat breeds are conserved (Official Gazette, 2012). TAGEM has stated that the Güney Karaman sheep breed (Anonymous, 2023a) and Mahalli goat breed are also under protection (Anonymous, 2023b).

In June 1980, the Republic of Turkey participated in studies on the subject for the first time by sending a delegate to a meeting hosted by the FAO in Rome. In some universities, the importance of genetic resources has been emphasized by discussing the subject in the form of seminars and theses on a theoretical basis, and by discussing the subject in the form of seminars and theses. The "Animal Genetic Resources Protection Project" was initiated in 1995 within the body of the Ministry of Food, Agriculture

and Livestock, General Directorate of Agricultural Research and Policies. The aim of the project is to protect specimens representing our native breeds, which are at risk of extinction, with current methods, to keep these genotypes out of the extinction process, and to provide identifying information for our breeds. The project was initiated with cattle breeds at risk, and expanded to include sheep, goats, buffalo, chicken and silkworms in 1996–1997, and honeybees in 2002. In the program, which was started in 2005 with the aim of protecting domestic breeds of domestic animals in their natural habitats, efforts are being made to protect domestic animal breeds under the threat of extinction in the hands of the public in small herds.

In Turkey, as a third form of the conservation process in addition to on-site and elsewhere protection, carried by TAGEM with the support of the Scientific and Technological Research Council of Turkey (TÜBİTAK, in Turkish abbr); within the scope of TÜRKHAYGEN-I project activities; embryos, semen and tissues of our native breeds are collected and genetic material belonging to the breed of small ruminants is stored in two ex-situ invitro gene banks¹⁸ within the body of International Livestock Research Institute and TUBITAK Marmara Research Center (TÜBİTAK-MAM) (Ertuğrul et al., 2011).

Genetic characterization of native breeds can be considered the first step in the conservation of domestic animal genetic resources. It is important to examine the genetic structures of the breeds to be protected and the genetic relations between these breeds. In addition to this, it is important to ensure the active participation of the public in the conservation program and to expand the protected animal populations. When planning breeding studies, the effects on animal genetic resources should be considered, and measures should be taken to ensure the continuity of pure breeds to apply the use crossbreeding method. Breeder organizations and registration systems are of great importance in terms of providing breed development strategies. Breeding objectives should be evaluated frequently, and the impact of selection on genetic diversity should be considered. Because of the use of breeding biotechnology and molecular techniques for appropriate species in the improvement of domestic animal genetic resources, it will be possible to protect the breeds at risk and to ensure the sustainable use of high-yielding domestic breeds for breeding purposes.

CONCLUSION

Identification of the breed using microsatellite markers with codominant inheritance is particularly useful, as is identifying similarities and differences within and between populations. These markers are also useful for predicting the genetic potential of any animal, allowing for selective breeding to improve the characteristics of that breed. It should also be noted that they have some disadvantages due to their low genome-wide variance. In this context, the introduction of other analysis methods such as SNP array technologies may help to reveal more detailed information. Using molecular genetic definitions, conservation and breeding programs can be designed in a way that will not only preserve valuable gene resources, but also ensure that these resources are maintained for future generations.

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**BİTKİSEL KAYNAKLI GIDALARDAN İZOLE EDİLEN *B. CEREUS* SUŞLARININ BAZI
ANTİBİYOTİKLERE KARŞI DUYARLILIK PROFİLLERİ**
**SUSCEPTIBILITY PROFILES OF *B. CEREUS* STRAINS TOWARDS CERTAIN
ANTIBIOTICS ISOLATED FROM PLANT-DERIVED FOODS**

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ÖZET

B. cereus doğada yaygın olarak bulunan gram pozitif, fakültatif anaerob, sporlu bir bakteridir. Sıklıkla baharat, et, süt, tahıl ve bakliyat gibi kuru gıdalardan izole edilmektedir. Dünya genelinde gıda kaynaklı zehirlenmelerin %1,4-%12'sinden *B. cereus*'un sorumlu olduğu bildirilmiştir. *B. cereus* kaynaklı hastalıklar başlıca gastrointestinal ve non-gastrointestinal olarak sınıflandırılmaktadır. Gastrointestinal hastalıklar diyarel ve emetik formda görülmektedir. Çoğunlukla iyi seyirli olmakla birlikte, karaciğer yetmezliği ile ilişkili ciddi ve ölümcül salgınlar bildirilmiştir. Gastrointestinal olmayan formda yara infeksiyonları, keratit, artrit, pnömoni ve sepsisemiye yol açabilmektedir. Özellikle bağışıklığı baskılanmış çocuklarda antibiyotiklerle tedavi gerektiren menenjit ve solunum yolları infeksiyonları gibi ciddi klinik problemlere yol açabilmektedir. Bakterilerde antibiyotik direnç gelişimi ve yayılımı Dünya Sağlık Örgütü tarafından 21. yüzyılın önemli sağlık sorunlarından biri olarak bildirilmiştir. Bu nedenle *B. cereus* gibi gıda kaynaklı patojenlerin, gıda zincirinde aktarılabilir antibiyotik direnç genlerinin tespiti hakkındaki araştırmalar önem kazanmıştır. Çalışmamız bitkisel kaynaklı çeşitli gıdalardan izole edilen *B. cereus* suşlarının bazı antibiyotiklere karşı direnç profillerini saptamak amacıyla gerçekleştirilmiştir. ISO 7932 metoduna göre 152 bitkisel kaynaklı gıdanın % 19,7'sinde; $1,4 \times 10^2$ kob/g- $1,0 \times 10^4$ kob/g arasında *B. cereus* tespit edilmiştir. İzole edilen 30 adet *B. cereus* suşunun sefiksim (5 µg), amoksisilin/klavulonik asit (30 µg), sulphametoksazol/trimetoprim (25 µg), tetrasiklin (30 µg), gentamisin (10 µg), kloramfenikol (30 µg), siprofloksasin (5 µg) ve eritromisin (15 µg) antibiyotiklerini içeren 8 farklı grup antibiyotiğe karşı fenotipik duyarlılık profilleri, Avrupa Antimikrobiyal Duyarlılık Testi Komitesi (EUCAST) yönergelerine göre disk difüzyon yöntemiyle test edilmiştir. Sonuçlar EUCAST kriterlerine göre duyarlı, orta duyarlı veya dirençli olarak yorumlanmıştır. Test edilen 30 adet *B. cereus* suşunun tamamı sefiksim ve amoksisilin/klavulonik asite dirençli bulunmuştur. Suşların %3,4'ünün sulphametoksazol/trimetoprim karşı duyarlı, %6,6'sının orta derecede duyarlı, %90'nın ise dirençli olduğu belirlenmiştir. En yüksek antibiyotik duyarlılığı; kloramfenikol (%100) ve gentamisine (%93,3) karşı iken, tetrasiklin (%56,7) ve eritromisin (%56,7) antibiyotiklerine karşı ise eşit oranda duyarlılık belirlenmiştir. Siprofloksasine karşı, suşların %83,3'ünün orta derecede duyarlı, %16,7'sinin dirençli olduğu saptanmıştır. Sonuç olarak; antimikrobiyal direnç geni yayılımlarının gıda kaynaklı patojenler aracılığıyla da mümkün olması, başta uygun tedavi planlarının oluşturulması ve antibiyotik direnç dağılımlarının izlenebilmesi açısından

antibiyotik duyarlılık profillerinin gıda kaynaklı patojenlerde de belirlenmesinin önemli olduğu düşünülmektedir.

Anahtar Kelimeler: *B. cereus*, antibiyotik direnç, bitkisel kaynaklı gıdalar

ABSTRACT

B. cereus is a gram-positive, facultative anaerobic, spore-forming bacterium commonly found in nature. It is often isolated from dry foods such as spices, meat, milk, grains, and legumes. It has been reported that *B. cereus* is responsible for 1.4%-12% of food-borne poisonings worldwide. *B. cereus* related diseases are classified mainly as gastrointestinal and non-gastrointestinal. Gastrointestinal diseases are seen in diarrheal and emetic forms. Although gastrointestinal diseases are mostly benign, some serious and fatal outbreaks associated with liver failure have also been reported. Non-gastrointestinal diseases can lead to wound infections, keratitis, arthritis, pneumonia, and septicemia. It can cause serious clinical illnesses such as meningitis and respiratory tract infections, especially in immunocompromised children and they need to be treated with antibiotics. The development and spread of antibiotic resistance in bacteria have been reported by the World Health Organization as one of the biggest health problems of the 21st century. As a result, research into foodborne pathogens such as *B. cereus*, which can cause foodborne infections, can be as a source of transferable antibiotic resistance genes in the food chain has gained importance. This study was carried out in *B. cereus* strains isolated from plant-based foods to determine the resistance against various antibiotics profiles. According to the ISO 7932 method, in 19.7% of 152 plant-based foods; *B. cereus* was detected between 1.4×10^2 cfu/g and 1.0×10^4 cfu/g. 30 strains isolated of *B. cereus* were treated with cefixime (5 µg), amoxicillin/clavulanic acid (30 µg), sulphamethoxazole/trimethoprim (25 µg), tetracycline (30 µg), gentamicin (10 µg), chloramphenicol (30 µg). The phenotypic susceptibility/resistance profiles against a total of 8 different groups of antibiotics including ciprofloxacin (5 µg) and erythromycin (15 µg) were tested using the disk diffusion method according to the European Committee for Antimicrobial Susceptibility Testing (EUCAST) guidelines. The results were evaluated according to EUCAST criteria as susceptible, intermediate, or resistant. All of the 30 *B. cereus* strains tested in the study were found to be resistant to cefixime and amoxicillin/clavulanic acid. It was determined that only 3.4% of the strains were susceptible to sulphamethoxazole/trimethoprim, 6.6% were moderately susceptible, and 90% were resistant. It was observed that the highest antibiotic sensitivity was against chloramphenicol (100%) and gentamicin (93.3%), with an equal susceptibility profile to tetracycline (56.7%) and erythromycin (56.7%) antibiotics. Sensitivity to ciprofloxacin was found to be 83.3% of the strains were moderately susceptible and of the 16.7% were resistant. As a result, it is critical to detect antibiotic resistance profiles in foodborne pathogens in order to determine the possibility of antimicrobial resistance genes spreading through these pathogens, develop appropriate treatment plans, and monitor antibiotic resistance distributions.

Keywords: : *B. cereus*, antibiotic resistance, plant-based foods

TAZE KAŞAR PEYNİRLERİNİN DUYUSAL VE TEKSTÜREL ÖZELLİKLERİNİN
MODELENMESİ
MODELLING OF SENSORY AND TEXTURAL PROPERTIES OF FRESH TYPE KASHAR
CHEESES

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ABSTRACT

In this study, we were focus on fundamental textural properties of fresh type Kashar Cheese and how they relate to sensory attributes. Texture analysis are very important in cheese quality control methods. Instrumental texture analysis should be able to predict multiple sensory characteristics of cheeses. For that purposes four regional (Ardahan province) and two country-wide produced fresh type Kashar cheese were selected. For both sensory and instrumental texture measurements, 2 cm cubes were cut. The sensory evaluation was performed by selected thirty consumers panel and instrumental measurements with Texture Analyzer. Hedonic scale for appearance of inside and outside surfaces of cheeses, texture, smell, and taste parameters were scored to sensory evaluation by panel. Taste, smell and appearance descriptors of kashar cheeses were found significantly different ($p<0.01$). For instrumental mechanical properties of Kashar cheeses; Hardness (N), Adhesiveness (mJ), Resilience, Cohesiveness, Spriginess (mm), Gumminess (N) and Chewiness (mJ) values are obtained. There were significant differences among the kashar cheeses in mechanical properties of Adhesiveness ($p<0.05$) and others (hardness, resilience, cohesiveness, spriginess, gumminess and chewiness) observed $p<0.01$. On the other hand, L^* , a^* , and b^* values of Kashar cheeses varied between 75.11 to 86.30, -7.16 to -4.19 and 16.84 to 33.33, respectively. Significant effects of colour values of each kashar cheeses were determined. Multivariate analysis were used to seek correlations between sensory attributes by consumer panel and instrumental texture measurements performed on each fresh type Kashar cheeses. Major finding of this study is that, regional produced fresh type kashar cheeses determined as the most intense sensory descriptors and differentiate from country wide produced cheeses. It also seems to instrumental properties may used identified for predict sensory attributes of geographically indicated kashar cheeses.

Keywords: Kashar Cheese, texture properties, sensory analysis

**FLUKONAZOLÜN *DROSOPHILA MELANOGASTER* (MEIGEN)'İN YAŞAMA, GELİŞME
VE BAZI ERGİN ÖZELLİKLERİNE ETKİLERİ**
**EFFECTS OF FLUCONAZOLE ON SURVIVAL, DEVELOPMENT AND SOME ADULT
TRAITS OF *DROSOPHILA MELANOGASTER* (MEIGEN)**

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ÖZET

Zararlı böcekler ile mücadelede, çevreye ve yararlı organizmalara olumsuz etkisi olan sentetik organik insektisitler yoğun olarak kullanılmaktadır. Bu amaçla toksik olmayan veya daha az çevresel zararı olan kimyasalların kullanılması konusunda çalışmalar yapılmaktadır. Model organizma olarak laboratuvar şartlarında *Drosophila melanogaster* (Meigen) (W1118 Diptera: Drosophilidae) yapay besin ortamında beslenerek klinik öneme sahip ilaç etken maddesi flukonazolün böceğin yaşama oranı, gelişme süresi, ergin ömür uzunluğu, yumurta verimi ve açılma oranı üzerine etkisi incelendi. Böceğin birince evre larvaları flukonazolün 100, 200, 400, 800 ve 1250 mg/L konsantrasyonlarını içeren yapay besinler ile beslendi. *D. melanogaster*'in ergin öncesi evrelerdeki yaşama, gelişme ve ergin özellikleri flukonazolün artan konsantrasyonlarıyla olumsuz yönde etkilendikleri görüldü. Flukonazolün tüm besinsel konsantrasyonları böceğin tüm evrelerindeki yaşama oranını artan konsantrasyonlar ile ters orantılı olarak önemli derecede azalttı. Flukonazolün denen en yüksek konsantrasyonu (1250 mg/L) 3. evreye ulaşan larva oranı ile pup olma oranını % 93,00 ± 2,95'den % 11,00 ± 2,59'e düşürdü. Kontrol besinine bırakılan larvaların % 93,00 ± 2,95'ü ergin evreye ulaşırken en yüksek flukonazol konsantrasyonunda bu oran % 8,00 ± 1,41'e önemli derecede düştü. Kontrol besini ile karşılaştırıldığında en yüksek konsantrasyon olan 1250 mg/L flukonazol içeren besin 3. larval evreye ulaşma ve pup olma süreleri ile ergin olma sürelerini yaklaşık olarak 1,5 gün uzattı. Flukonazolün 400, 800 ve 1250 mg/L'sini içeren besinlerde yetişen erginlerin ömür uzunluğu kontrol besinine kıyasla istatistiksel olarak anlamlı olarak kısaldı. Kontrol besininde erginler ortalama 28,00 ± 0,20 gün yaşarken 1250 mg/L'de bu süre 1,62 ± 0,20 güne düştü. Kontrol besininden elde edilen dişilerden 154,37 ± 3,97 yumurta elde edilmiş olup 400 mg/L konsantrasyondan itibaren yumurta sayısı önemli derecede azaldı. Bu yumurta sayısı 1250 mg/L'lik flukonazol konsantrasyonu tarafından 8,3 ± 0,45'e önemli derecede düşürüldü. Yumurta açılma yüzdesi ise kontrol grubu ile karşılaştırıldığında 100 mg/L flukonazolden itibaren önemli derecede azaldığı belirlendi. Besinlerde 100, 800 ve 1250 mg/L flukonazol içeren konsantrasyonlarda yumurta açılma oranı ortalama % 50 oranında düştü.

Anahtar Kelimeler: Yaşama, Gelişme, *Drosophila melanogaster*, Flukonazol, Ömür Uzunluğu, Yumurta Verimi, Yumurta Açılımı

ABSTRACT

Because of their harmful effects on human and nontarget organisms, organic insecticides are banned or less used for chemically management of pest insects. Researches therefore have been focused on alternative chemicals which are environmentally sound and effective methods to use for controlling pest insects in agricultural area. In the laboratory conditions, the effect of clinically important drug, fluconazole on the survivorship, development, adult longevity, fecundity, hatchability of the model organism *Drosophila melanogaster* (Meigen)'in W1118 (Diptera: Drosophilidae) were investigated. The insects were reared from first-instar larvae on an artificial diets containing, 100, 200, 400, 800 and 1250 mg/L of fluconazole. The findings of this study showed that high dietary concentrations of fluconazole negatively affected on survival, development in pre-mature stages and adult properties of *D. melanogaster*. Significantly negative effects on each developmental stages were observed by all concentrations of the fluconazole. Fluconazole decreased survivorship in each developmental stages of the insect by increased concentrations inversely. The highest concentration of this antifungal agent (1250 mg/L) decreased the survivorship in both of 3rd instars and pupal stage from $93 \pm 2.95\%$ to $11.00 \pm 2.59\%$. While the larvae reached adult stage by $93.00 \pm 2.95\%$ in control diet, this rate in 1250 mg/L which is the highest concentration of fluconazole significantly decreased to $8.00 \pm 1.41\%$. Compared to the control diet, the highest concentration of 1250 mg/L fluconazole extended the times to reach the 3rd larval stage, pupation and adult emergence by approximately 1.5 days. Longevity was significantly increased by 100 mg/L of fluconazole. However, longevity of adults reared in diets containing 400, 800 and 1250 mg/L fluconazole was significantly decreased by fluconazole compared to those in control diets. While the adults survived by 28.00 ± 0.20 days in the control diet, longevity decreased to 1.62 ± 0.20 days in the highest concentration (1250 mg/L). Egg production was decreased by 400 mg/L and higher concentrations of fluconazole. The females from control diet produced 154.37 ± 3.97 eggs but egg number was significantly reduced by 1250 mg/L fluconazole to 8.3 ± 0.45 . Egg hatching rate was decreased by 100 mg/L and higher concentrations. Hatchability in diets containing 100, 800 and 1250 mg/L fluconazole was decreased by 50% compared to the control group.

Keywords: Survivorship, Development, *Drosophila melanogaster*, Fluconazole, Adult longevity, Hatchability, Fecundity

BUĞDAY YETİŞTİRİCİLİĞİ İLE İLGİLİ RİSK FAKTÖRLERİ RISK FACTORS RELATED TO WHEAT CULTIVATION

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ÖZET

Buğday, bütün dünyada temel besinlerin hammaddesi olduğundan diğer tarımsal ürünlere nazaran çok daha önemlidir. Buğday ekmeğın hammaddesi ve dünya üzerinde 50 ülkenin temel besin maddesidir. Tropikal ve subtropikal bölgelerde, yüksek yağışlı nemli iklim, buğday yetiştiriciliği için risk oluşturmaktadır. Yakın zamanda yapılan araştırmalar, iyi geliştirilmiş hava tahmini ile çiftçilerin daha zamanında ekim, ekimden önce daha etkili mesafe bırakma ve koruma uygulamalarının daha geniş kullanımı gibi uyarlanabilir tepkilerinin artırılabilceğini göstermektedir. Diğer taraftan, kuraklık ve yüksek sıcaklıklar gibi risk faktörlerinin, tipik olarak buğdayın ekildiği bölgelerde daha yaygın hale gelmekte olduğu bilinmektedir. Verilen bu risk faktörlerinin son birkaç yılda önemli verim ve kalite kayıplarına ve artan üretim maliyetlerine katkıda bulunduđu gözlemlenmektedir. Bölgelerde buğday yetiştiriciliği, yüksek standartlarda ürün gerektiren ve uygun ekim uygulamaları ile sağlanabilen dış pazarlar nedeniyle günümüzün en önemli ve karlı tarım faaliyetleri arasında yer almaktadır. Genel olarak buğday üretimi için kullanılan ekili alanların oranı da pamuk ve şeker pancarı gibi diğer ürünlere göre azalmış ancak son on yılda buğday küspesine olan talebin artması nedeniyle her yıl artmıştır. Yukarıda verilen bilgilerden hareketle bu çalışmada buğday yetiştiriciliği ile ilgili risk faktörleri ilgili literatür çerçevesinde tartışılacaktır.

Anahtar Kelimeler: Buğday, Kuraklık, Risk Faktörleri

ABSTRACT

Wheat is much more important than other agricultural products as it is the raw material for staple foods around the world. Wheat is the raw material for bread and a staple food in 50 countries around the world. In tropical and subtropical regions, humid climates with high rainfall pose a risk to wheat production. Recent research shows that a better-developed weather forecasting can improve farmers' adaptive responses, such as more timely planting, more effective preplant spacing and wider use of crop protection practices. On the other hand, risk factors such as drought and high temperatures are known to be increasing in regions where wheat is typically grown. These risk factors have been observed to contribute to significant yield and quality losses and increased production costs in recent years. Wheat cultivation in these regions is one of the most important and profitable agricultural activities today due to the high product standards required and the external markets that can be secured through appropriate cultivation practices. In general, the proportion of arable land used for wheat production has decreased compared to other crops such as cotton and sugar beet, but has increased each year over the last decade due to the growing demand for wheat flour. Based on the above information, this study will discuss the risk factors associated with wheat cultivation in the context of the relevant literature.

Keywords: Drought, Risk Factors, Wheat,

FARKLI SENTETİK VE ORGANİK GÜBRE UYGULAMALARININ SİLAJLIK MISIR (ZEA MAYS)'DA BAZI VERİM VE KALİTE ÖZELLİKLERİNE ETKİSİ
EFFECTS OF DIFFERENT SYNTHETIC AND ORGANIC FERTILIZER APPLICATIONS ON SOME YIELD AND QUALITY CHARACTERISTICS OF SILAGE CORN (ZEA MAYS)

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ÖZET

Hayvan beslenmesinin en önemli eksiklerinin başında, sağlıklı, kaliteli ve besin değeri yüksek yem ihtiyacı gelmektedir. Son zamanlarda yapılan araştırmalar, sağlıklı yem ihtiyacının giderilmesi amacıyla kimyasal gübre uygulamalarının yönetilmesi üzerinde olmaktadır. Bu nedenle bu çalışma, farklı sentetik ve organik gübre uygulamalarının, RX-9292 silajlık mısır çeşidi üzerinde bazı verim ve kalite özelliklerine olan etkilerin belirlenmesi amacıyla kurulmuştur. Tesadüf blokları deneme desenine göre 3 tekerrürlü olarak kurulan denemede, kontrol, sentetik gübre/1 (20N;8P,8K), sentetik gübre/2 (24N;10P;10K), organik gübre /1 (tavuk gübresi 250kg/da), organik gübre/2 (büyükbaş hayvan gübresi 300kg/da), organik gübre/3 (organik solucan gübresi 300kg/da) olmak üzere 6 farklı gübre uygulaması yapılmıştır. Bu amaçla, bitkide kuru ağırlık, NDF (%), ADF (%), ADL (%), silaj kuru madde oranı (KMO), ilk koçan yüksekliği, koçan ağırlığı, bitki kuru ağırlığı (gr./4 bitki), koçan sayısı, bitki boyu, gövde çevre uzunluğu, bitkide koçan sayısı gibi verim ve kalite özellikleri incelenmiştir. Sonuç olarak, ADF (%) 20,11 ± 0,06-30,55 ± 0,01; NDF (%) 38,9 ± 0,1-57,31 ± 0,02; ADL (%) 2,06 ± 0,01-3,35 ± 0,03; silaj kuru madde oranı (KMO) (%) 22,19 ± 0,02-27,69 ± 0,02; bitki kuru ağırlığı (gr./4 bitki) 778-1508 gr.; ve koçan sayısı 1,00 ± 0,00-1,13 ± 0,12 adet; bitki boyu 183,00 ± 8,81-213,60 ± 7,01 cm.; gövde çevre uzunluğu 8,67 ± 0,61-10,93 ± 0,83 cm. değerleri elde edilmiştir. Elde edilen bu veriler ile hem sentetik hem de organik gübre uygulamalarının, (toprak besin maddelerince zengin olmasına rağmen) silajlık mısırdaki verim ve kalite değerlerinde artışa neden olduğu ve sentetik gübre uygulamalarının organik gübrelerle göre daha avantajlı olduğunu göstermektedir. Ancak sentetik gübrelerin çevreye verdiği zararlar dikkate alındığında ve organik gübre uygulamalarının hayvan sağlığı açısından önemli olması nedeniyle organik gübrelemenin daha uygun olacağı düşünülmektedir.

Anahtar Kelimeler: Kimyasal Gübre, Organik Gübre, Silajlık Mısır

ABSTRACT

One of the most important deficiencies in animal nutrition is the need for healthy, high quality and nutritious feed. Recent research have focused on the management of chemical fertilizer applications to meet the need for healthy feed. Therefore, this study was established** to determine the effects of different synthetic and organic fertilizer applications on some yield and quality characteristics of silage maize variety RX-9292. In the experiment, which was designed according to randomized block design with 3 replications, 6 different fertilizer treatments were applied as control, which are as follows; synthetic fertilizer/1 (20N;8P,8K), synthetic fertilizer/2 (24N;10P,10K), organic fertilizer/1 (poultry

manure 250kg/da), organic fertilizer/2 (cattle manure 300kg/da), organic fertilizer/3 (organic vermicompost 300kg/da). For this purpose, yield and quality traits such as plant dry weight, NDF (%), ADF (%), ADL (%), silage dry matter ratio (DMR), first cob height, cob weight, plant dry weight (g./4 plants), number of cobs, plant height, stem circumference length, and number of cobs per plant were analyzed. As a result, ADF (%) 20.11 ± 0.06 - 30.55 ± 0.01 ; NDF (%) 38.9 ± 0.1 - 57.31 ± 0.02 ; ADL (%) 2.06 ± 0.01 - 3.35 ± 0.03 ; silage dry matter ratio (DMR) (%) 22.19 ± 0.02 - 27.69 ± 0.02 ; plant dry weight (gr. /4 plants) 778-1508 g; number of cobs 1.00 ± 0.00 - 1.13 ± 0.12 ; plant height 183.00 ± 8.81 - 213.60 ± 7.01 cm; stem girth 8.67 ± 0.61 - 10.93 ± 0.83 cm. These data show that both synthetic and organic fertilizer applications (although rich in soil nutrients) caused an increase in yield and quality values in silage maize, and synthetic fertilizer applications were more advantageous than organic fertilizers. However, given the environmental damages caused by synthetic fertilizers and the importance of organic fertilization for animal health, organic fertilization is considered more appropriate.

Keywords: Chemical Fertilizer, Organic Fertilizer, Silage Maize,

**KUZEYBATI AZERBAIJAN'DA YETİŞTİRİLEN BAZI FINDIK ÇEŞİT ve
GENOTİPLERİNİN MEYVE ÖZELLİKLERİ**
**NUT CHARACTERISTICS OF SOME HAZELNUT VARIETIES AND GENOTYPES IN
NORTHWEST AZERBAIJAN**

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ÖZET

Fındık, Azerbaycan ekonomisine gelir sağlayan önemli bir bitki türüdür. Azerbaycan'da fındık yetiştirilen alanlar her geçen yıl artmaktadır. Fındık tarımının sürdürülebilir olması için verim ve kalitesi yüksek olan çeşitlerle yetiştiricilik yapılmalıdır. Bu nedenle çeşit seçimi önemlidir. Azerbaycan'da en fazla yetiştirilen fındık çeşidi 'Atababa'dır. Fakat bu çeşide göre daha verimli çeşitler elde edilmek istenmektedir. Bu çalışmada kuzeybatı Azerbaycan'da yetiştirilen bazı fındık çeşitleri ('Atababa', 'Galip' ve 'Saçaklı') ile bunlara alternatif olarak gösterilen çok verimli genotiplerin (Balakan 1 ve Balakan 2) verim ve meyve özellikleri belirlenmiştir. Bu amaçla, çotanaktaki meyve sayısı, çatlak meyve oranı, meyve ağırlığı, iç ağırlığı, iç oranı ve sağlam iç oranı incelenmiştir. Araştırmada incelenen çeşit ve genotiplerde çotanaktaki meyve sayısı 2.58-3.78, boş meyve oranı % 2.33-5.06, meyve ağırlığı 1.40-1.99 g, iç ağırlığı 0.57-0.97 g, iç oranı % 37.5-53.1 ve sağlam iç oranı % 94.4-99.2 arasında değişmiştir. Araştırmada çotanaktaki meyve sayısı en yüksek 3.78 ile 'Saçaklı' çeşidinde belirlenmiştir. Boş meyve ve sağlam meyve oranları bakımından çeşit-genotipler arasında farklılık bulunmamıştır. Meyve ağırlığı en yüksek 'Saçaklı' ve 'Atababa' çeşitlerinde (sırasıyla 1.99 g ve 1.98 g), en düşük ise 1.40 g ile Balakan 1 genotipinde tespit edilmiştir. İç ağırlığı en yüksek 0.97 g ile 'Atababa' çeşidinde, en düşük ise Balakan 2 ve Balakan 1 genotiplerinde (sırasıyla 0.62 g ve 0.57 g) tespit edilmiştir. İç oranı değeri en yüksek % 53.1 ile 'Galip' çeşidinde, en düşük ise % 40.6 ile Balakan 1 genotipinde belirlenmiştir. Araştırma sonucunda 'Galip' çeşidinin meyve kalitesinin 'Atababa' çeşidine göre daha yüksek olduğu, Balakan 2 ve Balakan 1 genotiplerinin iç oranlarının çok düşük olması nedeniyle yetiştiriciliğe değer bulunmadıkları tespit edilmiştir.

Anahtar kelimeler: Atababa, Saçaklı, Galip, iç oranı, meyve ağırlığı

ABSTRACT

Hazelnut is an important plant species that provides income to the Azerbaijani economy. Hazelnut growing area is increasing every year in Azerbaijan. In order for hazelnut cultivation to be sustainable, hazelnut cultivars have high yield and quality should be cultivated. Therefore, the cultivar choice is important. 'Atababa' is the common grown hazelnut cultivar in Azerbaijan. However, it is desired to obtain more productive cultivars than this cultivar. In this study, yield and nut characteristics of some hazelnut cultivars ('Atababa', 'Galip' and 'Saçaklı') and very productive genotypes (Balakan 1 and Balakan 2) in northwest Azerbaijan. For this purpose, nut number per cluster, cracked nut ratio, nut weight, kernel weight, kernel ratio and good kernel ratio were investigated. The number of nuts per cluster differed between 2.58-3.78, rate of empty nut differed between 2.33-5.06%, nut weight differed between 1.40-1.99 g, the kernel weight differed between 0.57-0.97 g, kernel ratio differed between 37.5-53.1% and the good kernel ratio differed between 94.4-99.2% in the cultivar and genotypes. In the study, the highest number of nuts per cluster was determined as 3.78 in the 'Saçaklı' cultivar. There was no difference between cultivar-genotypes in terms of empty nut and good kernel ratios. The highest nut weight was determined in 'Sacakli' and 'Atababa' cultivars (1.99 g and 1.98 g, respectively), and the lowest in Balakan 1 genotype with 1.40 g. The highest kernel weight was determined in 'Atababa' cultivar with 0.97 g, and the lowest in Balakan 2 and Balakan 1 genotypes (0.62 g and 0.57 g, respectively). The highest kernel ratio was determined in the 'Galip' cultivar with 53.1%, and the lowest in the Balakan 1 genotype with 40.6%. As a result of the research, it was determined that the nut quality of 'Galip' cultivar was higher than 'Atababa' cultivar, Balakan 2 and Balakan 1 genotypes were not found to be worthy of cultivation due to their very low kernel ratios.

Keywords: Atababa, Sacakli, Galip, kernel ratio, nut weight

**SÜT SAĞIM MAKİNALARINDA HIZLI MASAJIN PNÖMATİK PULSATÖR ÜZERİNDE
TASARIMI VE OPTİMİZASYONU¹**
**DESIGN AND OPTIMIZATION OF RAPID MASSAGE ON PNEUMATIC PULSATOR IN
MILKING MACHINES***

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ÖZET

Sütün sağımı sürecinde sağım makinasındaki vakum seviyesi, nabız (pulsasyon) hızı, nabız oranı vb. sağım parametreleri sütün kalitesi ve miktarı üzerinde önemli etkiye sahiptir. Sağım için gerekli vakum, makinadaki vakum pompası tarafından karşılanmakta, sağımın tekniğine uygun yapılması ise nabız aygıtı (pulsatör) tarafından kontrol edilmektedir. Pulsatörler, meme lastiği ve onu çevreleyen sert kılıf arasındaki nabız odasını vakuma ve atmosfere bağlayarak meme lastiğinin saniyede bir kez açılıp kapanmasını (yani nabız atmasını) sağlayan valflerdir. Nabız odası vakum etkisinde iken meme lastiği açık kalmakta ve sütün emilme işlemi gerçekleşmekte, nabız odası atmosfer havası etkisine girdiğinde ise meme lastiği içe büzüşerek hayvanın meme başını sıkma yani masaj etkisinde tutmaktadır. Pulsatörlerin mekanik, hidrolik, pnömatik ve elektronik tipleri mevcut olup pnömatik ve elektronik tipler en yaygın kullanılan çeşitleridir.

İnek ve manda gibi süt hayvanlarının sağım performansını artırmak için sağım öncesi ve/veya sağım sonuna doğru oksitosin salgısını harekete geçirecek veya devam ettirecek uyarım (stimülasyon) etkisinin belirli bir süre (30 ila 120 saniye arasında) uygulanması önemlidir. Uyarım işlemi sağımcı tarafından manuel yapılabilirdi gibi, modern sağım sistemlerinde hızlı pulsasyon (hızlı masaj) özelliğe sahip elektronik pulsatörler tarafından da gerçekleştirilmektedir. Diğer yandan pnömatik bir pulsatörün nabız sayısı değişimi, aygıtın üzerindeki ayar vidasından manuel olarak yapılabilir. Ancak, inek ve manda gibi hayvanların sağımı sırasında pulsatörün kısa süre için hızını artırıp tekrar normale düşürmek hem kolay değil hem de hassas yapılamaz.

Bu araştırmanın amacı pnömatik pulsatör normal sağım pulsasyonunda çalışırken, istenildiğinde hızlı masaja pratik şekilde ulaşabilmesini sağlayacak tasarımı yapabilmektir. Pnömatik pulsatörün gövdesi üzerinde yapılan yeni bir tasarım ile makine normal pulsasyonda (ort. 60 nabız/min) sağım yaparken, pulsasyon hızının bir valf yardımıyla 200 nabız/min üzerine çıkarılması kolaylıkla değiştirilebilmiştir. Pulsatör üzerindeki hızlı masaj, yani hızlı nabız sayısı, hayvan cinsine ve sağım fizyolojisine göre, gerektiğinde 200 ila 300 nabız/min aralığında ayarlanabilmektedir. Pulsatördeki bu pratik tasarım, sağımcıya sadece bir valfi çevirerek hızlı şekilde hem normal sağım hem de uyarım işlemini anlık değiştirme kolaylığı sağlamıştır. Tasarımı yapılan pnömatik pulsatör, güçlümlü bir sağım makinasında kuru sağım koşullarında elektronik bir nabız ölçüm cihazı ile testlere tabi tutulmuştur. Testlerde 40, 45 ve 50 kPa çalışma vakumları seçilmiş ve her vakumdaki normal sağım hızı 60 nabız/min olarak kabul edilmiştir. Pulsatör hızlı masaja dönüştürüldüğünde normal sağım hızı seçilen çalışma vakumlarında sırasıyla ortalama 220, 232 ve 240 nabız/min sayılarına yükselmiştir. Ölçülen hızlı nabız sayılarındaki vakum değerleri ise sırasıyla ortalama 29, 32 ve 35 kPa değerlerine düşmüştür.

Anahtar Kelimeler: Pnömatik pulsatör, Nabız hızı, Oksitosin, Hızlı masaj, Vakum seviyesi.

¹ Bu çalışma birinci yazarın devam eden yüksek lisans tezinden türetilmiştir.

* This study is derived from the first author's ongoing master's thesis.

ABSTRACT

During the milking process, the vacuum level in the milking machine, pulse (pulsation) rate, pulse ratio etc. Milking parameters have a significant effect on the quality and quantity of milk. The vacuum required for milking is met by the vacuum pump in the machine, and the milking technique is controlled by the pulsator. Pulsators are valves that allow the liner to open and close (i.e., pulsation) once a second by connecting the pulsator chamber between the liner and the surrounding rigid sheath to the vacuum and atmosphere. While the pulse chamber is under the vacuum effect, the liner remains open and the milk is sucked in. There are mechanical, hydraulic, pneumatic and electronic types of pulsators, and pneumatic and electronic types are the most widely used types.

In order to increase the milking performance of dairy animals such as cows and buffaloes, it is important to apply the stimulation effect for a certain period of time (between 30 and 120 seconds), which will activate or maintain oxytocin secretion before milking and/or towards the end of milking. Stimulation can be done manually by the milker, or by electronic pulsators with fast pulsation (stimulation) feature in modern milking systems. On the other hand, the pulse rate change of a pneumatic pulsator can be done manually from the adjustment screw on the device. However, during milking of animals such as cows and buffaloes, increasing the speed of the pulsator for a short time and reducing it to normal again is not easy and cannot be done sensitively.

The aim of this research is to design the pneumatic pulsator that will enable practical access to rapid massage when required while operating in normal milking pulsation. With a new design made on the body of the pneumatic pulsator, it was possible to easily change the pulsation rate above 200 pulses/min with the help of a valve while the machine was milking at normal pulsation (average 60 pulses/min). The rapid massage on the pulsator, that is, the rapid pulse rate, can be adjusted within the range of 200 to 300 pulses/min, if necessary, depending on the animal breed and milking physiology. This practical design in the pulsator provided the milker with the convenience of instantaneously changing both normal milking and stimulation processes by simply turning a valve. The designed pneumatic pulsator was tested with an electronic heart rate measuring device in dry milking conditions in a hopper milking machine. Working vacuums of 40, 45 and 50 kPa were selected in the tests and the normal milking rate in each vacuum was accepted as 60 pulses/min. When the pulsator was converted to rapid massage, the normal milking rate increased to 220, 232 and 240 pulses/min, respectively, at the selected working vacuums. Vacuum values in the measured fast pulse rates decreased to the average values of 29, 32 and 35 kPa, respectively.

Keywords: Pneumatic Pulsator, Pulsation rate, Oxytocin, Rapid massage, Vacuum level.

1. GİRİŞ

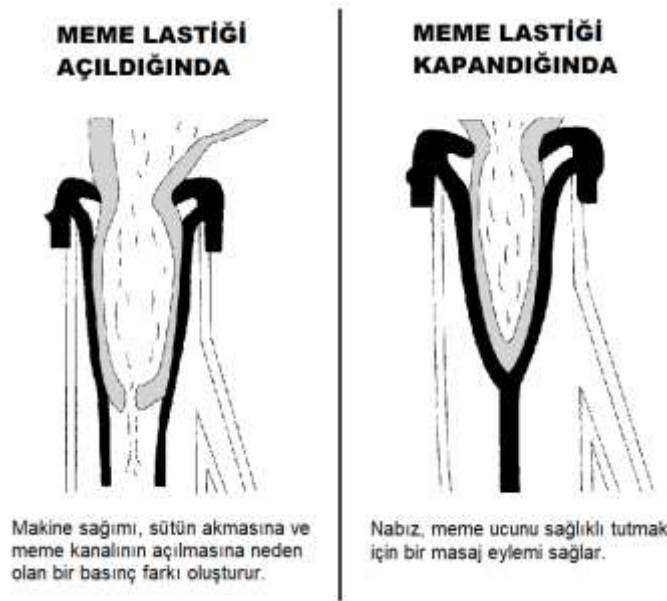
Tüm süt sağım makineleri, süt hayvanlarının hassas meme dokusuna fazla zarar vermeden verimli, eksiksiz ve güvenli bir şekilde sağım yapmak için tasarlanmaktadır. Sağım makinesi hangi marka ve tipte olursa olsun; vakum pompası ve motoru, vakum regülatörü, pulsasyon sistemi, vakum sağlamak için boru-hortum sistemi, süt taşıma sistemi (süt borusu, hortumu, güğümü, kabı vb.) ve sağım başlığı gibi aynı temel bileşenlere sahiptir. Bir sağım başlığı; bir adet süt pençesi ve 4 adet memelikten (meme kadehi) oluşur (Ohnstad, 2011).

Bir sağım makinesindeki pulsasyon (nabız) sistemi; meme (emzik) lastiğini çevreleyen bölümdeki basınçta (vakum) döngüsel değişikliklere izin vermektedir. Bu, meme kadehinin içindeki meme lastiğinin açılmasına ve hayvanın meme başından sütün akmasını sağlar. Ardından meme lastiğini hayvanın meme başının etrafında kapatarak meme dokusuna masaj yapar ve bu sayede tıkanıklığı azaltır (Anonim, 2023).

Tüm pulsasyon sistemleri, bir pulsatörden, bir vakum kaynağından ve pulsatörü meme başı kadehi ile meme lastiği arasında oluşturulan nabız odasına bağlayan bağlantı boru hattı ve esnek puls hortumlarından oluşmaktadır. Pulsasyonun amacı ise, makine sağımı sırasında meme dokularında meydana gelen ve inek rahatsızlığına, meme başı tıkanıklığına ve potansiyel olarak meme ucu hasarına (hiperkeratoz) yol açabilen tıkanıklık ve ödem miktarını sınırlamaktır. Pulsasyon, her nabız döngüsünde

meme başından yüksek oranda süt akışının korunmasına ve iyi süt akışını teşvik etmeye yardımcı olur (Grinchenko et al., 2016; Anonim, 2023).

Pulsatör, vakum ve atmosfer havasını meme lastiği ve onu çevreleyen kadeh (kılıf) arasında değiştiren ve sağım sürecinden sorumlu olan cihazdır. Bir nabız döngüsünün iki aşaması vardır. Meme ucundaki vakum, sütü bir basınç farkıyla uzaklaştırır. Buna açık kalma veya sağım aşaması denir. Masaj veya dinlenme aşaması ise, pulsatörün lastik ve kılıf arasındaki hazneye (nabız odası) atmosfer havasını kabul etmesiyle başlar. Bu, meme ucundaki lastiği çöktürür ve memeye masaj sağlar. Bu aşamada süt akışı yavaşlar ve durur. Memeliklerin nabız odasındaki sağım ve masaj aşamaları Şekil 1’de gösterilmiştir. Masaj döngüsü gereklidir, çünkü sağım döngüsü sırasında süt vakumla çıkarılırken, bu vakum aynı zamanda kan ve vücut sıvılarını meme ucuna çeker. Yeterli masaj yapılmadığında meme ucu ve meme başı zarar görebilir ve bu da mastitisin artmasına neden olabilir. Bu eylem pulsatörü sağım sürecinde çok önemli hale getirir. Sağım aşamaları yeterince gerçekleştirilmezse çeyrekler (herbir memelik) sağılmaz veya çok yavaş sağılır. Masaj aşaması gerçekleşmez ise meme başında ödem oluşur ve meme başı düzgün sağılmaz. Ayrıca hayvanın meme ucunda hasar oluşacaktır. Her iki durum da meme sağlığı için kötüdür (Bray and Shearer, 1993).



Şekil 1. Memeliğin sağım ve masaj aşamaları

Şekil 2’de verilen diyagram sağım ve masaj aşamalarının her 1 saniyede gerçekleştiği nabız çevrimidir. Yani süt alım ve masaj aşamalarının gerçekleştiği dakikadaki 60 nabız hızına ait bir pulsasyon döngüsü örneğidir. Diyagramda sağım aşaması “a+b” fazlarını ve dinlenme aşaması ise “c+d” fazlarını kapsar. Nabızın a-fazı (veya açılma fazı) sırasında meme başından süt akmaya başlar. Süt akışı b-fazı (açık faz) boyunca ve c-fazının ilk kısmına (kapanma fazı) kadar devam eder. Süt akışı, c-fazı eğrisinin yaklaşık %50-75’ine karşılık gelen bir zamanda yavaşlar ve d-fazı (tam kapanma) boyunca ve a-fazının ilk kısmına (açılış) kadar süt akışı olmaz (Ünal, 2013; Anonim, 2003).

Pulsatör, süt sağım makinasının en önemli elemanıdır. Mekanik, hidrolik, pnömatik ve elektronik tipleri bulunmakla birlikte, pnömatik ve elektronik tiplerin kullanım alanı daha yaygındır. Bir pulsatörün tasarımındaki en önemli iki unsur “nabız hızı” ve “nabız oranı” ayarlarıdır. Nabız hızı, sağım fazının ve masaj fazının dakikada meydana gelme sayısıdır. İnek sağımında en yaygın nabız hızı dakikada 45-65 arasındaki nabız sayılarıdır. Yani memelik kılıfının içindeki lastik dakikada 45 ila 65 kez açılır ve kapanır. Araştırmalar 60 nabız/min hızını en uygun nabız hızı kabul etmektedir. Bir nabız döngüsünde, sağım aşaması genellikle masaj aşamasına eşit veya daha uzundur. Her fazda harcanan bir nabız döngüsünün zaman yüzdesine, nabız oranı denir. Diğer bir ifade ile nabız oranı, pulsatörün sağım fazında (açık) kalma süresinin dinlenme fazına (kapalı) kıyasla yüzdesidir. En yaygın oranlar 60:40; 65:35 ile 70:30’dur. Örneğin, 60:40 nabız oranı, vakumun döngünün %60’ı için arttığı veya maksimum vakumda olduğu, %40’ı için ise azaldığı veya atmosferik basınçta olduğu anlamına gelir. Teorik olarak bu oran ne kadar yüksek olursa, sağım daha hızlı gerçekleşir (Anonim, 2003). Ancak, pratikte 60:40

oranındaki pulsatörler daha yaygındır (özellikle pnömatik pulsatörlerde). Oranın ilk sayısı, sağım aşamasındaki döngünün yüzdesini (a+b), ikinci sayı ise dinlenme aşamasındaki döngünün yüzdesini (c+d) ifade eder. Optimum nabız oranı, meme başı tıkanıklığını veya meme ucu hasarını önlemek için yeterli dinlenme süresi sağlarken sağım fazı süresini en üst düzeye çıkarır. Araştırmalar, yeterli dinlenmeyi sağlamak ve mastitis riskinin artmamasını sağlamak için d-fazının en az 150 milisaniye (nabız hızı 60 nabız/min ise döngünün %15'ine eşdeğer) olması gerektiğini göstermiştir. Pulsatörlerin nabız çıkışları isteğe bağlı olarak eş zamanlı⁽²⁾ (4x0) ve değişken zamanlı⁽³⁾ (2x2) olarak çalıştırılabilmektedir (Reinemann *et al.*, 2001). Ülkemizde süt sığırlarının sağımalarında kullanılan pulsatörlerin hemen tümü değişken zamanlı esasa göre çalıştırılır.



Şekil 2. Memeliğin sağım ve masaj aşamaları

Günümüzde süt çiftlikleri genelinde 60:40 nabız oranı ve 60 nabız/min hıza sahip pulsatörler kullanılmaktadır. Bazı durumlarda, her pulsasyon döngüsünde meme lastiğinin açık olduğu süre artırılarak sağım verimliliği iyileştirilebilir. Bu, oran 65:35 veya 70:30'a genişletilerek elde edilir. Bu değişikliği yaparken, en az 150 milisaniyelik bir d-fazının elde edildiğinden emin olunmalıdır. Nabız oranı artırıldığında, lastik her atım (nabız) döngüsünde daha uzun süre vakuma maruz kalacaktır. Süt akışı yavaşladığında veya durduğunda meme başlarının vakuma maruz kaldığı süreyi en aza indirmek önemlidir. Bu da, otomatik başlık çıkarıcılar ile daha erken sürede sağım başlığını çıkarmak suretiyle elde edilebilir.

Süt sığırcılığında (inek, manda) sağım performansını artırmak için (sütün daha kısa sürede, yüksek sağım veriminde ve maksimum süt akışında sağlanabilmesi) sağım öncesi ve/veya sağım sonuna doğru oksitosin salgısını harekete geçirecek uyarım (stimülasyon) etkisinin uygulanması önemlidir. Gorewit ve Gassman (1985) araştırmalarında, gruplandırdıkları Holstein cinsi ineklere sağım öncesinde 0, 15, 30, 60 ve 120 saniye süre ile manuel uyarım (stimülasyon) uyguladıklarını, elde edilen sonuçlarda 30, 60 ve 120 saniyelik manuel uyarım yapılanların, uyarım yapılmayanlara göre daha yüksek süt verimleri, pik süt akış hızları ve ortalama akış hızlarında sağıldıklarını ve sağımalarının daha kısa sürelerde tamamlandığını belirlemişlerdir. Sağım öncesi hayvanın meme başlarına sağımcı tarafından uygulanan yıkama, kurulama ve ön sağım gibi hazırlık aşaması, hayvanın oksitosin salgısını artırmaktadır. Bu salgının etkisi süresi 3-7 dakika arasındadır. Küçük sürülerde sağım öncesi, esnası ve sonuna doğru hayvanın kontrolü sağımcı tarafından yapılabilmeyle birlikte insan hatası ve yetersizliği, hayvanların yeterince kontrol edilemediğini göstermektedir. Büyük sürülerin sağıldığı modern sağım tesislerinde manuel uygulamanın yetersizliğini, elektronik sütölçerli ve uyarım (hızlı masaj) özellikli elektronik

² Sağım başlığındaki dörtlü memeliklere aynı anda basınç uygulanıp, aynı anda serbest bırakılmasıdır.

³ Sağım başlığındaki iki memeliğe aynı anda basınç uygulanıp, diğer ikisini hareketsiz yani masaj etkisinde bırakmak ve ardından dönüşümlü olarak bu işlemi tekrarlama esasıdır.

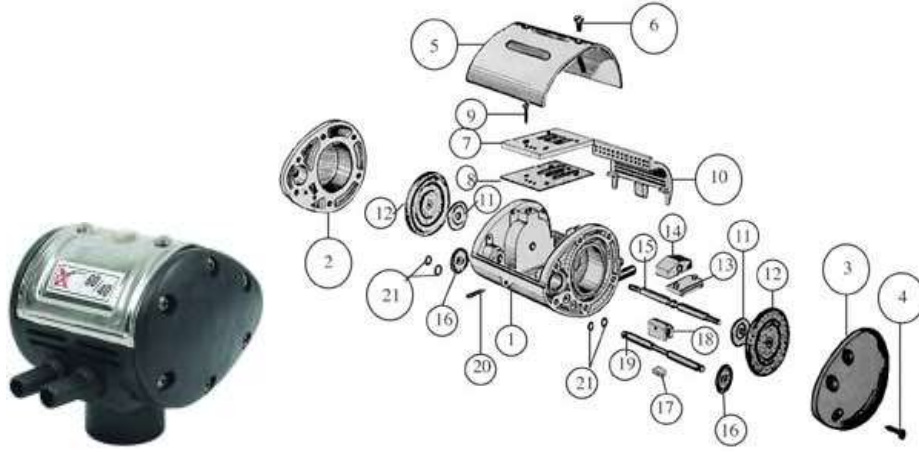
pulsatörler telafi edebilmektedir. Uyarım özellikli elektronik pulsatörler örneğin ineğin sağım başlangıcı ve sırasında süt debisi az veya azalırsa (ort. 200-300 ml/min), otomatik olarak devreye girmekte ve 30-45 saniye süreyle hızlı nabız (200-300 nabız/min aralığında) uygulamaktadır. Bu anda sağım başlığındaki meme başı vakumu düşmekte (20-35 kPa aralığında) ve başlık kendi ağırlığının da etkisiyle aşağıya sarkarak meme başlarına hızlı masaj yapmaktadır. Ancak bu özellikteki pulsatörler güçlü makinalar ile 10-12 adet sağım ünitesine kadar kurulumu yapılan sabit tesisleri için çok pahalı olabilmektedir. Bu yüzden küçük işletmelerde ağırlıklı olarak pnömatik pulsatörlü sağım makineleri kullanımı yaygındır.

Bir pnömatik pulsatörün nabız sayısı değişimi, aygıtın üzerindeki ayar vidasından manuel olarak yapılabilmektedir. Bu ayar imalatçı firma tarafından hayvan cinsi ve uygun çalışma vakumu dikkate alınarak sabit nabız hızında yapılmaktadır. Pulsatördeki bu ayar inek ve mandalar için 50-60 nabız/min, keçiler için 90-100 nabız/min ve koyunlar için 120-180 nabız/min aralıklarında ayarlanmakta ve sağım süresince sadece ayarlanan sabit hızda çalışmaktadır. Ancak inek ve manda gibi hayvanların sağım anında pulsatörün kısa süre için hızını artırıp tekrar normale düşürmek hem kolay değil hem de hassas yapılamaz. Piyasadaki yerli üretim hızlı masaj özellikli bir elektronik pulsatörün piyasa fiyatı minimum 2000 TL iken, sıradan bir pnömatik pulsatörün fiyatı en fazla 200 TL civarındadır. İthal elektronik pulsatörlerin fiyatı ise minimum 1000 ABD \$'dan başlamaktadır. Her iki pulsatördeki büyük fiyat farkı küçük çiftlikler için çok önemli rakamlardır. Böyle bir durumda küçük çiftçinin tercihi her şekilde pnömatik pulsatörlü makine olacağından, pulsatörün hem normal hem de hızlı masaj pulsasyonunda pratik kullanıma sahip olması, satın alınmasında teşvik edici bir öncelik kazandıracaktır. Çiftçi; hayvan sağlığı, yüksek süt verimi ve süt kalitesi, kısa sağım süresi gibi olumlu yanları sayesinde her iki nabız özelliğine pnömatik pulsatör ile ulaşabilecektir. Yukarıda ifade edilen sebeplerden dolayı bu çalışmada, sağım öncesi uyarım ile hayvanın sağımına hazır duruma getirilmesi ve/veya sağım bitimine doğru yapılan uyarım ile memede kalan son sütün alınması, sağımının inisiyatifine bırakılmadan, hızlı masaj özellikli elektronik pulsatör olmadan da, pnömatik pulsatör yardımıyla yapıp yapılamayacağı amaçlanmıştır. Böylece pnömatik bir pulsatör üzerinde hem normal sağım hızı (ort. 60 nabız/min) hem de hızlı masaj nabızının ($200 \leq \text{Nabız Sayısı} \leq 300$ nabız/dk arası) sadece bir valf yardımıyla yapılmasına imkân sağlayacak, ucuz, güvenilir bir tasarımın yapılması ve geliştirilmesi amaçlanmıştır.

2. MATERYAL VE YÖNTEM

Sağım makinesinde hayvan ile temas eden tek eleman sağım başlığıdır. Dört memelikten oluşan sağım başlığı iki cidarlı olarak yapılmıştır. Hayvanın memesine tutunan iç cidar esneyebilen fakat deforme olmayan lastik malzemeden (kauçuk, silikon vb.) yapılır. Dış cidar ise sert plastik ya da paslanmaz metalden olabilir. Sağım başlığındaki memeliklerde sağılan süt, iç cidarın uzantısı olan kısa süt hortumları ile süt pençesine iletilir. Süt pençesi, uzun süt hortumu ile güğüme ya da süt borusuna bağlanmıştır. Aynı şekilde memeliklerin dış cidarları da kısa nabız hortumları ile kendi aralarında birleştikten sonra uzun nabız hortumu ile pulsatöre bağlanmıştır.

Bu çalışmada yerli üretim bir pnömatik pulsatör kullanılmıştır. Pulsatörün tasarım öncesi görünüşü ve pulsatörü oluşturan parçalar Şekil 3'de verilmiştir. Pnömatik pulsatörün gövdesi içerisinde asıl işlevi yerine getiren 2 adet mil-sürgü mekanizması vardır. Orta kısımda bulunan büyük mil-sürgü mekanizması (büyük sürgü), vakum basıncı (emme safhası) ve atmosfer basıncı (masaj safhasını) zamanlamalarını (emme ve masaj nabız oranını) koordine etmektedir. Diğer bir ifade ile nabız oranını sağlamaktadır. Araştırmada kullanılan pulsatör 60:40 (emme:masaj) nabız oranında çalışacak şekilde imal edilmiştir. Arka kısımdaki mil-sürgü mekanizması (küçük sürgü) ise vakum ve atmosfer basıncı zamanlamalarının dakikadaki sayısını (nabız sayısını) koordine etmektedir. Nabız hızını düşürmek ve yükseltmek için gövdenin orta bölümüne bir ayar vidası yerleştirilmiştir. Bu vida bağlandığı delik içinde ileri-geri hareketi ile nabız hızının sayısı kontrol edilir. Vidanın delik içindeki sıkma yönü (küçük sürgü milinin nabız hızını komuta ettiği hava kanalını daraltmak) nabız hızını düşürmekte, sökölme yönü ise nabız hızını arttırmaktadır.



Şekil 3. Tasarımda kullanılan yerli üretim pnömatik pulsatör ve pulsatörü oluşturan parçalar

Bu çalışmadaki temel amaç, sağım makinası hangi çalışma vakumunda çalışıyor ise, bu basınçtaki normal sağıma ait nabız hızının (ort. 60 nabız/min) kontrol edildiği ayar vidası haricinde ikinci bir tasarım ile pulsatörü uyarım (hızlı masaj) konumuna getirmektir. Bunun için pulsatörün küçük mil-sürgü mekanizmasının monte edildiği hava kanalına dışarıdan ikinci bir by-pas girişi yapılmıştır. Pnömatik pulsatör üzerindeki tasarım ayrıntısı Şekil 4'te gösterilmiştir. Pulsatör gövdesinin altında, ortada bulunan ayar vidasının her iki yanında, eşit mesafede ve aynı çapta delikler açılmıştır. Açılan bu deliklere birer vida yerleştirilmiştir. Herbir vidanın merkezinden aynı çapta boydan boya birer delik açılmış ve ardından bu iki vida silikon bir hortum ile birleştirilmiştir. Silikon hortum orta kısımdan bıçakla kesilmiş ve hortumun açık uçları sert plastik bir hortum (nipel) ile tekrar birleştirilmiştir. Nipel üzerinde ayrıca bir delik açılarak buraya bir vida yerleştirilmiştir. Bu vidanın görevi silikon hortum içinden geçen nabız sayısını (vakum-atmosfer havası sayısını) kontrol etmektedir. Yani, pulsatördeki ana ayar vidası dakikada 60 nabız sayısına ayarlanmış ise, silikon hortum içinden geçecek hava sayısı hızlı masaj etkisinde iken, bu sayının üzerine eklenmiş olacaktır. Çalışmada silikon hortum üzerindeki vida ayarı, 50 kPa çalışma vakumundaki 60 nabız/min üzerine dakikada yaklaşık +180 nabız eklenecek şekilde planlanmıştır. Uygulamalı çalışma sırasında hem normal sağım nabzına göre çalışmak hem de sağım öncesi veya bitime doğru hızlı masaj aşamasına geçişi kontrol etmek için silikon hortum üzerine plastik malzemeden bir valf (vana) yerleştirilmiştir. Bu valf sağım esnasında sağımcı tarafından kolaylıkla açma-kapama konuma getirilebilmektedir. Valf kapalı olduğunda (hortuma 90 derece döndüğünde) hayvan sadece 60 nabız/min'da (normal sağım hızında) sağılmakta, açıldığında (hortumla aynı eksen) yaklaşık 240 nabız/min nabız hızına çıkmaktadır.



Şekil 4. Pnömatik pulsatör üzerindeki pratik hızlı masaj işlemi tasarımı

Hızlı masaj özellikle tasarlanan pnömatik pulsatorün sağım anındaki vakum-nabız değişimlerini ölçmek için dijital göstergeli elektronik kayıt özellikli bir vakum-nabız ölçüm cihazı (Exendis, PT V) kullanılmıştır (Şekil 5). Cihaz ile TS ISO 5707:2007 (2014) ve TS ISO 6690:2007 (2014) standartlarında ve araştırma çalışmalarında belirtilen pulsasyon (vakum, nabız) ilişkileri için aşağıdaki veriler ölçülmüştür:

- NS: Nabız sayısı (atım/min)
- VB: Vakum basıncı (kPa)
- Aksama (Hata, Balans, Limping): Değişken zamanlı pulsatorün iki yarımları arasındaki nabız oranları arasındaki aksama oranı (% , ms)
- Yapısal nabız oranı (60/40)
- a+b: Süt alım safhası (% , ms)
- c+d: Masaj safhası (% , ms)
- a: Ortalama vakum artış safhası (% , ms)
- b: En yüksek vakum safhası (% , ms)
- c: Vakum azalış safhası (% , ms)
- d: En düşük vakum safhası (% , ms)
- Pulsatordeki vakum (nabız) fazları değişim grafiği.



Şekil 5. Vakum-nabız ölçüm cihazı ile tasarım pulsatoründe yapılan vakum-nabız ölçüm görüntüleri

Tasarımı yapılan pnömatik pulsatorün normal sağım ve hızlı masaj anındaki pulsasyon değerlerini ölçmek için sağım başlığının kısa nabız hortum çıkışlarından veri alınmıştır. Bunun için vakum-nabız ölçüm cihazının iki vakum çıkışına bağlanan birer hortuma üç yollu birer çatal bağlantı eklenmiş ve sonrasında sağım başlığındaki değişken zamanlı çalışan hatların birer ucu çatal bağlantılara, çatal bağlantıdan çıkan birer hortum da süt pençesinin iki yarımlarındaki birer nabız çıkışına by-pass yapılmıştır. Sağım başlığındaki meme lastiği, kadeh (kılıf), kısa süt, kısa nabız ve süt pençesi gibi elemanların tasarımı doğru yapılırsa ve bunların birleştirilmesi uyumlu olduğu taktirde birinci ölçüm noktasında alınacak vakum-nabız verilerini değerlendirmek en doğru sonuçları verecektir.

3. BULGULAR VE TARTIŞMA

Pnömatik pulsatorün yöntem bölümünde belirtilen ölçüm noktasından elde edilen vakum-nabız değişimleri Tablo 1’de verilmiştir. Tabloda görüldüğü gibi, pulsatorün sağım anındaki nabız hızı (60 nabız/min) uyarım etkisine (hızlı masaja) dönüştürüldüğünde sırasıyla ortalama 220, 232 ve 240 nabız/min hızlarına ulaştığı görülmüştür. Diğer yandan makinanın normal sağım anındaki 40, 45 ve 50 kPa çalışma vakumları, pulsatorün hızlı masaja geçmesiyle sırasıyla ortalama 30, 33 ve 35 kPa basınçlara düşmüştür. Sağım başlığının meme başında düşen bu vakum değerleri, sağım başlığının kendi yapısal ağırlığı da (yaklaşık 2-2,5 kg) dikkate alındığında, hayvanın meme başlarından düşmez. Aksine sağım başlığı yerçekimi kuvveti doğrultusunda aşağıya sarkma eğilimi göstererek sağım veriminin artmasına, sağım süresinin azalmasına ve memede artık süt kalmaması gibi olumlu iyileştirmeler sağladığı araştırmalar tarafından desteklenmektedir.

Araştırmada tasarım için seçilen pnömatik pulsatorün iki yarımına ait nabız oranları arasındaki hata (aksama) oranı ortalama %4,0 civarındadır. Bu oran standarttaki %5 sınırını değerini aşmadığı için kabul edilebilir sınırdadır. Pulsatorün normal sağımdaki pulsasyon faz oranları incelendiğinde, “b” ve “d” fazlarının standartta belirtilen sırasıyla %30’dan ve %15 oranlarından büyük olduğu saptanmıştır.

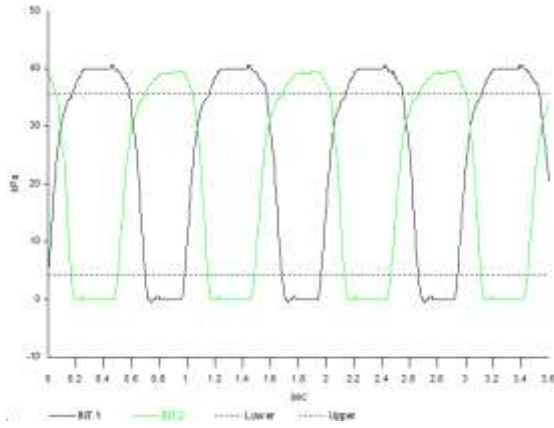
Yukarıda normal sağımda belirtilen standart verilerin (aksama oranı, “b” fazı, “d” fazı ve nabız oranı), pulsator hızlı masaja geçtikten sonra da kabul edilebilir sınırlar içinde kaldığı görülmüştür.

Tablo 1. Nabız ölçüm cihazının sağım başlığı kısa nabız hortumlarına bağlı konumunda ölçülen vakum-pulsasyon sonuçları

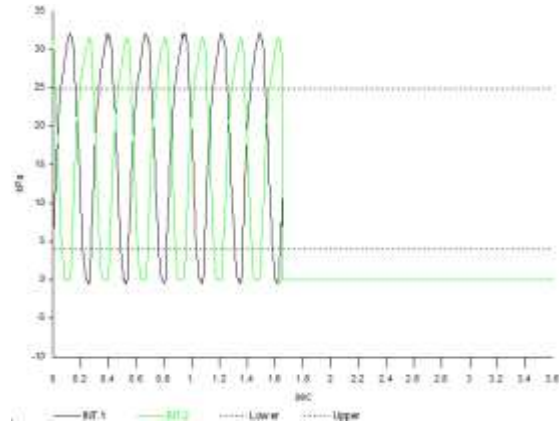
Ölçüm No	Kanal No	Vakum (kPa)	A ms %	B ms %	C ms %	D ms %	A+B ms %	C+D ms %	Aksama ms %	Nabız ms nabız/min
1-1	INT.1	40,0	182	405	114	280	587	394		
			18.6	41.3	11.6	28.5	59.8	40.2	42	981
			190	355	104	331	545	435	4.3	61.2
			19.4	36.2	10.6	33.8	55.6	44.4		
1-2	INT.1	30,0	61	100	56	56	161	112		
			22.3	36.6	20.5	20.5	59.0	41.0	7	273
			59	95	50	69	154	119	2.6	219.8
			21.6	34.8	18.3	25.3	56.4	43.6		
2-1	INT.1	45,0	193	412	119	284	605	403		
			19.1	40.9	11.8	28.2	60.0	40.0	40	1008
			205	360	105	338	565	443	4.0	59.5
			20.3	35.7	10.4	33.5	56.1	43.9		
2-2	INT.1	33,0	65	90	55	49	155	104		
			25.1	34.7	21.2	18.9	59.8	40.2	8	259
			62	85	50	62	147	112	3.1	231.7
			23.9	32.8	19.3	23.9	56.8	43.2		
3-1	INT.1	50,0	209	386	125	275	595	400		
			21.0	38.8	12.6	27.6	59.8	40.2	37	995
			218	340	112	324	558	436	3.7	60.3
			21.9	34.2	11.3	32.6	56.1	43.9		
3-2	INT.1	35,0	68	84	55	44	152	99		
			27.1	33.5	21.9	17.5	60.6	39.4	6	250
			68	78	49	55	146	104	2.4	240.0
			27.2	31.2	19.6	22.0	58.4	41.6		

Tasarlanan pulsatorün Tablo 1’de verilen ölçüm sonuçlarının vakum-nabız fazları değişimleri Şekil 5’te grafiksel olarak verilmiştir. Şekilde görüldüğü üzere, makinanın normal sağım ve hızlı masaj fazlarındaki vakum-nabız fazlarının eğrisel değişimleri Tablo 1’de verilen sayısal verileri desteklemektedir. Hızlı masaj anındaki nabız fazları sayılarının birim zamanda daha yüksek değerlere çıktığı şekildeki frekansların sıklığından daha iyi anlaşılmaktadır. Bu anda memeliğin nabız odasındaki

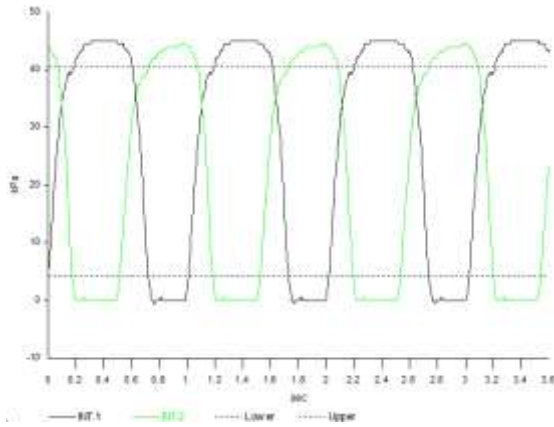
hızlı vakum-atmosfer havası değişimi sayesinde hayvanın meme ucundan belirli bir süre (30-60 saniye) süt akışı olmayıp oksitosin salgısı için stimülasyon etkisi sağlanmış olur.



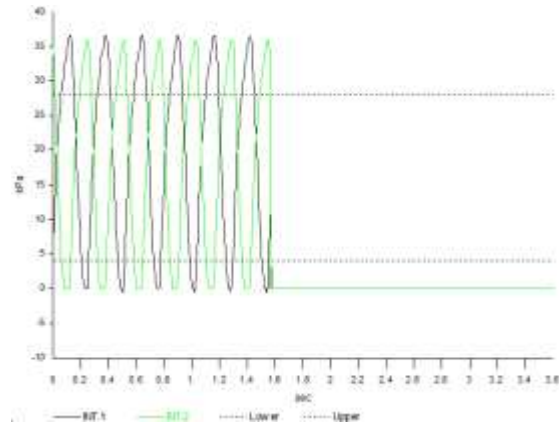
Normal sağımda (40 kPa, 60 nabız/min)



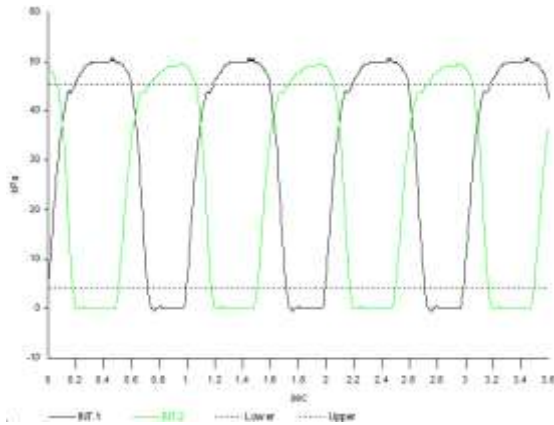
Hızlı masajda (30 kPa, 220 nabız/min)



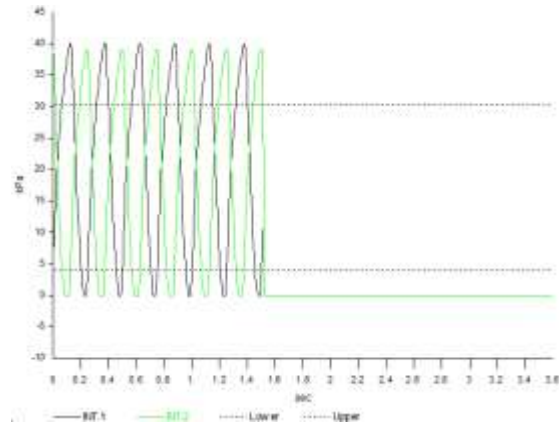
Normal sağımda (45 kPa, 60 nabız/min)



Hızlı masajda (33 kPa, 232 nabız/min)



Normal sağımda (50 kPa, 60 nabız/min)



Hızlı masajda (35 kPa, 240 nabız/min)

Şekil 5. Nabız ölçüm cihazının sağım başlığı kısa nabız hortumlarına bağlı konumunda ölçülen vakum-pulsasyon fazları değişim eğrileri

4. SONUÇ

Bu çalışma için aşağıdaki sonuçlar çıkarılabilir:

- Pnömatik pulsator üzerinde yapılan tasarım, üzerindeki valfin sağa sola çevrilmesiyle pratik şekilde normal nabız ve hızlı masaj (uyarım) değişikliğine geçebilmektedir.
- Küçük ölçekli süt çiftliklerinde sağımçı, manuel uyarıya fazla ihtiyaç duymadan ve ergonomik olarak yorulmadan hayvanın sağımını bu tasarımdaki bir pulsatorlu makine ile kolayca sağayabilecektir.
- Küçük çiftçinin hızlı masaj özellikli pnömatik pulsatoru kullanması; hayvanın sağım süresinin azalmasına, süt veriminin artmasına ve mastitis riskine yakalanmamasına yardımcı olabilecektir.
- Çiftçi sağımdan sabah ve akşam sağımlarından kazanacağı fazla zamanını, çiftliğin diğer işlerine ayırabilecektir.
- Çiftçi piyasada yüksek fiyatlarda satılan yerli üretim hızlı masaj özellikli bir elektronik pulsator yerine, en az on kat daha ucuz olan hızlı masaja dönüştürülebilir bir pnömatik pulsator sağım kolaylığına ulaşabilecektir.
- Pnömatik pulsator kurulumlu sabit sağım tesislerinde nabız aygıtları, sağım çukurundan yaklaşık 2.5 metre yüksekteki vakum hattına monte edilmektedir. Bu nedenle böyle tesislerde kullanım kolaylığı için hızlı masaj değişim valfi sağımıcının uzanabileceği yüksekliğe göre tasarlanmalıdır.
- Tasarımda kullanılan sağ-sola çevirmeli valf yerine hava akışını daha seri kesip-açabilecek bir düğme (buton) tasarımı pratikliği daha da artırabilecektir.

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**MİKRO BESİN GÜBRELERİ İÇİN, METAL İÇEREN ŞELAT BİLEŞİKLERİNİN
HAZIRLANMASI, BİYOLOJİK ETKİNLİKLERİNİN ÖLÇÜLMESİ VE TARIMDA
KULLANILABİLİRLİKLERİNİN ARAŞTIRILMASI**

**PREPARATION OF CHELATING COMPOUNDS INCLUDING METAL AS
MICRONUTRIENT FERTILIZER, MEASUREMENT OF THEIR BIOLOGICAL
ACTIVITIES, AND INVESTIGATION OF THEIR USAGE IN AGRICULTURE**

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ÖZET

Artan nüfusun beslenme ihtiyacı, aşırı kullanılan tarım arazilerinin verimsizleşmesi, tarımsal üretimde gübre kullanımını zorunlu hale getirmiştir. 20. yüzyıl boyunca, tüm dünyada tarımsal gelişmenin ana teması, giderek artan nüfusun besin ihtiyacını karşılayacak ürün üretimi için kullanılan birim alan başına artan üretkenliktir. Günümüz tarımının başlıca amacı ise, çevreyi ve doğal kaynakları tehdit etmeden arazi ve su verimliliğini en üst düzeye çıkarmaktır.

Bitki yaşam fonksiyonlarını devam ettirmesi için gerekli olan zorunlu bitki besin maddeleri, bitki metabolizması için gerekli olan, diğer bir ifade ile eksikliğinde veya yokluğunda bitki yaşamının söz konusu olmadığı elementler olarak tanımlanmaktadır. İki grupta toplanan bu elementlerden makro elementler kadar mikro elementlerde önemlidir. Mikro elementler, makro elementlere göre bitki bileşimleri ve topraklarda daha küçük konsantrasyonda bulunur. Fe, Cu, Mn gibi mikroelementlerden olan Zn bitkide azot metabolizmasını, nişasta oluşumunu ve tohum olgunlaşmasını etkiler. Ayrıca büyüme hormonlarının üretimi için gerekli olan bir bitki elementi olan çinkodur. Bitkilerin klorofil içerikleri çinko noksanlığında azalarak yaprak damarlarında kloroza sebep olur.

Bu çalışmada, tarımda kullanılan aminoasit yapısına benzer şelatlayıcı ajanlara alternatif yeni amin bileşikler sentezlenerek bu poli karboksilik asit türevi ligandlardan mikro besin elementi olan Zn tuzu ile kompleksler hazırlanmıştır. Tarımda mikro besin elementi olarak kullanılan Zn komplekslerin bitki büyüme parametrelerinin ölçümleri yapılarak tarımda gübre olarak kullanılabiliirlikleri araştırılmıştır.

Anahtar Kelimeler: Mikrobeseinler, Çinko, Çinko eksikliği, Şelatlama ajanı

Bilgi: Bu çalışma Türkiye Bilimsel ve Teknolojik Araştırma Kurumu (TÜBİTAK) tarafından desteklenmiştir. TEYDEP Proje No:7210292

ABSTRACT

Nutrition requirements of the increasing population and the decrease in the quality of agricultural lands due to global warming have necessitated using fertilizers in agricultural production. Since the twentieth century, the central theme of agricultural production has been to enhance productivity per unit area to supply the food requirements of the increasing population. Today the primary purpose of these studies

is to make the yield and quality of lands and water usage uber-efficient without polluting and threatening the environment and natural resources.

Essential plant nutrients are necessary for plants to maintain their life functions. These important elements are classified as macro and micronutrients. Micronutrients are essential for plant growth and development and are found in small amounts in soil because they are needed in small amounts. Micronutrients like iron (Fe), Zinc (Zn), and manganese (Mn) affect the normal growth and optimum yield of plants. One of the micro nutrients, Zn, affects nitrogen metabolism, the formation of starch, and seed maturation in plants. It is also important for the production of plant growth hormones. In the case of Zn deficiency, chlorophyll content decreases, and chlorosis occurs in plant leaves.

In this study, we synthesized new amine compounds alternative to chelating agents similar to the amino acid structure used in agriculture. Then we prepared the complexes as micronutrient elements from these polycarboxylic acid derivative ligands and Zn salts. Applying these Zn complexes to the plants, we measured some growth parameters and analyzed the usage of these microelement complexes as fertilizers in agriculture.

Keywords: Micronutrients, Zinc, Zinc deficiency, Chelating agent

Acknowledgements: The research was supported by the Scientific and Technological Research Council of Turkey (TUBITAK), TEYDEP, project no 7210292.

**POLİKARBOKSİLİK ASİT TÜREVİ ŞELATLAYICI AJANLARIN SENTEZİ VE BİTKİ
BESLEMEDE KULLANILABİLİRLİKLERİNİN ARAŞTIRILMASI**
**SYNTHESIS OF POLYCARBOXYLIC ACID DERIVATIVE CHEATING AGENTS AND
INVESTIGATION OF THEIR USAGE IN PLANT NUTRITION**

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ÖZET

Küresel ısınmanın beraberinde getirdiği kuraklığın yanı sıra dünya nüfusunun ve şehir yaşantısının da artışıyla tarımsal alanların kısıtlanması tarımdaki verimlilik artışını hayati kılmaktadır. Özellikle kısıtlı alanlarda yapılan seracılık tarımında bitki besleme ve diğer parametreler ile ilgili bilimsel çalışmalar yapılarak verimliliği artırıcı yeni gübreleme ve besi teknikleri oluşturulmaktadır. Yapılan araştırmalar bitkilerde mikro besin elementlerinin eksikliğinde fotosentez oluşumunun olumsuz etkilendiğini ve dolayısıyla toplam üretkenliğin azaldığını göstermektedir. Bunun başlıca nedeni klorofil ve karotenoidlerin içeriğindeki azalma ve kloroplastlarda elektron taşınmasının inhibisyonudur. Ek olarak, kloroplastlarda, süperoksit anyon radikalının oluşumu da dahil olmak üzere, mikro element eksikliği ile artan bir aktif oksijen oluşumu gözlenir. Son yıllarda, gelişmiş tarım uygulamalarında mikro besin elementi olarak adlandırılan ve ithal ürünler arasında yer alan ticari şelatlayıcıların (EDDHA (Etilendiamin-N,N'-bis((2-hidroksifenil)asetik asit) ve EDTA (Etilendiamintetraasetik asit)) ve komplekslerinin giderek önem kazandığı görülmektedir.

Bizde bu çalışmada, ithal ürünlere alternatif çevreci oldukları bilinen amin bileşiklerinin ve mikro elementlerin tuzları kullanılarak sentezlenen polikarboksilik asit türevi şelatlayıcı ajanların sentez ve yapısal karakterizasyonunu gerçekleştirdik. Bitki besleme çalışmalarının ardından yapılan bitki büyüme analizleri ile bu bileşiklerin gübre olarak kullanılma potansiyellerini değerlendirdik.

Anahtar Kelimeler: Şelatlayıcı Ajanlar, Bitki Besleme, Mikro besin elementleri, Polikarboksilik asit Türevi Bileşikler

Bilgi: Bu çalışma Türkiye Bilimsel ve Teknolojik Araştırma Kurumu (TÜBİTAK) tarafından desteklenmiştir. TEYDEP Proje No:7210292

ABSTRACT

Global warming and its severe effects, the rapid increase in population, and urbanization have caused a decrease in the number of agricultural lands and the agricultural crop yield and productivity. The sustainability of agricultural production is vital for the continuity of the world population. In recent years, there has been a considerable rise in the research about plant nutrition, plant fertilizer, and other nutrition techniques to increase in agricultural crop productivity, yield, and quality. Research has shown that in plants, metabolic processes, notably photosynthesis, are affected significantly in the case of microelement deficiency. One of the important micro elements, iron, plays a fundamental role in plants. In the case of iron deficiency in plants, the number of thylakoid membranes per chloroplast decreases, resulting in rapid inhibition of chlorophyll formation and transportation. Iron deficiency can also affect the concentration of photosynthetic pigments and cause a decrease in the level of photosynthetic pigments, resulting in leaf yellowing. In iron-deficient plants, photosynthesis is affected negatively, and the total plant yield and productivity decreases. Iron deficiency also leads to the formation of reactive oxygen species in chloroplasts. EDDHA (Ethylenediamine-N,N'-bis(2-hydroxyphenylacetic acid), and EDTA (ethylenediaminetetraacetic acid) are commercial chelating agents and imported products. These

chelating agents and their complexes as micronutrients are important for advanced agricultural practices and are gaining increasing importance these days.

In this study, we synthesize and characterize polycarboxylic acid derivative complexes using domestic and environment-friendly amine compounds and microelement salts. Right after the plant nutrition treatments, we perform plant growth analysis and evaluate the potential use of these compounds as fertilizer.

Keywords: Chelating agent, Plant nutrition, Micronutrients, Polycarboxylic acid derivative compounds

Acknowledgements: The research was supported by the Scientific and Technological Research Council of Turkey (TUBITAK), TEYDEP, Project No 7210292.

**BİR KEDİDE ORAL MELOKSİKAM SÜSPANSİYONUN İNTRAVENÖZ
UYGULANISISONUCU NELER OLDU?**

**WHAT HAPPENED AS A RESULT OF INTRAVENOUS ADMINISTRATION OF ORAL
MELOXICAM SUSPENSION IN A CAT?**

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ÖZET

Tekir ırkı 16 aylık, dişi kedi Ankara Üniversitesi Veteriner Fakültesi Hayvan Hastanesi Acil Kliniğine sağ arka ayağında topallık şikayeti ile getirildi. Verilen anamnez bilgisinde kedinin evden kaçtığı ve sonrasında eve topallayarak geri geldiği belirtildi. Acil muayenesinden 4 gün sonra İç Hastalıkları kliniğine getirilen kedinin ortopedik muayenesinde kırık şüphesi ortaya çıktı ve cerrahi kliniğine sevkı uygun görüldü. Cerrahi kliniğinde yapılan muayenesinin ardından sağ arka ayakta basış topallığı ile beraber palpasyonda art.coxae'da ağrı bulgusu ve krepitasyona rastlandı. Radyolojik incelemenin ardından femur kemiğinin collum femoris bölgesinde transvers kırık olduğu tespit edilerek ameliyat öncesi tetkikler için iç hastalıkları birimi ile görüşüldü. İç hastalıklarında yapılan preoperatif muayenenin ardından caput femorisin eksizyon artroplastisi operasyonu kararlaştırılarak ertesi gün operasyonu yapıldı. Post operatif süreçte anestezik maddelerin vücuttan atılımı da göz önünde bulundurularak oluşabilecek komplikasyonlar dahilinde herhangi bir acil müdahale gereksinimi durumunda operasyon öncesi süreçte uygulanan intravenöz kateterizasyon hasta üzerinde hasta sahibine gerekli bilgilendirmeler yapıldıktan sonra intravenöz kateter aktif olacak şekilde bırakılarak ilk günün ardından hasta sahibi tarafından çıkartılabileceği aktarıldı. Ameliyat sonrası birinci günden başlayarak ağrı kesici olarak kullanımı oral yolla tok karnına 1ml dozda önerilen meloksikam süspansiyon preparatı beşeri hekimlik mesleği icra eden hasta sahibi tarafından intravenöz yolla uygulandı. Uygulamanın ardından kedide bazı aşırı duyarlılık reaksiyonları başladığı aktarıldı ve acil kliniğe getirildi. Burada sıvı sağaltımı ve oksijen tedavisi uygulanan hastada, ilaç uygulamasının ardından 2. saat sonunda taşipne, taşikardi ve bazı diğer bulguların gerilediği tespit edildi. Uygulamanın ardından 72 saat sonra yapılan muayene ve laboratuvar tetkikleri sonucunda durumun normale döndüğü tespit edildi. Bu vaka sunumu sayesinde 2 tespit yapıldı. Birincisi; hayvan sahibine istemeden de olsa kesinlikle medikal müdahale uygulaması için fırsat verilmemeli. İkincisi ise; evde uygulanması için verilecek ilaçların mümkün olduğunca ilacın üzerindeki fiziksel uyarılarla beraber hasta sahibinin yönlendirilmesi gerekliliğidir.

Anahtar Kelimeler: meloksikam şurup, kedi, aşırı duyarlılık.

ABSTRACT

A 16-month-old tabby cat was brought to Ankara University Veterinary Faculty Animal Hospital Emergency Clinic with the complaint of lameness in the right hind leg. Animal owner said that the cat ran away from the house and then came back home with symptoms of lameness. Four days after the emergency examination, the cat was brought to the Internal Medicine clinic, and in the orthopedic

examination, a suspected fracture was revealed and the cat was referred to the surgery clinic. After the examination in the surgery clinic, lameness of pressure in the right hind foot and pain findings and crepitation were found in the art.coxae on palpation. After radiological examination, a transverse fracture was found in the collum femoris region of the femur, and she was referred to the internal medicine clinic for preoperative examinations. After the preoperative examination in internal diseases, the operation for excision arthroplasty of the caput femoris was decided and the operation was performed the next day. Considering the excretion of anesthetic substances from the body in the post-operative process, the intravenous catheter, which was applied in the preoperative period, was left on the cat in case of any emergency intervention within the complications that may occur. The meloxicam suspension preparation, which was recommended to be used as a pain reliever orally at a dose of 1 ml on a full stomach starting from the first postoperative day, was administered intravenously by the patient's owner, who was a human physician. After the application, it was said that some hypersensitivity reactions started in the cat, and the cat was brought to the emergency clinic. Tachypnea, tachycardia and some other findings were found to regress at the end of the 2nd hour after drug administration in the cat who underwent fluid therapy and oxygen therapy in the emergency clinic. As a result of the examination and laboratory tests performed 72 hours after the application, it was determined that the situation returned to normal. Thanks to this case report, 2 determinations were made. First; The animal owner should not be given the opportunity for medical treatment, even unintentionally. The second is; It is necessary to direct the patient's owner together with the physical warnings on the medication as much as possible.

Keywords: meloxicam oral suspension, feline, hypersensitivity.

YUMURTACI BILDİRCİNLERDE (*Coturnix coturnix japonica*), YEM KATKI MADDESİ OLARAK AŞOTU (*Cymbocarpum anethoides*) İLAVESİNİN KARACİĞER DOKUSU ÜZERİNDEKİ HİSTOLOJİK ETKİSİ

HISTOLOGICAL EFFECT OF THE ADDITION OF ASHOT (*Cymbocarpum anethoides*) AS A FEED ADDITIVE ON LIVER TISSUE IN LAYER QUAILS (*Coturnix coturnix japonica*)

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ÖZET

Bitkisel kökenli yem katkı maddeleri, sistemik fonksiyon düzenleyici, yumurta verimliliği ve çevresel etkilerin olumsuz yönlerinin minimize edilmesi açısından kanatlı beslenmesinde kullanılmaktadır. Apiaceae familyasına mensup olan *Cymbocarpum* cinsinin türleri Anadolu coğrafyasında Aşotu, Öz aşotu yada Kızıl aşotu olarak tanınmaktadır. Dağ anıği yada aşotu olarak bilinen *Cymbocarpum anethoides* ilkbahar mevsiminde yaygınlık gösteren ve yemeklerde de kullanılan aromatik bir bitkidir. Çalışmamızda bıldırcın (*Coturnix coturnix japonica*) türünden her bir grupta 48 adet bıldırcın olmak üzere biri kontrol ikisi deneme olarak 3 grup oluşturuldu. Deneme gruplarındaki bıldırcınların canlı ağırlıklarına oranla 1 g/kg ve 2 g/kg dozunda rasyonlarına dağ anıği ilavesi yapılarak beslenmeye tabi tutuldular. 8 haftalık uygulama süresi sonunda servikal dislokasyonla öldürülen bıldırcınlardan karaciğer dokusu alınarak %10 luk formaldehit ve bouin solüsyonlarında tespit edildikten sonra rutin doku takip aşamalarından geçirilmiş ve parafin bloklara gömülmüş doku örneklerinden mikrotomla 4-5 µm'lik seri kesitler lamlara alınmıştır. Hazırlanan karaciğer doku preparatları hematoksilin-eozin boyamaya tabi tutulmuştur. Makroskobik inceleme sonucunda karaciğerin tek parça olan lobus hepatitis dexter ve pars lateralis ile pars medialis denilen 2 kısımdan oluşan lobus hepatitis sinister olmak üzere 2 ana parçadan oluşmuş olduğu gözlemlendi. Preparatların ışık mikroskobu altında incelemesi sonucu; kontrol grubu karaciğer dokusu lopçuğun merkezinde Vena centralis, lopçukların köşelerinde intersitisyumun azlığına bağlı olarak dağınık halde Vena interlobularis, Arteria hepatica ve Ductus biliferus'dan oluşan karaciğer üçlüsü mevcut idi. Hepatositlerde az miktarda yağ vakuollerine rastlandı. Rasyona dağ anıği ilavesi yapılan deneme gruplarında kullanılan doza bağlı olarak sentral ve portal bölgede homojen olarak dağılmış lipid vakuollerinde artış gözlemlenmiştir. Dağ anıği ilaveli bazal diyetle beslenen gruplardan alınan karaciğer doku örneklerinde histolojik görünümün hepatik makroveziküler steatoz şeklinde olduğu, hepatositlerde lipidin vakuoller halinde biriktiği gözlemlenmiştir. Çalışmanın sonucunda rasyona dağ anıği

ilavesinin trigliserit ve kolesterol artışına bağlı olarak hepatositlerde lipit birikimine sebep olduğu kanısındayız.

Anahtar kelimeler: *Cymbocarpum anethoides*, *Coturnix coturnix japonica*, Karaciğer, Yem katkı maddeleri

ABSTRACT

Plant-based feed additives are used in poultry nutrition in terms of systemic function regulator, egg productivity and minimizing the negative aspects of environmental effects. The species of the genus *Cymbocarpum*, which is a member of the Apiaceae family, are known as Aşaotu or Red Ashot in Anatolian geography. *Cymbocarpum anethoides*, also known as mountain stigma or achote, is an aromatic plant that is widespread in the spring season and is also used in cooking. In our study, 3 groups of quail (*Coturnix coturnix japonica*) were formed, 48 quails in each group, one control and two experimental. Achote was added to the diets of the quails in the experimental groups at a dose of 1 g/kg and 2 g/kg in proportion to their live weight. At the end of the 8-week application period, liver tissue from quails killed by cervical dislocation was taken and fixed in 10% formaldehyde and bouin solutions, then they were passed through routine tissue follow-up stages and 4-5 µm serial sections from tissue samples embedded in paraffin blocks were taken on slides. Prepared liver tissue preparations were stained with the hematoxylin-eosin method. As a result of macroscopic examination, it was seen that the liver consisted of lobus hepatis dexter in one piece and lobus hepatis sinister in two pieces. Lobus sinister hepatis was observed to consist of 2 parts called pars lateralis and pars medialis. As a result of the examination of the preparations under the light microscope; In the control group liver tissue, there is Vena centralis in the center of the lobule. In the corners of the lobules, it was observed that they were composed of Vena interlobularis, Arteria hepatica and Ductus biliferus in scattered form due to the scarcity of interstitium. In the portal region, the liver triad was present in scattered form. A small amount of fat vacuoles were found in hepatocytes. Depending on the dose of ashot used in the experimental groups, an increase in dispersed lipid vacuoles was observed in the central and portal regions. It was observed that histological appearance was hepatic macrovesicular steatosis in liver tissue samples taken from the experimental groups, and lipid accumulated in hepatocytes as vacuoles. As a result of the study, we believe that the addition of ashot to the basal diet causes lipid accumulation in hepatocytes due to the increase in triglycerides and cholesterol.

Keywords: *Cymbocarpum anethoides*, *Coturnix coturnix japonica*, Liver, Feed additives

**ABORTE SIĞIR VE KOYUN FÖTUSLARINDAN BAZI ÖNEMLİ BAKTERİYEL
ETKENLERİN MOLEKÜLER YÖNTEMLERLE ARAŞTIRILMASI**
**INVESTIGATION OF SOME IMPORTANT BACTERIAL AGENTS FROM ABORTED
BOVINE AND SHEEP FETUSES BY MOLECULAR METHODS**

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ÖZET

Ülkemiz, sığır ve koyun yetiştiriciliğinde dünyadaki sayılı ülkeler arasında yer almaktadır. Buna karşın, sığır ve koyunlarda yavru atıkları ile her yıl büyük kayıplar meydana gelmektedir. Hayvanlarda görülen atık olguları polifaktöriyel bir etiyolojiye sahiptir. Fakat abortların çoğunluğu infeksiyöz kaynaklıdır ve bunların önemli bir kısmını bakteriyel hastalıklar oluşturmaktadır. Bakteriyel etkenlerin teşhisinde örnek alım ve gönderim koşulları, fötusun kontamine veya otoliz olması gibi laboratuvar yoklamalarını olumsuz etkileyen birçok faktör vardır. Aborta neden olan infeksiyöz etkenlerin tespitinde konvansiyonel yöntemlere ilaveten moleküler yöntemlerin de kullanılması doğruluk oranını artırmaktadır.

Bu çalışmada; Kafkas üniversitesi, Veteriner Fakültesi, Mikrobiyoloji Anabilim Dalı laboratuvarlarına 2022 yılında getirilmiş olan aborte sığır ve koyun fötuslarından *Brucella*, *Campylobacter* ve *Arcobacter* türlerinin varlığının PCR ile araştırılması amaçlanmıştır.

Çalışma kapsamında, toplamda 46 adet aborte fötusa (27 sığıra ve 19 koyuna ait) ait abomasum içeriği değerlendirildi. Abomasum içeriklerinden doğrudan DNA izolasyonu genomik DNA ekstraksiyon kiti kullanılarak üretici firmanın talimatlarına göre gerçekleştirildi. PCR tabanlı moleküler teşhis *Brucella*, *Campylobacter* ve *Arcobacter* türlerine özgü primerler kullanılarak ve ilgili literatürler doğrultusunda amplifikasyon ve görüntüleme işlemleri yapılarak tamamlandı.

İncelenen 27 sığır aborte fötusunun 6'sından (%22.22) *B. abortus*, 19 koyun aborte fötusundan ise 2 (%10.52) *B. melitensis* olmak üzere toplam 46 aborte fötus örneğinden 8 *Brucella* spp. (%17.39)

belirlendi. Sığır aborte fötuslarından *Campylobacter* ve *Arcobacter* tesbiti yapılamazken, koyun aborte fötuslarının 3'ünden (%15,78) *Campylobacter fetus* ve 1'inden ise (%1.9) *Arcobacter cryaerophilus* belirlendi.

Bu çalışma sonucunda, Kars yöresinde atık etkenlerinin başında *Brucella* spp.'nin geldiği görülmektedir. Buna ilaveten abortların etiolojisinde *Campylobacter* ve *Arcobacter* türlerinin de rol oynayabileceği göz ardı edilmemelidir. Bölgedeki abort vakalarıyla mücadelede bakteriyel etkenlerin de dikkate alınması gerektiği ortaya konulmuştur. Ayrıca abortla seyreden hastalıklar üzerine diğer etkenlerin de araştırılarak ortaya konması bu gibi hastalıklarla mücadele ve kontrolde planlamalara yardımcı olacaktır.

Anahtar Kelimeler: Aborte fötus, bakteriyel etken, PCR

ABSTRACT

Our country is among the few countries in cattle and sheep raising in the world. On the other hand, large losses occur by abortions of cattle and sheep every year. Abortions occurring in animals have a polyfactorial etiology. However, a majority of abortions are infectious origin and bacterial diseases constitute a significant part of them. In the diagnosis of bacterial agents, there are many factors that negative effect laboratory examinations, such as sampling and sending conditions, contamination or autolysis of the aborted fetus. Detection of infectious agents causing abortion is increase the accuracy rate using of molecular methods in addition to conventional methods.

In this study; it was aimed to investigate the presence of *Brucella*, *Campylobacter* and *Arcobacter* species from aborted cattle and sheep fetuses by PCR in the laboratories of the Department of Microbiology, Faculty of Veterinary Medicine, Kafkas University in 2022.

In this study, the abomasum content of a total of 46 aborted fetuses (27 cattle and 19 sheep) were evaluated. Direct DNA isolation from abomasum contents was performed using the genomic DNA extraction kit according to the manufacturer's instructions. PCR-based molecular diagnosis was completed by using primers specific to *Brucella*, *Campylobacter* and *Arcobacter* species and by performing amplification and imaging processes according to relevant literature.

Eight *Brucella* spp. (17.39%) were determined from a total of 46 aborted fetuses, of which 6 (22.22%) of the 27 aborted bovine fetuses were *B. abortus*, and 2 (10.52%) of the 19 sheep aborted fetuses were *B. melitensis*. While *Campylobacter* and *Arcobacter* could not be determined from bovine aborted fetuses, *Campylobacter fetus* was determined in 3 (15.78%) of sheep aborted fetuses and *Arcobacter cryaerophilus* was found in 1 (1.9%) of sheep aborted fetuses.

As a result of this study, it is seen that *Brucella* spp. is the leading abortion agent in Kars region. In addition, it should not be ignored that *Campylobacter* and *Arcobacter* species may also play a role in the etiology of abortions. It has been revealed that bacterial agents should also be taken into account in the battle against abortion cases in the region. Likewise, researching and revealing other etiologic agents on diseases progressing with abortion will help to plan in the protection and control of such diseases.

Keywords: Aborted fetus, Bacterial agent, PCR

**KURBAN BAYRAMI SÜRESİNCE KESİLEN ETİN GIDA GÜVENLİĞİ AÇISINDAN
İNCELENMESİ**
**THE INVESTIGATION OF SACRIFICED MEAT DURING EID AL-ADHA FESTIVAL IN
TERMS OF FOOD SAFETY**

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ÖZET

Kurban Bayramı Müslüman ülkelerdeki en büyük dini bayramlardan biridir. Kurban kesebilecek gelir seviyesine sahip bireylerin kurbanlık olmaya uygun olarak satın aldıkları hayvanları hijyen kurallarına göre kesip, yine aynı kurallara uygun olarak porsiyonlama ve dağıtımını sağlamaları gerekmektedir. Bu süreçte, hayvan refahı, kesim hijyeni, etin besin kalitesi ve mikrobiyal özelliklerinin toplum beslenmesi açısından değerlendirilmesi halk sağlığının korunması ve geliştirilmesi açısından önem arz etmektedir. Bu çalışmanın amacı, ülkemizde Kurban Bayramı süresince kurbanın kesimi, etin taşınması, dağıtımı, depolanması, işlenmesi, hazırlanması, pişirilmesi, servisi ve tüketimi aşamalarında gıda güvenliğinin sağlanıp sağlanmadığının değerlendirilmesidir. Ayrıca gıda güvenliğine yönelik uygulamalar ile demografik durum arasındaki ilişkinin araştırılması da amaçlanmıştır. Literatürde kurbanda gıda güvenliğini incelemeye ilişkin herhangi bir güvenilir-geçerli anket bulunmadığında, çalışmamızın veri toplama formu kırmızı et tüketimine yönelik uluslararası otoritelerin belirlemiş olduğu kurallarla et ve gıda güvenliğine yönelik çalışmalarda sorular temelinde hazırlanmıştır. Bu bağlamda, veri toplama formumuz demografik özellikler, kurban kesimi, kurban etinin taşınması ve dağıtımı, kurban etinin depolanması, kurban etinin tüketimi, işlenmesi ve hazırlanması, kurban etinin pişirilmesi ve servisi, kurban ve sağlık konularına yönelik soruları içeren altı bölümden oluşmaktadır. Veri toplama formunda anlaşılmayan bir hususun olmaması için ise araştırma öncesinde küçük bir popülasyonla bir pilot çalışma gerçekleştirilmiştir. Hazırlanan veri toplama formunun Kurban Bayramı'nın hemen sonrasında her haneden bir kişi tarafından doldurulması sağlanmıştır (n=218). Kurban kesmeyen haneler çalışma dışında tutulmuştur. Elde edilen veriler Jamovi (2.3.21) istatistik programına aktararak tanımlayıcı istatistiksel analizler gerçekleştirilmiştir. Çalışmaya katılanların birçoğunun kurban kesimi sonrası eti haneye uygun hijyenik koşullar altında taşımadığı, eti mikrobiyolojik kontaminasyona sebep olabilecek şekilde çözdürdüğü ve çapraz kontaminasyon riski olabilecek şekilde kestiği belirlenmiştir. Bunun gibi uygulamalar halk sağlığı açısından ciddi bir tehdit ifade etmekte olup, gelecekte gerçekleştirilecek eğitsel müdahale çalışmalarıyla tüketicilerin bilinçlendirilmesi sağlanmalıdır.

Anahtar Kelimeler: gıda güvenliği, et, hijyen.

ABSTRACT

Eid al-Adha is one of the biggest religious festivals in Muslim countries. Individuals with an income level that can sacrifice should slaughter the animals they buy by the hygiene rules, and provide portioning and distribution by the same rules. In this process, the evaluation of animal welfare, slaughter hygiene, nutritional quality, and microbial characteristics of meat in terms of community nutrition is important in terms of protecting and improving public health. This study aims to evaluate whether food safety is provided during the slaughter of the sacrifice, transportation, distribution, storage, processing, preparation, cooking, service, and consumption of the meat during the Eid al-Adha in our country. It is also aimed to investigate the relationship between food safety practices and demographic situations. In the absence of any reliable-valid questionnaires in the literature on examining food safety in the sacrificial meat, the data collection form of our study was prepared based on the rules set by the international authorities for red meat consumption and the questions in the studies on meat and food safety. In this context, our data collection form consists of six sections that include questions about demographic characteristics, the slaughter of sacrifice, transportation and distribution of sacrificial meat, storage of sacrificial meat, consumption, processing, and preparation of sacrificial meat, cooking and serving of sacrificial meat, sacrifice, and health. A pilot study was carried out with a small population before the study to avoid any unclear issues in the data collection form. It was ensured that the prepared data collection form was filled by one person from each household immediately after the Eid al-Adha (n=218). Non-sacrificed households were excluded from the study. The obtained data were transferred to the Jamovi (2.3.21) statistical program and descriptive statistical analyzes were carried out. It was determined that most of the participants in the study did not carry the meat under hygienic conditions suitable for the household after the sacrifice, thawed the meat in a way that could cause microbiological contamination, and cut it in a way that could pose a risk of cross-contamination. Practices like these represent a serious threat to public health, and consumers should be made aware of future educational interventions.

Keywords: food safety, meat, hygiene

**TÜRKİYE, ABD ve ALMANYA'DAKİ ÇEVİRİMİÇİ ALIŞVERİŞ SİTELERİNDE SATIŞA
SUNULAN BEBEK BİSKÜVİLERİNİN BESİN ETİKETLERİNİN İNCELENMESİ**
**THE INVESTIGATION OF FOOD LABELS OF BABY BISCUITS WHICH SALE ON
ONLINE SHOPPING WEBSITES IN THE TURKEY, USA and GERMANY**

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ÖZET

Günümüzde bebek ek gıdalarının ticari olarak birçok formda üretiliyor olması, annelerin bu ürünleri alırken bilinçli olarak tercih edebilmelerini zorlaştırmaktadır. Tüketici sağlığının korunması ve sağlıklı besin tercihlerinin gerçekleştirilmesi için ise paketlenmiş ürünlerde, gıda etiketi çalışmaları gerçekleştirilmektedir. Literatürde, çeşitli ülkelerde satışa sunulan kahvaltılık gevrekler, fast-food ürünleri, bebek mamaları ve asitli içecekleri inceleyen gıda etiketi araştırmaları mevcuttur. Ancak, tüketim tercihi ve gıda endüstrisindeki payı gittikçe artan bebek ek gıdalarına yönelik herhangi bir gıda etiketi çalışması bulunmamaktadır. Bu çalışmanın amacı, ülkemizde çevrimiçi ortamda satışa sunulan bebek bisküvilerinin Almanya ve ABD'deki muadillerine göre besinsel ve gıda katkı maddesi içeriğinin değerlendirilmesidir. Bu amaçla üç ülkede 167 bebek bisküvisi belirlenmiş olup, etiket bilgisinin eksik olması (n=50), 2 yaşın altındaki bireyler için uygun olmaması (n=10), internet üzerinden satıştan kaldırılmış olması (n=18), toz formunda olması (n=5) gibi nedenlerden dolayı 83 ürün çalışmadan dışlanmıştır. Türkiye (n=24), ABD (n=17) ve Almanya (n=43)'da çevrimiçi olarak satışa sunulan 84 bebek bisküvisinin etiketi çalışmaya dahil edilmiştir. Elde edilen veriler Jamovi (2.3.21) istatistik programına aktarılmış, Shapiro Wilk, Mann Whitney U testi ve ki kare testleri uygulanarak sonuçlar değerlendirilmiştir. Türkiye, ABD ve Almanya'da satışa sunulan bebek bisküvilerindeki besinsel öğelerin ortalama±standart sapma değerleri sırasıyla enerji (419±89.1, 422±25.8, 427±22.5), karbonhidrat (62.2±14.7, 71.6±6.1, 69.9±5.2), yağ (15.2±7.1, 11.7±2.7, 11.6±2.6), doymuş yağ (5.0±2.6, 4.5±3.5, 3.5±2.5), protein (6.9±2.3, 6.1±3.3, 8.8±2.6), şeker (15.5±8.4, 21.7±3.8, 19.8±6.6), tuz (0.2±0.3, 0.2±0.2, 0.3±0.3) ve lif (3.7±2.0, 2.6±1.6, 3.1±3.2) şeklindedir. ABD'de satışa sunulan ürünlerdeki karbonhidrat ve şeker miktarı ülkemizdekilere göre anlamlı olarak daha yüksektir ($p<0.05$). Ayrıca, ülkemizdeki bebek bisküvilerinin yağ ve doymuş yağ miktarları Almanya'da satışa sunulan muadillerine göre daha yüksek, protein ve karbonhidrat miktarları ise anlamlı ölçüde daha düşük bulunmuştur ($p<0.05$). Sonuçlar ülkemizdeki bireyler için potansiyel bir sağlık tehdidi ifade etmekte olup, ileride gerçekleştirilecek geniş kapsamlı araştırmalarla gelecek nesillere güvenli ve eşit bir gıda endüstrisi sağlanmalıdır. Bu çalışma Tübitak 2209 A proje çağrısı tarafından desteklenmektedir.

Anahtar Kelimeler: besin ögesi, tamamlayıcı beslenme, gıda etiket bilgisi, gıda katkı maddesi

ABSTRACT

Today, the fact that infant complementary foods are produced commercially in many forms makes it difficult for mothers to consciously choose these products while purchasing them. To protect consumer health and to realize healthy food preferences, food label studies are carried out for packaged products. In the literature, there are food label studies examining breakfast cereals, fast-food products, baby foods, and sodas sold in various countries. However, there is no food label study for baby complementary foods, whose consumption preference and share in the food industry are increasing. This study aims to evaluate the nutritional and food additive content of baby biscuits offered for sale online in our country, compared to their counterparts in Germany and USA. For this purpose, 167 baby biscuits were determined in three countries, 83 products were excluded from the study due to reasons such as lack of label information (n=50), not being suitable for individuals under the age of 2 (n=10), being removed from sale on the internet (n=18), being in powder form (n=5). Labels of 84 baby biscuits offered for sale online in Turkey (n=24), USA (n=17), and Germany (n=43) were included in the study. The obtained data were transferred to the Jamovi (2.3.21) statistical program, and the results were evaluated by applying Shapiro Wilk, Mann Whitney U test, and chi-square tests. The mean \pm standard deviation values of nutritional components in baby biscuits offered for sale in Turkey, USA and Germany are energy (419 \pm 89.1, 422 \pm 25.8, 427 \pm 22.5), carbohydrate (62.2 \pm 14.7, 71.6 \pm 6.1, 69.9 \pm 5.2), fat (15.2 \pm 7.1, 11.7 \pm 2.7, 11.6 \pm 2.6), saturated fat (5.0 \pm 2.6, 4.5 \pm 3.5, 3.5 \pm 2.5), protein (6.9 \pm 2.3, 6.1 \pm 3.3, 8.8 \pm 2.6), sugar (15.5 \pm 8.4, 21.7 \pm 3.8, 19.8 \pm 6.6), salt (0.2 \pm 0.3, 0.2 \pm 0.2, 0.3 \pm 0.3) and fiber (3.7 \pm 2.0, 2.6 \pm 1.6, 3.1 \pm 3.2), respectively. The amount of carbohydrates and sugar in the products offered for sale in the USA is significantly higher than those in our country ($p<0.05$). In addition, while the fat and saturated fat amounts of baby biscuits in our country were higher than their counterparts sold in Germany, the protein and carbohydrate amounts were found to be significantly lower ($p<0.05$). The results represent a potential health threat to individuals in our country, and a safe and equitable food industry should be provided to future generations with extensive research to be carried out in the future. This study is funded by Tubitak-2209 project call.

Key Words: nutrient, complementary feeding, food label information, food additive

**KEDİLERDE KAN SERUMU VE İDRAR AMH KONSANTRASYONLARININ
KARŞILAŞTIRILMASI**
COMPARISON OF BLOOD SERUM AND URINARY AMH CONCENTRATIONS IN CATS

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ÖZET

Anti-mullerian hormon dimerik yapıda bir glikoproteindir. Yalnızca ovaryumdaki granuloza hücreleri tarafından üretildiği için ovaryum rezervi hakkında bilgi sunmaktadır. Kedilerde tekrarlı kan alımlarının pratik olmamasından dolayı idrar AMH düzeyi araştırılması amaçlanmıştır. Ayrıca histolojik olarak belirlenen foliküler dağılıma göre AMH düzeyinde değişim olup olmadığı ortaya konulması

hedeflenmiştir. Çalışmanın materyalini Kafkas Üniversitesi, Veteriner Fakültesi, Hayvan Hastanesi'ne ovariyohisterektomi operasyonu isteğiyle getirilen 34 sağlıklı kedi oluşturdu. Ortalama 3,044 kg (2,5-4,4 kg) ağırlığında ve 18 ay (12-48 aylık) yaşta olan pubertaya ulaşmış kedilerden örnekler alındı. Ovariyohisterektomi ile alınan ovaryum dokusu %10'luk formaldehit solüsyonuna konuldu ve laboratuvara gönderildi. Operasyondan önce vena cephalica antebrachii'den kan örnekleri ve idrar katateri kullanılarak idrar örnekleri toplandı. Alınan idrar ve kan örnekleri 3000 rpm'de 20 dakika santrifüj edildi ve serumları çıkarıldı. Serumlar eppendorf tüplere aktarıldı ve analizler yapılmaya dek -20°C'de depolandı. Alınan serumlarda AMH düzeylerinin analizi canin ELISA kiti (BT LAB, China) kullanılarak yapıldı. Verilerin analizi SPSS® (SPSS Version 26.0, Chicago, IL, USA) programında yapıldı. Ortalama AMH düzeyi kan da $10,24 \pm 0,64$ ng/mL, idrarda $5,57 \pm 0,81$ ng/mL olduğu belirlendi. Kan ile idrar AMH düzeyi arasında istatistiksel olarak önemli bir fark olduğu saptandı ($P < 0,001$). 18 aylıktan küçük olan kedilerde kan AMH düzeyi ($10,18 \pm 0,89$ ng/mL), 18 aylık ve daha büyük olan kedilerle ($10,29 \pm 0,94$ ng/mL) karşılaştırıldığında istatistiksel olarak önemli bir fark tespit edilmedi. Benzer şekilde yaşı 18 aylıktan küçük olan kedilerde idrar AMH düzeyi ($4,21 \pm 1,19$ ng/mL), 18 aylık ve daha büyük olan kedilerle ($6,79 \pm 1,05$ ng/mL) karşılaştırıldığında fark belirlenmedi. Kan serumu AMH düzeyi ile idrar AMH düzeyi arasında korelasyon saptanmadı (Correlation coefficient= 0,051; $P=0,78$). Sonuç olarak kan ile idrar serumu arasında korelasyon olmadığı ve yaşa bağlı olarak AMH düzeyinin önemli oranda değişmediği görüldü.

Anahtar kelimeler: AMH, Kedi, Kan serumu, İdrar

ABSTRACT

Anti-mullerian hormone is a dimeric glycoprotein. It is produced only by granulosa cells in the ovary and therefore provides information about ovarian reserve. Because of the impracticality of repeated blood sampling in cats, it was aimed to investigate urinary AMH levels. In addition, it was aimed to reveal whether there is a change in AMH level according to histologically determined follicular distribution. The material of the study consisted of 34 healthy cats that were brought to Kafkas University, Faculty of Veterinary Medicine, Animal Hospital for ovariohysterectomy. Samples were taken from cats reaching puberty with an average weight of 3.044 kg (2.5-4.4 kg) and an age of 18 months (12-48 months). The ovarian tissue removed by ovariohysterectomy was placed in 10% formaldehyde solution and sent to the laboratory. Before the operation, blood samples were collected from the *vena cephalica antebrachii* and urine samples were collected using a urinary catheter. The urine and blood samples were centrifuged at 3000 rpm for 20 minutes and serum was removed. Sera were transferred to eppendorf tubes and stored at -20°C until analysis. AMH levels in the sera were analyzed using canin ELISA kit (BT LAB, China). Data analysis was performed in SPSS® (SPSS Version 26.0, Chicago, IL, USA). The mean AMH level was 10.24 ± 0.64 ng/mL in blood and 5.57 ± 0.81 ng/mL in urine. There was a statistically significant difference between blood and urine AMH levels ($P < 0.001$). When the blood AMH level (10.18 ± 0.89 ng/mL) in cats younger than 18 months of age was compared with that in cats 18 months of age and older (10.29 ± 0.94 ng/mL), no statistically significant difference was detected. Similarly, there was no statistically significant difference in urinary AMH levels in cats aged less than 18 months (4.21 ± 1.19 ng/mL) compared to cats aged 18 months and older (6.79 ± 1.05 ng/mL). There was no correlation between blood serum AMH level and urine AMH level (Correlation coefficient=0.051; $P=0.78$). In conclusion, there was no correlation between blood and urine serum AMH levels and AMH levels did not change significantly with age.

Keywords: AMH, Cat, Blood Serum, Urine

ZÜM ÇEKİRDEĞİ İLAVESİYLE ZENGİNLEŞTİRİLMİŞ KEMİK SUYU ÜRETİMİ
PRODUCTION OF FUNCTIONAL BONE BROTH ENRICHED WITH THE ADDITION OF
GRAPE SEEDS

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ÖZET

Günümüzde beslenme konusunda artan bilgi birikimleri sayesinde bireyler sağlıklı beslenmeye önem vermektedirler. Bu sayede fonksiyonel ürünlerin pazar payı her geçen gün artmaktadır. Fonksiyonel besinler doğal bir besin olabileceği gibi bir fonksiyonel besin bileşeniyle zenginleştirilmiş olabilir. Fenolik bileşik tüketiminin, antioksidan özellikleriyle bazı kanser türlerini, kardiyovasküler hastalıkları ve farklı yaş gruplarına özgü dejeneratif hastalık risklerini azalttığı belirlenmiştir. Bu ve benzer sağlık etkileri sebebiyle, fonksiyonel gıda üretiminde fenolik bileşikler yönünden zengin ürün üretimi önemli bir yer tutmaktadır. Şarap ve sirke endüstrisinde atık olarak ortaya çıkan üzüm çekirdeği, antibakteriyel ve antioksidatif aktivitelere sahip iyi bir fenolik bileşik kaynağıdır.

Kültürel beslenmemizde, önemli yere sahip olan kemik suyunun faydaları bilimsel çalışmalarla desteklenmekle birlikte; tüketiminde ve endüstriyel ölçekte üretiminde artış görülmektedir. Kemik suyu, lezzet verici olarak ve sağlıklı beslenme amacıyla tüketilmektedir. Bu çalışmada, gıda üretim işletmelerinde atık ürünler olarak ortaya çıkan yüksek fenolik bileşen ve antioksidan aktiviteye sahip üzüm çekirdeği, kemik suyuna farklı zaman dilimlerinde (1, 2, 3, 4 ve 5. saat) ilave edilmiştir. Son ürünlerdeki toplam fenolik madde (TFM), toplam antioksidan kapasite (TAK) değerleri, LC-MS/MS’de fenolik bileşen karakterizasyonu ve kaynatma süresine bağlı olarak bu değerlerdeki değişimlerin tespit edilerek optimum pişirme süresinin belirlenmesi amaçlanmıştır. Bu yolla da tüketicilerin beğenisine, atık ürün değerlendirilerek; yenilikçi, zenginleştirilmiş ve fonksiyonel ürün elde edilmeye çalışılmıştır.

Analiz sonuçları incelendiğinde; kemik suyunun üzüm çekirdeği ile kaynatılmasıyla, TFM ve TAK değerleri artış göstermiştir. En düşük sonuçlar kontrol grubunda, en yüksek değer ise kemik suyunun, üzüm çekirdeği ile 4 saat kaynayan numune olduğu tespit edilmiş ve bu değerler TFM ve TAK (DPPH ve CUPRAC) analizleri için sırasıyla 54.2-4680.1 mg GAE/100g; 2.8-438.3 mg TE/100g ve 61.4-1494.3 mg TE/100g olarak saptanmıştır. LC-MS/MS’de fenolik bileşen karakterizasyonunda 17 bileşen (Epikateşin, Kateşin, Gallik asit, Luteolin 7-O-glukozit, kuersetin 3-O-glukoronit, kuersetin 3-O-

glukozit, şirinjik asit, kafeik asit, elajik asit, rutin, vanilin, ferulik asit, taksifolin, 2-hidroksibenzoik asit, 3,4-dihidroksibenzoik asit, 4-hidroksibenzoik asit, 4-hidroksisinamik) tespit edilmiştir.

Anahtar Kelimeler: Kemik suyu, fonksiyonel gıda, üzüm çekirdeği, antioksidan kapasite, fenolik bileşik

ABSTRACT

Nowadays, thanks to the increasing knowledge about nutrition, consumers prefer a quality and healthy life. For this reason, the market share of functional products is increasing day by day. Functional foods can be a natural nutrient or enriched with a functional nutrient component. It has been determined that the consumption of phenolic compounds reduces the risks of some cancer types, cardiovascular diseases and different age groups degenerative diseases specific to with their antioxidant properties. Due to these and similar health effects, the production of products enriched in phenolic compounds has an important place in functional food production. Grape seed, which is produced as a waste in the wine and vinegar industry, is a good source of phenolic compounds with antibacterial and antioxidative activities.

The benefits of bone broth, which has an important place in our cultural nutrition, are supported by scientific studies. There is an increase in both consumption and industrial scale production of bone broth. Its consumed for flavor and healthy diet. In this study, grape seed, which has a high phenolic component and antioxidant activity and is obtained as waste products in food production enterprises, was added to bone broth at different time periods (1, 2, 3, 4 and 5 hours). It was aimed to determine the optimum cooking time by determining the total phenolic content (TPC), total antioxidant capacity (TAC), LC-MS/MS phenolic component characterization values in the final product and the change of these values depending on the boiling time. In this way, to the taste of consumers; is to obtain an innovative, enriched and waste-evaluated functional product.

When the analysis results are examined; the lowest results were found in the control group, the highest value was the sample that boiled bone broth with grape seed for 4 hours and these values were TPC and TAC (DPPH and CUPRAC) analyzes were determined as 54.2-4680.1 mg GAE/100g; 2.8-438.3 mg TE/100g and 61.4-1494.3 mg TE/100g respectively. Phenolic component characterization in LC-MS/MS, 17 compounds (Epicatechin, Catechin, Gallic acid, Luteolin 7-O-glucoside, Quercetin 3-O-glucuronide, Quercetin 3-O-glucoside, Syringic acid, Caffeic acid, Ellagic acid, Rutin, Vanillin, Ferulic acid, Taxifolin, 2-Hydroxybenzoic acid, 3,4-Dihydroxybenzoic acid, 4-Hydroxybenzoic acid, 4-Hydroxycinnamic acid) were detected.

In line with these results, boiling the bone broth with grape seeds increased TPC and TAC values.

Keywords: Bone broth, functional food, grape seed, antioxidant capacity, phenolic compound

**SIYAH NOHUTUN TAHIL ÜRÜNLERİNDE ZENGİNLEŞTİRME MATERYALİ OLARAK
KULLANIM POTANSİYELİ**
**POTENTIAL USE OF BLACK CHICKPEA AS AN ENRICHMENT MATERIAL IN CEREAL
PRODUCTS**

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ÖZET

Toplumun dengeli beslenme konusunda bilinçlenmesi ile birlikte gıdaların yalnızca açlık giderme için tüketimi sona ermiş, besleyici öğeler açısından da zengin bir kaynak olma gerekliliği ortaya çıkmıştır. Bu amaçla gıda bileşenlerince zengin bitkisel ve hayvansal çok çeşitli kaynaklarla fonksiyonel özelliklere sahip yeni ürünlerin geliştirilmesi çalışmaları ağırlık verilmiştir.

Değişmekte olan beslenme alışkanlıklarına rağmen tahıl ürünleri yaygın şekilde tüketilmeye devam etmektedir. Tahıl ürünlerinin zenginleştirilmesinde baklagil unları sahip oldukları bileşim özellikleri sayesinde fazlaca tercih edilen kaynaklardan bir tanesi haline gelmiştir. Dünya genelinde en çok yetiştirilen baklagiller içerisinde nohut (*Cicer arietinum* L.), kuru fasulyeden sonra 2. sırada yer almaktadır. *Leguminosae* familyasında yer almakta olan nohut *Papilionaceae* alt familyasına ve *Cicer* cinsine aittir. Büyük ve açık renkli “Kabuli” ile küçük ve koyu renkli “Desi” olmak üzere yaygın şekilde üretilen 2 nohut tipi bulunmaktadır. Desi ve Kabuli tipi nohutlara göre üretimi daha az olan “siyah nohut” ise son yıllarda iyi bir zenginleştirme materyali olarak dikkat çekmektedir. Bu nohut çeşidi zengin protein içeriğinin yanında demir, ham lif, doymamış yağ asidi ile antosiyanin ve karotenoid gibi biyoaktif bileşenleri de fazla miktarda içermektedir. İçerdiği bu antosiyanin ve karotenoidler sayesinde ise iyi bir antioksidan kaynağı olduğu belirtilmiştir. Siyah nohut ununun buğday ununa kıyasla toplam antosiyanin miktarının yaklaşık 70 kat, toplam karotenoid miktarının yaklaşık 6 kat, antioksidan aktivitesinin ise yaklaşık 2 kat fazla olduğu saptanmıştır. Tüm bu özelliklerinin yanında kabuk kısmının yaklaşık %65 oranında diyet lifi içerdiği ve bu nedenle iyi bir diyet lifi kaynağı olarak zenginleştirme çalışmalarında kullanılabileceği bildirilmiştir.

Bu çalışmada, siyah nohutun çeşitli tahıl ürünlerinin zenginleştirilmesinde kullanımına ilişkin araştırmalar incelenmiştir.

Anahtar Kelimeler: Siyah nohut, zenginleştirme, antioksidan aktivite

ABSTRACT

With the improvement of knowledge about balanced nutrition, the consumption of food only to satisfy hunger ended, and the need for food sources rich in nutritional elements has emerged. Therefore, the investigations have been focused on developing new animal and plant-based functional products which are rich in nutritional components.

Despite changing dietary habits, cereal products continue to be widely consumed. Thanks to their nutritional properties, legume flours have become one of the most preferred enrichment materials for the cereal products. Among legumes, chickpea (*Cicer arietinum* L.) is the second most-produced legume worldwide, after beans. Chickpea belongs to the family Fabaceae, subfamily Papilionaceae, and genus *Cicer*. There are two widely produced types of chickpeas which are “Kabuli” (large seeds and light-colored coats) and “Desi” (small seeds and dark-colored coats). In recent years, “Black chickpea”, which is less produced than Desi and Kabuli types, attracts attention as a good enrichment material. Besides the high protein content, black chickpeas are a good source of iron, fibers, polyunsaturated fatty acids, and bioactive compounds, such as anthocyanins and carotenoids. In addition, it is known that

black chickpea is a good source of antioxidants due to the content of anthocyanins and carotenoids. Black chickpea flour has approximately seventy times higher anthocyanin, six times higher carotenoid content, and approximately two times higher antioxidant activity than wheat flour. Besides all these nutritional properties, it has been reported that the hull of the black chickpea contains approximately 65% of dietary fiber. Therefore, it can be used as a good source of dietary fiber in enrichment studies.

In this research, we reviewed and discussed the studies on the use of black chickpea in the enrichment of cereal products

Keywords: Black chickpea, enrichment, antioxidant activity

**ASİTRETİN VE METOTREKSAT UYGULANMIŞ RATLARIN DALAK DOKUSUNDA
POLİFENOL OKSİDAZ AKTİVİTESİ ÜZERİNE ALFA-LİPOLİK ASİT'İN ETKİLERİ**
**EFFECTS OF A-LIPOLIC ACID ON POLYPHENOL OXIDASE ACTIVITY IN SPLEEN
TISSUE OF RATS TREATED WITH ACITRETIN AND METHOTREXATE**

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ÖZET

Lipofilik zayıf bir asit olan ACT, suda az çözünen bir A vitamini analogudur. Metotreksat (MTX, 4-amino-10-metilpteroilglutamik asit) ise bir folik asit analogu olup neoplastik olan veya olmayan hastalıklarda tedavi amacıyla kullanılan bir antimetabolittir. Ayrıca birçok hematolojik bozukluğu ve romatoid artrit gibi otoimmün hastalıkları tedavi etmek için yaygın olarak kullanılan MTX dozunun toksisiteye etkili olduğu da bilinmektedir. Son yıllarda da MTX, ACT ile birlikte kullanılmaktadır. Alfa lipoik asit (ALA) protein, yağ ve karbonhidrat metabolizmasında önemli fizyolojik etkileri olan besinsel bir koenzimdir. Organik besin monomerlerinin ATP'ye dönüştürülmesi için gerekli olan multi enzim kompleksinin parçasıdır. ALA'nın moleküler hasarı onarma, asetilkolin üretimini artırma, serbest radikallere ve lipid peroksidasyonu karşı koruma görevleri de vardır. Bu çalışmada, ACT ve MTX tarafından üretilen serbest radikallerin hücresel düzeyde neden olduğu hasarın giderilmesinde ALA'nın dalak dokusundaki polifenol oksidaz (PO) enzim aktivitesi üzerindeki etkisinin araştırılması amaçlanmıştır. Polifenol oksidaz, aktif bölgesinde bakır içeren, moleküler oksijen ile fenolik bileşiklerin oksidasyonunu katalize eden ve oksidoredüktaz sınıfının bir üyesi olan bir enzimdir. Çalışma grupları, Kontrol grubu (K), ALA grubu, ACT+MTX grubu ve ACT+MTX+ALA grubu olarak oluşturulmuştur. 24 saat aç bırakılmış olan ratlara yapılan enjeksiyon işlemleri her sabah aynı saatte gerçekleştirilmiştir. ACT, MTX ve ALA % 0.9'luk NaCl'de çözölmüştür. ACT (20mg/kg/gün), MTX (20mg/kg/hafta), ALA (50mg/kg/gün) ve bunların kombinasyonları da vücut ağırlığı düzeyinde intraperitoneal enjeksiyon ile ratlara verilmiştir. Ratlar enjeksiyon başlangıcından 7 gün sonra servikal dislokasyon ile sakrifiye edilmiş ve kalp perfüzyonundan sonra dalakları çıkarılmıştır. Ratlardan alınan dalak doku örneklerinde PO enzim aktivitesi ölçölmüştür. ALA verilen grupta K'ya göre %57 inhibisyon, ACT+MTX grubunda ise K'ya göre %48 inhibisyon gözlenmiştir. ACT+MTX grubuna ALA eklendiğinde ise K'ya göre %10 aktivasyon gözlenirken ACT+ MTX grubuna göre %52 aktivasyon gözlenmiştir. ALA tek başına verildiğinde dalak dokusunda PO aktivitesini inhibe ederek antioksidan özellik gösterirken ACT+MTX kombinasyonu ile birlikte verildiğinde PO aktivitesini tetikleyici etki göstermiştir.

Anahtar Sözcükler: Dalak, Asitretin, Metotreksat, Polifenol Oksidaz

ABSTRACT

ACT, a lipophilic weak acid, is a slightly water-soluble vitamin A analog. Methotrexate (MTX, 4-amino-10-methylpteroylglutamic acid) is a folic acid analogue and is an antimetabolite used for treatment in

neoplastic or non-neoplastic diseases. It is also known that the dose of MTX, which is widely used to treat many hematological disorders and autoimmune diseases such as rheumatoid arthritis, is effective in toxicity. In recent years, MTX has been used together with ACT. Alpha lipoic acid (ALA) is a nutritional coenzyme with important physiological effects in protein, fat and carbohydrate metabolism. It is part of a multi-enzyme complex required for the conversion of organic nutrient monomers to ATP. ALA also has tasks such as repairing molecular damage, increasing acetylcholine production, protecting against free radicals and forming lipid peroxidation. This study, it was aimed to investigate the effect of ALA on the polyphenol oxidase (PO) enzyme activity in the spleen tissue in removing the damage caused by the free radicals produced by ACT and MTX at the cellular level. Polyphenol oxidase is an enzyme that contains copper in its active sites, catalyzes the oxidation of phenolic compounds with molecular oxygen and is a member of the oxidoreductase class. Study groups were formed as Control group (C), ALA group, ACT+MTX group and ACT+MTX+ALA group. Injections performed on rats fasted for 24 hours were performed each morning synchronously. ACT, MTX and ALA were dissolved in 0.9% NaCl. ACT (20mg/kg/day), MTX (20mg/kg/week), ALA (50mg/kg/day) and their combinations were also given by intraperitoneal injection at body weight level. Rats were sacrificed by cervical dislocation seven days after the start of injection, and their spleens were removed after cardiac perfusion. PO enzyme activity was measured in spleen tissue samples taken from rats. Compared with group C; While 57% inhibition was observed in the ALA group, 48% inhibition was observed in the ACT+MTX group. When ALA was added to the ACT+MTX group, while 10% activation was observed according to K, 52% activation was observed compared to the ACT+ MTX group. As a result; when ALA was given alone, while it showed antioxidant properties by inhibiting PO activity in the spleen tissue, it showed a triggering effect on PO activity when given with ACT+MTX combination.

Keywords: Spleen, Acitretin, Methotrexate, Polyphenol Oxidase

**PERİPARTURİENT DÖNEM İNEKLERDE SERUM AST, ALT, ALP ve GGT
AKTİVİTELERİNİN ARAŞTIRILMASI**
**INVESTIGATION OF SERUM AST, ALT, ALP and GGT ACTIVITIES IN
PERIPARTURIENT COWS**

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ÖZET

Gebelikten laktasyona geçiş yani ‘periparturient dönem’ buzağılamadan önceki son 3-4 haftayı ve doğumdan sonraki ilk 3-4 haftayı kapsamaktadır. Periparturient dönem, birçok metabolik ve enfeksiyöz hastalıkların meydana geldiği, immun sistemin etkilendiği kritik bir dönemdir. Periparturient dönemdeki süt ineklerinin beslenmesi ve fizyolojisi ile ilgili yapılan çalışmalara göre, problemlerin en çok görüldüğü dönemdir. Bu dönemdeki metabolik hastalıklar tüm çiftlik hayvanlarında sorun olmakla beraber ekonomik kayıplara yol açmaktadır. İneklerde bu dönemdeki hastalıkların oluşma riski besinsel ve metabolik durumları içermekle birlikte diğer faktörler de (mevsim, yaş, gebelik sayısı, gebeliğin süresi, önceki hastalıklar ve hijyen gibi) etkili olmaktadır. Karaciğer fonksiyonu, süt ineklerinde kuru dönemden erken laktasyona geçişte çok önemlidir. Bu sebeplerden dolayı sütü ineklerde gebeliğin son dönemi, doğum anı ve laktasyonun başlangıcı kapsayan geçiş döneminde serum aspartat amino transferaz (AST), alanin amino transferaz (ALT), alkalin fosfataz (ALP) ve gama glutamil transferaz (GGT) aktivitelerinin araştırılması amaçlanmaktadır. Çalışmada 20 adet Esmer ve Simental ırkı inek kullanıldı. Çalışma için doğumdan bir ay önce, doğumdan iki hafta önce, doğum anında, doğumdan iki hafta sonra, doğumdan bir ay sonra olarak kan örnekleri kuyruk veninden antikuagülansız tüplere alındı. Alınan kanlar 3000 rpm’de 15 dk santrifüj edilerek serumları çıkartıldı. Ölçümler yapıncaya kadar serumlar -20°C’de muhafaza edildi. AST, ALT, ALP ve GGT aktiviteleri kolorimetrik yöntem ile ölçüldü. Periparturient dönem ineklerde yapılan bu çalışmada elde edilen verilerden yola çıkarak serum AST aktivitesi doğum anında ve doğumdan sonraki ikinci haftada diğer dönemlere göre anlamlı derecede yüksek ($p<0.001$) bulundu. Serum ALT aktivitesi doğumdan önceki iki hafta ve doğumdan önceki birinci aydaki dönemlerde doğum anı ve doğumdan sonraki bir aylık dönemlere göre anlamlı derecede yüksek ($p<0.01$) bulundu. Serum ALP aktivitesi doğum anında diğer dönemlere göre anlamlı derecede yüksek ($p<0.001$) bulundu. Serum GGT aktivitesi doğum anında, doğumdan sonraki iki hafta ve doğumdan sonraki bir aylık dönemlerde diğer dönemlere göre anlamlı derecede yüksek ($p<0.001$) bulundu. Sonuç olarak, özellikle doğum öncesi dönemde aşırı enerji tüketiminden kaçınmak karaciğer fonksiyonunu iyileştirmek için önemli olduğu kanaatine varılmıştır.

Ahahtar Kelimeler: Periparturient dönem, Aspartat amino transferaz, Alanin amino transferaz, Alkalin fosfataz, Gama glutamil transferaz.

ABSTRACT

The transition from pregnancy to lactation that is the 'periparturient period' covers the last 3-4 weeks before calving and the first 3-4 weeks after calving. The periparturient period is a critical period in which many metabolic and infectious diseases occur and the immune system is affected. According to the studies on the nutrition and physiology of dairy cows in the periparturient period it is the period when the problems are most common. Metabolic diseases in this period are a problem in all farm animals and cause economic losses. While the risk of developing diseases in cows in this period includes nutritional and metabolic conditions, other factors (season, age, number of pregnancies, duration of pregnancy, previous diseases and hygiene) are also effective. Liver function is very important in the transition from dry to early lactation in dairy cows. For these reasons, it is aimed to investigate serum aspartate amino transferase (AST), alanine amino transferase (ALT), alkaline phosphatase (ALP) and gamma glutamyl transferase (GGT) activities in dairy cows during the transitional period including the last period of pregnancy, calving and the beginning of lactation. 20 Brown and Simmental cows were used in the study. For the study, blood samples were drawn from the tail vein into tubes without anticoagulation one month before calving, two weeks before calving, at the time of calving, two weeks after calving, and one month after calving. The blood samples were centrifuged at 3000 rpm for 15 minutes and their serums were extracted. Serums were stored at -20°C until measurements were made. AST, ALT, ALP and GGT activities were measured by colorimetric method. Based on the data obtained in this study in periparturient cows, serum AST activity was found to be significantly higher at the time of calving and in the second week after calving compared to other periods ($p<0.001$). Serum ALT activity was found to be significantly higher in the two weeks before calving and in the first month before calving compared to the time of calving and one month after calving ($p<0.01$). Serum ALP activity was found to be significantly higher at the time of calving compared to other periods ($p<0.001$). Serum GGT activity was found to be significantly higher at the time of calving, two weeks after calving, and one month after calving compared to other periods ($p<0.001$). As a result, it was concluded that it is important to avoid excessive energy consumption especially in the prenatal period to improve liver function.

Keywords: Periparturient period, Aspartate amino transferase, Alanine amino transferase, Alkaline phosphatase, Gamma glutamyl transferase.

**SALGINLARA NEDEN OLAN *SHIGELLA SONNEI*'Yİ ENFEKTE EDEN YENİ BİR LİTİK
BAKTERİYOFAJIN İZOLASYONU**
**ISOLATION OF A NOVEL LYTIC BACTERIOPHAGE INFECTING *SHIGELLA SONNEI*
CAUSING EPIDEMICS**

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ÖZET

Şigelloz, shigellanın neden olduğu gıda ve su kaynaklı hastalıklardan biridir. *S. sonnei* de dahil olmak üzere dört *Shigella* bakteri türünden birinin neden olduğu bir gastrointestinal enfeksiyondur. Çok düşük enfektif doza sahip virülan bir patojendir, bu da az sayıda bakterinin, yaklaşık 10 ila 100 organizmanın hastalığa neden olması için yeterli olduğu anlamına gelir. İnsanlar bilinen tek rezervuardır ve kanlı ishalden sonra haftalarca dışkıda bakteri salgılayabilir. *Shigella*, enfekte kişilerin bağırsaklarında bulunur ve kişiden kişiye temas, enfekte bir kişinin dışkısı ile temas veya kontamine gıda veya su tüketimi gibi dolaylı temas yoluyla fekal oral yolla bulaşabilir. Asemptomatik taşıyıcılar da hastalığı bulaştırabilir. Tüm yaş grupları arasında ishale bağlı ölümlerin ikinci nedenidir. *Shigella sonnei*, *Shigella* türleri arasında akut bağırsak enfeksiyonunun en yaygın etkenidir. Günümüzde *Shigella* izolatlarında görülen çoklu antibiyotik direncinin tedavide büyük sorunlara neden olduğu bildirilmektedir. Geçen yıllarda sıkça kullanılan trimetoprim/sülfametoksazol ve ampisiline karşı birçok ülkede yüksek oranda direnç geliştiği görülmektedir. Antibiyotik direncindeki artış nedeniyle morbidite ve mortalite oranlarının önlenmesi için alternatif tedavi yöntemlerine ihtiyaç duyulmaktadır. Bu nedenle Bakteriyofaj tedavisi bu yolda bir ışık olmuştur. *Shigella* fajları, yüksek riskli bölgelerde salgın şigellozu azaltmak ve gelişmiş ülkelerde antibiyotiğe dirençli bakterileri tedavi etmek için büyük potansiyel göstermiştir. *Shigella sonnei*'yi enfekte eden yeni bir litik bakteriyofajı izole ederek faj tedavisi ile şigellozu biyokontrol etmeyi amaçladık. Gıda ve su kaynaklı çeşitli salgınlara neden olan *S. sonnei* Mikroliz Terapötik Bakteriyofaj Bankasından (MTBB) alınmıştır. Çalışmaya 5 adet *S. sonnei* dahil edilmiştir. İzolatların antimikrobiyal duyarlılıkları disk difüzyon yöntemi kullanılarak EUCAST önerilerine göre değerlendirildi. Çoklu ilaç direncine sahip olan *Shigella* spp. spesifik fajları izole etmek için bir atık su arıtma tesisinden farklı numuneler kullanıldı. Sonuç olarak, atık sudan *S. sonnei*'nin büyümesini etkili bir şekilde inhibe edebilen litik bakteriyofaj izole edildi. Fizyolojik ve genetik özellikleri karakterize edildi. Geniş konak aralığı, hızlı litik döngüsü ve istenmeyen genlerin bulunmaması, çeşitli faj uygulamalarında potansiyel kullanım için çok umut vericidir.

Anahtar Kelimeler: *S. sonnei*, diare, bakteriyofaj.

ABSTRACT

Shigellosis is one of the food and waterborne diseases caused by shigella. It is a gastrointestinal infection caused by one of four species of Shigella bacteria, including *S. sonnei*. It is a virulent pathogen with a very low infective dose, meaning that a small number of bacteria, about 10 to 100 organisms, is sufficient to cause disease. Humans are the only known reservoir and can excrete bacteria in the stool for weeks after bloody diarrhea. Shigella is found in the intestines of infected people and can be transmitted via the fecal-oral route through indirect contact, such as person-to-person contact, contact with the feces of an infected person, or consumption of contaminated food or water. Asymptomatic carriers can also transmit the disease. It is the second cause of death due to diarrhea among all age groups. Shigella sonnei is the most common cause of acute intestinal infection among Shigella species. It has been reported that multi-antibiotic resistance seen in Shigella isolates causes major problems in treatment. It is observed that high rates of resistance have developed in many countries against trimethoprim/sulfamethoxazole and ampicillin, which have been used frequently in the past years. Due to the increase in antibiotic resistance, alternative treatment methods are needed to prevent morbidity and mortality rates. Therefore, Bacteriophage therapy has been a light on this path. Shigella phages have shown great potential to reduce epidemic shigellosis in high-risk areas and to treat antibiotic-resistant bacteria in developed countries. We aimed to biocontrol shigellosis by phage therapy by isolating a novel lytic bacteriophage infecting Shigella sonnei. *S. sonnei*, which causes various food and water-borne outbreaks, was obtained from the Microlysis Therapeutic Bacteriophage Bank (MTBB). 5 *S. sonnei* strains were included in the study. Antimicrobial susceptibility of the isolates was evaluated using the disc diffusion method according to EUCAST recommendations. Shigella spp., which has multi-drug resistance. Different samples from a wastewater treatment plant were used to isolate specific phages. As a result, lytic bacteriophage was isolated from the wastewater, which can effectively inhibit the growth of *S. sonnei*. Physiological and genetic features were characterized. Its wide host range, fast lytic cycle and absence of unwanted genes make it very promising for potential use in various phage applications.

Keywords: *S. sonnei*, diarrhea, bacteriophage.

**MELEZ BİR KÖPEKTE PULMONER HİPERTANSİYON VE İZOLE SAĞ TARAFLI
KONJESTİF KALP YETMEZLİĞİNİN EKO KARDİYO GRAFİK DEĞERLENDİRİLMESİ**
**ECHOCARDIOGRAPHIC EVALUATION OF PULMONARY HYPERTENSION AND
ISOLATED RIGHT-SIDED CONGESTIVE HEART FAILURE IN A MIX-BREED DOG**

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ÖZET

Kalp yetmezliği, kardiyovasküler sistemin yeterli kan dolaşımını sağlayamamasıyla sonuçlanan önemli fonksiyon bozukluğunun görüldüğü bir sendromdur. Köpeklerde sol taraflı konjestif kalp yetmezliği dejeneratif miksomatöz lezyonlarla ilişkili olsa da, sağ taraflı kalp yetmezliği çoğunlukla pulmoner hipertansiyonla ilişkilidir. Ekokardiyografik muayene hem insanlarda hem de köpeklerde pulmoner hipertansiyon ve sağ taraflı kalp yetmezliğinin tespitinde önemli rol oynamaktadır. Sunulan olgu materyalini uyuşukluk, abdominal distansiyon, kaşeksi ve egzersiz intoleransı şikayetleri ile kliniğimize getirilen, dokuz yaşlı, dişi, kısırlaştırılmış, melez ırk bir köpek oluşturdu. Yapılan klinik muayenede göğsün sağ tarafında 4/6 derece holo-sistolik üfürüm, siyanotik mukozal membranlar, abdominal palpasyonda fluktuasyon ve taşikardi belirlendi. Sağ parasternal uzun ve kısa eksen görünümünün ekokardiyografik incelemesinde perikardiyal kesede sıvı birikimi görüldü. Ayrıca, sağ atriyum ve ventrikülde genişleme ve intraventriküler septumda düzleşme gözlemlendi. Renkli Doppler ekokardiyografide ciddi triküspit kapak yetmezliği tespit edildi. Ayrıca, pulmoner arter kapağının Doppler değerlendirmesinde deselerasyon süresinde uzama ve aselerasyon süresinde azalma belirlendi. Triküspit kapağın Sürekli akım (CW) Doppler değerlendirmesinde, 57 mm Hg'lik sağ ventrikül sistolik basıncına (RVSP) eşit 3,91 m/s'lik bir regürjitasyon akımı izlendi. Ayrıca, sağ atrium alanı sol atriumun üç katı büyüklükte ölçüldü. Sonuç olarak köpeklerde pulmoner hipertansiyon sağ taraflı konjestif kalp yetmezliğine neden olabilir. Ayrıca sağ taraflı konjestif kalp yetmezliği karın boşluğu, toraks ve perikardiyal kesede sıvı birikimine yol açabilir. Kalp yetmezliğinin kesin nedenini değerlendirmek için konvansiyonel ve Doppler ekokardiyografik muayene gereklidir.

Anahtar kelimeler: Köpek, Ekokardiyografi, Pulmoner Hipertansiyon.

ABSTRACT

Heart failure is a syndrome in which severe dysfunction results in the failure of the cardiovascular system to maintain adequate blood circulation. Although in dogs, left-sided congestive heart failure is related to degenerative myxomatous lesions, right-sided HF is mostly associated with pulmonary hypertension. Echocardiography plays a pivotal role in the detection of pulmonary hypertension and right-sided heart failure in both humans and dogs. The case material was a nine years old, female, spayed, mix-breed dog brought to our clinic with complaints of lethargy, abdominal distension, cachexia and exercise intolerance. Clinical findings showed a 4/6-degree holo-systolic murmur on the right side of the chest, cyanotic mucosal membranes, fluctuation on the abdominal palpation, and tachycardia. An echocardiographic examination of the right parasternal long and short axis views showed fluid accumulation in the pericardial sac. Also, enlargement of the right atrium and ventricle, and flattening of the intraventricular septum were observed. Color Doppler echocardiography showed severe tricuspid valve regurgitation. In addition, Doppler evaluation of the pulmonary artery valve revealed a prolongation of deceleration time and a decrease in acceleration time. CW-Doppler evaluation of the tricuspid valve showed a regurgitation flow of 3.91 m/s equal to the RVSP of 57 mmHg. Furthermore, the area of the right atrium was measured to be three times bigger than the size of the left atrium. In conclusion, pulmonary hypertension in dogs can cause right-sided congestive heart failure. Also, right-

sided congestive heart failure can lead to fluid accumulation in the abdominal cavity, thorax, and pericardial sac. To evaluate the exact cause of HF, conventional and Doppler echocardiography is necessary.

Keywords: Dog, Echocardiography, Pulmonary Hypertension.

BAZI YEŞİL ALAN BİTKİLERİNİN FİZİKSEL ÖZELLİKLERİNİN BELİRLENMESİ
DETERMINING THE PHYSICAL PROPERTIES OF SOME TURFGRASS PLANTS

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ÖZET

Son yıllarda yeşil alanların artırılmasına yönelik yapılan çalışmalar artmaktadır. Ancak burada değerlendirilecek olan bitkilerin özelliklerinin bilinmesi kaliteli, uzun ömürlü ve istenilen performansı gösterebilmeleri bakımından önem taşımaktadır. Bu çalışma 2022 yılında Bingöl Üniversitesi Ziraat Fakültesi Biyosistem Mühendisliği ve Tarla Bitkileri Bölümlerine ait laboratuvarlarda gerçekleştirilmiştir. Yeşil alan bitkilerinden çayır salkımotu (*Poa pratensis* L.), kaba salkımotu (*Poa trivialis* L.), narin tavusotu (*Agrostis tenuis* Sibth.) ve stolonlu tavusotu (*Agrostis stolonifera* L.) bitkilerine ait tohumların bazı fiziksel özellikleri incelenmiştir. Elde edilen değerlerin yeşil alanların mekanizasyon aracılığı ile artırılmasına katkı sağlayacağı ön görülmektedir.

Anahtar Kelimeler: Yeşil alan bitkileri, Tavusotu, Salkımotu, Tohum özellikleri

ABSTRACT

In recent years, studies to increase green areas have been increasing. However, knowing the characteristics of the plants to be evaluated here is important in terms of showing quality, longevity and desired performance. This study was carried out in the laboratories of Bingöl University Faculty of Agriculture, Biosystem Engineering and Field Crops Departments in 2022. Some physical properties of seeds of green field plants such as Kentucky bluegrass (*Poa pratensis* L.), rough bluegrass (*Poa trivialis* L.), colonial bentgrass (*Agrostis tenuis* Sibth.) and creeping bentgrass (*Agrostis stolonifera* L.) were investigated. It is foreseen that the obtained values will contribute to the increase of green areas through mechanization.

Keywords: Green field plants, Bluegrass, Bentgrass, Seed characteristics

1. GİRİŞ

Son yıllarda yeşil alanların artırılmasına yönelik yapılan çalışmalar gün geçtikçe artmaktadır. Ancak burada değerlendirilecek olan bitkilerin özelliklerinin iyi bilinmesi kaliteli, uzun ömürlü ve istenilen performansı gösterebilmeleri bakımından önem taşımaktadır. Ayrıca su ve rüzgar erozyonun karşı toprak yüzeyinin korunarak toprak kayıplarının önüne geçilmesi son derece önemlidir. Bu çalışma içerisinde yeşil alanlarda kullanılan dört farklı bitki incelenmiştir.

Tavusotu (*Agrostis* L.): Çok sık ve dipten biçimlere, aşırı soğuk iklimlere dayanıklılığı ile bilinen tavusotu (*Agrostis* L.) cinsine ait yaklaşık 200'den fazla tür bulunmakta ve bütün türler yağışlı koşullarda, verimli topraklarda ve toprak pH'sı 5.5-6.5 olduğunda oldukça başarılı bir çim örtüsü oluşturabilmektedirler (Avcıoğlu, 1997; Avcıoğlu ve ark., 2009). Karasal iklimlere uyum sağlamış olan bu türler o bölgelerde golf sahalarında yoğun bir şekilde kullanılmaktadırlar (Serin & Tan, 1998).

Avrupa ve Asya'da doğal olarak yetişen stolonlu tavus otu (*Agrostis stolonifera* L.), ince dokulu ve sık biçime dayanıklı olması sebebiyle dünyanın birçok bölgesinde yeşil alan bitkisi olarak kullanılmaktadır. Farklı toprak tiplerine uyum sağlayabilen stolonlu tavusotu, birçok serin iklim bitkisine göre tuza dayanıklılığı oldukça fazla olan bir bitkidir. En iyi gelişmesini serin ve güneşli olan bitki, aşırı sıcak ve soğuklara dayanıklı olup, sıcak iklim bölgelerindeki yarı gölge şartlarında çok başarılı bir şekilde yetişebilmektedir (Avcıoğlu ve ark., 2009). Uzun ömürlü bir bitki olan stolonlu tavusotunun tohumlarının çimlenmesi ve alan kaplama hızı biraz yavaş olup, daha sonra hızlı bir şekilde gelişebilmektedir. Stolonlu tavusotu, tohumla veya vejetatif olarak stolon parçaları ile üretimi yapılmaktadır (Açıkgöz, 1994). Ekim işlemleri elle serpme şeklinde yapılmakta olup, 1 gramında 12 000 adet tohum bulunduğu için tohumlar özellikle rüzgârsız hava şartlarında ve mümkün olduğu kadar yüzeye yakın bir şekilde yapılması gerekmektedir (Avcıoğlu ve ark., 2009).

İnce tavusotu olarak da bilinen narın tavusotu (*Agrostis tenuis* Sibth.), Avrupa'nın doğal türleri arasında yer almaktadır (Avcıoğlu, 1997). Kısa boylu, ince yapılı ve narın bir bitki olan narın tavusotu, kısa sülük ve köksaplara sahip olup oldukça yavaş gelişmektedir. Kış soğuklarına dayanımı stolonlu tavusotundan zayıf olsa da çoğu bölgelerde kış soğuklarından zarar görmeden kış aylarını geçirmektedir. Uzun ömürlü olan narın tavusotu, çok farklı toprak şartlarında yetişebilmekte, verimli, nemli, ince yapılı ve pH'sı 5.5-6.5 arasında olan asitli topraklarda daha iyi gelişebilmektedir (Açıkgöz, 1994). Narın tavusotunun bir gramında 16 000 adet tohum bulmasından dolayı tohum yatağı hazırlığının çok daha özenle hazırlanması gerekmektedir. Yeşil alan oluşturulmasında, golf alanları, park ve bahçeler için tercih edilen türler arasında olup, kaliteli çim yüzeyleri elde edebilmek amacıyla bakımında çok özenli olunmalıdır (Avcıoğlu ve ark., 2009).

Salkımotu (*Poa* L.): Salkımotu (*Poa* sp. L.) cinsi buğdaygiller familyasına ait "yumak oymağı" (*Festuceae*) içerisinde bulunmaktadır (Gençkan, 1992). Bu cinse ait türler ülkemizin değişik bölgelerindeki doğal vejetasyonda görülmektedirler (Elçi, 2005). Dünyanın hemen hemen her yerinde, özellikle ılıman ve soğuk iklim bölgelerinde, hatta tropik bölgelerin yüksek dağlık kesimlerine kadar yayılmış yaklaşık 500 kadar türü bulunmaktadır (Hatipoğlu & Atış, 2009). Çok farklı kullanım alanlarına sahip olan salkımotu türleri genellikle tarımsal açıdan bir değer taşımamaktadırlar (Soya ve ark., 2004).

Taban ve nemli mera alanlarında çok sık rastlanan ve çok değerli bir mera bitkisi olan çayır salkımotu (*Poa pratensis* L.), sığır, koyun ve atlar için oldukça değerli bir yem kaynağı durumunda olup (Wennerberg, 2004), meralarda azalıcı bitki grubunda bulunmaktadır (Serin ve ark., 2005). Çayır salkımotu, uzun ömürlü çok yıllık olup köksap oluşturarak gelişen kısa boylu bir buğdaygil yem bitkisidir. Kurağa dayanımı az olan bitki ekimden sonra yavaş gelişmekte, ancak daha sonra köksapları ile gelişerek hızlı bir şekilde etrafa yayılmaktadır (Elçi ve Açıkgöz, 1993). Biçime dayanıklı olması, sıkı bir çim kapağı oluşturması, yapraklarının parlak renkli ve ince olması gibi nedenlerle yeşil alanlarda çok fazla kullanılmaktadır. Bu nedenle de ülkemizde pazara sunulan çayır salkımotu tohumluğunun yem bitkisinden ziyade hemen hemen tamamı yeşil alan bitkisi olarak kullanılmaktadır (Açıkgöz, 2021). Buğdaygil yem bitkileri arasında en küçük tohumlara sahip olan bitkilerden birisi olan çayır salkımotundan çok iyi bir fide çıkışı elde edebilmek için tohum yatağının çok iyi hazırlanması, tohumun toprakla iyi temas etmesi için ekimden sonra merdane geçirilerek toprağın iyice bastırılması gerekmektedir (Soya ve ark., 2004).

Çok yıllık ve uzun ömürlü olan kaba salkımotu (*Poa trivialis* L.), Avrupa'nın yerli bir bitkisi olup serin ve nemli iklimlerde çok iyi gelişme göstermekte, kurağa ve sıcağa dayanıklılığı ise zayıf olan bir bitkidir (Açıkgöz, 1994). Daha az kardeş ve sürgün oluşturan ve adi salkımotu olarak da bilinen kaba salkımotu, rizom oluşturmamakta ve son yıllarda kullanımı azalmış olan bir buğdaygil bitkisidir (Avcıoğlu, 1997). Bol nemli ve gölgeli topraklarda diğer yeşil alan bitkilerinden daha iyi gelişen kaba salkımotu, kurak ve sıcak yaz aylarında dormant duruma geçerek sonbaharda havaların serinlemesi ile birlikte tekrar

gelişmeye devam etmektedir (Elçi, 2005). Biçmeye karşı oldukça dayanıklı olan bitki, 1 cm civarında yapılan biçimlerden dahi çok fazla zarar görmemektedir (Açıkgöz, 1994).

Bu çalışmada, yeşil alanların değerlendirilmesinde kullanılan dört farklı bitkiye ait tohumların bazı fiziksel özellikleri incelenmiştir. Özellikle mekanizasyon yardımı ile geniş arazilerde bu bitkilerin rahatlıkla ekilebilmesi için tohumlara ait bazı özelliklerin bilinmesi gerekmektedir. Bu çalışma içerisinde bu parametrelerin belirlenmesi amaçlanmıştır.

2. MATERYAL VE METOT

Bu çalışma, 2021 yılında Bingöl Üniversitesi Ziraat Fakültesine ait laboratuvarlarında yürütülmüştür. Yeşil alan bitkilerinden çayır salkımotu (*Poa pratensis* L.), kaba salkımotu (*Poa trivialis* L.), narin tavusotu (*Agrostis tenuis* Sibth.) ve stolonlu tavusotu (*Agrostis stolonifera* L.) bitkilerine ait tohumların bazı fiziksel özellikleri incelenmiştir. Tohumlar Bingöl Üniversitesi Ziraat Fakültesi Tarla Bitkileri Bölümünden temin edilmiştir. Tohumların uzunluk (mm), genişlik (mm), yüzey alan (mm²), ortalama aritmetik ve geometrik çap (mm), küresellik ve bin tane ağırlıkları (g) belirlenmiştir (Dumanoglu ve ark., 2021). Her bir tohum grubunun içerisinde rastgele olacak şekilde 100'er adet tohum seçilerek kendine ait yazılımı olan stereo mikroskop (Nikon SMZ 745T) altında uzunluk, genişlik ve yüzey alan değerleri ölçülmüştür (Dumanoglu ve ark., 2022). Burada belirlenen değerlerden faydalanılarak bu tohumlara ait ortalama aritmetik $((L+W)/2)$ ve geometrik çap $((L \times D^2)^{1/3})$ ile küresellik (D_0/L) değerleri saptanmıştır (L: Tohuma ait uzunluk değeri (mm) W: Tohuma ait genişlik değeri (mm), D: Ortalama aritmetik çap (mm); D_0 : Ortalama geometrik çap (mm)) (Mohsenin, 1970; Alayunt, 2000; Kara, 2012; Kara, 2017). Ayrıca 0.001 g hassas terazi kullanılarak tohumlara ait bin tane ağırlıkları tartılmıştır (Dumanoglu & Geren, 2020; Ozturk & Dumanoglu, 2021). Elde edilen verilerden faydalanarak Tablo 1'de belirtilen aralıklara göre tohumların sınıflandırılması yapılmıştır.

Tablo 1. Tohumların geometrik ve şekil özelliklerine göre sınıflandırılması (Yağcıoğlu, 2015)

Geometrik özelliklerine göre tohumlar	Tane genişliği/Tane uzunluğu (b/a) (mm)
Uzun	<0.6
Orta	0.6 – 0.7
Kısa	> 0.7
Şekil özelliklerine göre tohumlar	Uzunluk (a), Genişlik (b), Kalınlık (c) (mm)
Yuvarlak	$a \approx b \approx c$
Oval	$a/3 < b \approx c$
Uzun	$c < b < a/3$

3. BULGULAR VE TARTIŞMA

Bu çalışmada 4 farklı yeşil alan bitkisine ait tohumların bazı tohum özellikleri incelenmiştir. Elde edilen verilere göre, tüm yeşil alan bitkilerine ait tohumların genel olarak ortalamaları, 2.202 mm uzunluk, 0.522 mm genişlik, 0.933 mm² yüzey alan, 1.362 mm aritmetik çap, 1.767 mm geometrik çap, 0.678 küresellik ve 0.214 g bin tane ağırlığı saptanmıştır. Stolonlu tavusotu ile narin tavusotunu incelediğimizde, bu bitkilere ait tohumların ortalama 1.571 mm uzunluk, 0.397 mm genişlik, 0.417 mm² yüzey alan, 0.984 mm aritmetik çap, 0.567 mm geometrik çap, 0.334 küresellik ve 0.123 g bin tane ağırlığına sahip oldukları belirlenmiştir. Çayır salkımotu ile kaba salkım otlarının tohum özellikleri ise; ortalama 2.834 mm uzunluk, 0.647 mm genişlik, 1.395 mm² yüzey alan, 1.740 mm aritmetik çap, 2.966 mm geometrik çap, 1.022 küresellik ve 0.305 g bin tane ağırlığına sahip oldukları saptanmıştır. Birbirlerine yakın değerler almış olsalar da tavusotlarını kendi içlerinde incelediğimizde, stolonlu tavusotunun değerlerinin narin tavusotuna göre daha yüksek olduğu; aynı şekilde salkımotlarını incelediğimizde de Çayır salkımotunun değerlerinin Kaba salkımotuna daha yüksek olduğu belirlenmiştir (Tablo 2). Dört farklı yeşil alan bitkisine ait tohumların özelliklerinden elde edilen verilere göre, tüm tohumların geometrik özelliklerine ve şekil özellikleri bakımından uzun tohumlar olduğu belirlenmiştir.

Tablo 2. Yeşil alan bitkilerine ait bazı tohum özellikleri

Tohumlar	Tohum özellikleri						
	Uzunluk (mm)	Genişlik (mm)	Yüzey alan (mm ²)	Ortalama Aritmeti k Çap (mm)	Ortalama Geometri k Çap (mm)	Küresellik	Bin tane ağırlığı (g)
<i>Stolonlu tavusotu</i> (<i>Agrostis stolonifera</i> L.)	1.681	0.414	0.524	1.048	0.700	0.381	0.089
<i>Narin tavusotu</i> (<i>Agrostis tenuis</i> Sibth.)	1.460	0.379	0.417	0.920	0.434	0.286	0.157
Ortalama	1.571	0.397	0.417	0.984	0.567	0.334	0.123
<i>Çayır salkımotu</i> (<i>Poa pratensis</i> L.)	2.861	0.652	1.423	1.756	3.084	1.046	0.316
<i>Kaba salkımotu</i> (<i>Poa trivialis</i> L.)	2.806	0.641	1.366	1.723	2.848	0.998	0.293
Ortalama	2.834	0.647	1.395	1.740	2.966	1.022	0.305
Toplam Ortalama	2.202	0.522	0.933	1.362	1.767	0.678	0.214

Sonuç olarak, bu çalışmada yeşil alanların oluşturulması ve değerlendirilmesinde tercih edilen dört farklı yeşil alan bitkisine ait tohumların bazı fiziksel özellikleri incelenmiştir. Elde edilen değerler, özellikle mekanizasyon yardımı ile geniş arazilerin yeşillendirilmesinde, hayvansal üretim faaliyeti gösteren alanlarda değerlendirilmesine olanak sağlayacaktır. Ayrıca su ve toprak erozyonuna karşı toprak yüzeyini koruyacağından toprak kayıplarının da önlenmesi mümkün olacaktır. Arazi ve toprak yapısı gibi özellikler göz önüne alınarak seçilen ekim makinalarının ekici düzenlerinin tohumların yapısına uygun olarak tercih edilmesi ekonomik anlamda üreticilerin tohum gibi önemli bir girdi kaynağından tasarruf etmelerine yardımcı olacaktır.

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**BAL ARILARININ YÖN BULMALARINDA TİTREŞİM FREKANSI İLE
ANTENLERİNDEN FAYDALANABİLME İMKÂNLARININ ARAŞTIRILMASI**
**INVESTIGATION OF THE OPPORTUNITIES THAT HONEY BEES CAN BENEFIT FROM
THEIR ANTENNAS AND VIBRATION FREQUENCY IN FINDING THE DIRECTION**

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ÖZET

İşçi arıların besin kaynağının yerini veya karşılaşılan herhangi bir tehlike durumunu kendi kovanda oldukları arılara haber verdiğini biliyoruz. Bu iletişim yolunun Dans Teorisi ve Koku Teorisine nispeten yol ve zaman açısından daha ekonomik olduğunu düşündüğümüz sesin titreşiminin antenler vasıtasıyla alınıp, arıların ses kaynağına doğru yönelimlerinin olup olmadığına dair bir dayanak arandı. Çalışma 20 kovanın bulunduğu ve yaklaşık 100.000 arıyı ihtiva eden bir alanda Kafkas arılarıyla yapıldı.

İşçi arıların geri dönüş yollarını bulma noktalarında kovanlarıyla aralarında titreşimsel bir ilişki olabilir miydi? Bunun için deney kovanından alınan işçi arılar işaretlenip kavanoz içerisinde, önceden gitmedikleri yerlere bizim tarafımızca götürülüp serbest bırakıldılar. 1 km'den 5 km'ye kadar bırakılan her noktadan geri dönüşler olduğu belirlendi. Bu da bizim çalışmamız için kovanla gezici arı arasında farklı bir iletişim olabileceğini düşündüren olumlu bir sonuçtu. Çünkü arı, kovanını bilmediği bir alanda olmasına rağmen buluyordu. Ancak yine de arılar, bu alanları önceden ziyaret edip belli işaretçileri hafızalarında taşıyor olabilir miydi? Bu problemi ortadan kaldırmak adına sağlam niteliğinde yeni bir çalışma daha yapıldı. Bu sağlamada deney kovanının yeri gece yarısı 5 km öteye taşındı. Sabahın ilk ışıklarından biraz önce kovan açıldı ve çıkan arılar toplanarak ilk uçuşlarını yapmadan yakalanıp işaretlendiler. İşaretlenen arılar kovandan sırasıyla 500 m ve 1 km uzaklıklardaki rastgele alanlara götürüldü. Bu arılardan bazılarının döndüğü kamera kayıtlarımızda görüntülendi. Dönemeyen arıların işçi olmayan arılar olabileceği ihtimalini de göz önüne alırsak arı iletişiminde yeni bir bakış açısı geliştirmeyi yani bize göre kovanın yaydığı bir frekansın işçi arılar tarafından okunabildiği ve geri dönüş için en kısa yolu seçmelerinde bir referans olarak kullanabileceklerini düşünebiliriz. Anlaşılan gezici arıların geri dönüş için kullandıkları en kısa yolu bulmalarını sağlayan bir yol vardı ve bu yol pek çok araştırma metodunun ortaya koyulmasıyla bulunacak komplike bir yoldu. Gelişen teknoloji ve çipleme sisteminden yararlanılarak takibinin yapılabileceği daha yetkin çalışmalarla bu yolun bulunması mümkün olacaktır.

Anahtar Kelimeler: Bal Arısı, Arılarda Yön Bulma, Arılarda İletişim, Titreşim ve Frekans

ABSTRACT

A basis was sought as to whether the vibrations of the sound and the frequencies emitted in the air, which we think are more economical in terms of distance and time, compared to the dance theory and the theory of smell, are received by the bees via antennas and whether the bees are oriented towards the sound source. The study was conducted with Caucasian bees in an area containing 20 hives and approximately 100,000 bees.

However, could the bees have visited these areas in advance and carried certain markers in their memory? In order to eliminate this problem, a new study was carried out in the nature of provision. In this provision, the location of the experimental hive was moved 5 km away at midnight. A little before the first light of the morning, the hive was opened and the emerging bees were collected, caught and marked before they made their first flight. The marked bees were taken to random areas at 500 m and 1 km distances from the hive, respectively. Some of these bees were seen in our camera recordings

returning. Considering the possibility that non-returning bees may be non-worker bees, we can think of developing a new perspective in bee communication, that is, a frequency emitted by the hive can be read by the worker bees and can be used as a reference in choosing the shortest path for return. It seems that there was a path that allowed the wandering bees to find the shortest path they took to return, and this path was a complicated path to be found by introducing many research methods. It will be possible to find this way with more competent studies that can be followed by using the developing technology and chipping system.

Key Words: Honey Bee, Direction Finding in Bees, Communication in Bees, Vibration and Frequency

KOVAN RENGİNİN BAL ARISI KOLONİSİ PERFORMANSINA OLASI ETKİLERİ
POTENTIAL EFFECT OF HIVE COLOR ON HONEY BEE COLONY PERFORMANCE

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ÖZET

Kovan renginin koloni performansı üzerine olası etkilerini belirlemeyi amaçlayan araştırmada, çam ağacından imal edilmiş toplam 9 adet kovan kullanılmıştır. Birinci grup kovanlar kapaklar dahil beyaz, ikinci grup kovanlar kapak dahil mavi ve üçüncü grup kovanlar kapak beyaz gövde ise mavi renge boyanmış ve içerlerine veri kaydediciler yerleştirilmiştir. Açık alanda tutulan kovanlarda 27 Haziran/26 Temmuz tarihleri arasında her 59 dakikada bir sıcaklık kaydı yapılmıştır. İki farklı rengin üç kombinasyonunun kovan iç sıcaklığına etkisinin ele alındığı çalışmada birinci, ikinci ve üçüncü grup için sıcaklık değer ortalamaları tüm gün için sırasıyla 22.36 ± 7.23 °C, 24.26 ± 8.27 °C ve 24.93 ± 8.91 °C olarak hesaplanmış ve bir yönlü varyans analizi sonuçlarına göre gruplar fark istatistik olarak önemli bulunmuştur ($p < 0.001$). Araştırmada çevre sıcaklığının kovan içi sıcaklığına günün belli saatlerinde daha etkili olacağından hareketle 10.00-17.00 saatleri arasındaki veriler ayrı olarak ele alınmış, söz konusu analizler tekrarlanmıştır. Buna göre gerek tüm gün gerekse günün sıcak saatlerine ait veriler dikkate alındığında, beyaz renk grubunun daha düşük sıcaklık ortalamasına sahip olduğu görülmüştür. Bu nedenle sıcak yaz günlerinde yalıtım, gölgelik ve havalandırma düzenlemelerine ek olarak kovanların beyaz renge sahip olmasının koloni performansına önemli katkı sağlayacağı sonucuna varılmıştır.

Anahtar Kelimeler: Bal arısı, kovan rengi, koloni performansı, sıcaklık.

ABSTRACT

In this study, the objective was to determine the potential effect of hive colour on honey bee colony performance, and nine hives made of pine trees were used. Among the three hive groups, the hives and their covers in the first group were painted in white; the hive and covers in the second group were painted in blue; and finally, the hives in the third group were painted in blue while their covers were painted in white. Data recorders were placed inside all hives. Temperatures were recorded every 59 minutes between June 27 and July 26 in the hives kept in the open field. In the study, in which the effect of three combinations of two different colours on the hive's internal temperature was examined, the average temperature values were calculated for the first, second, and third groups as 22.36 ± 7.23 °C, 24.26 ± 8.27 °C, and 24.93 ± 8.91 °C respectively, for the whole day. The one-way variance analysis results showed that the difference among groups was statistically significant ($p < 0.001$). In the study, concerning the fact that the ambient temperature would be the more effective in-hive temperature at certain times of the day, the data recorded between 10.00 a.m. -5.00 p.m. during the day was discussed separately, and the analyses in question were repeated. Accordingly, considering the data for the whole day and the hot hours, it was observed that the white colour group had a lower temperature average. Therefore, in addition to insulation, shading, and ventilation regulations on hot summer days, it was concluded that the white colour of the hives contributes significantly to the honey bee colony's performance.

Keywords: Honey bee, hive color, colony performance, temperature.

MALT KÜSPESİNDEN ARPA YAĞI ELDESİ
OBTAINING BARLEY OIL FROM MALT WASTE

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ÖZET

Gıda endüstrisi içerisinde bira üretimi, stratejik ve ekonomik konuma sahip olan dinamik bir sektördür. Türkiye İstatistik Kurumu verilerine göre, 2017 ve 2018 yılında biralık arpa üretimi 400000 ton olarak gerçekleşmiştir. Türkiye’de 2017 yılında üretilen toplam bira 9.597 milyon hektolitire, 2018’de ise 10.149 milyon hektolitredir. Bira üretiminde lider konumdaki Almanya’da, 2017 yılında 93.013 milyon hektolitire (hl) bira üretimi gerçekleşirken, 85.582 milyon hl bira tüketilmiştir. Bira üretim ve tüketim değerleri sırasıyla, Birleşik Krallık’ta 40.480 milyon hl ve 44.051 milyon hl, Polonya’da 40.382 milyon hl ve 37.223 milyon hl, İspanya’da 37.621 milyon hl ve 39.572 milyon hl olarak kaydedilmiştir.

Bira üretimi sırasında kaçınılmaz olarak çeşitli atık, yan ürün ve atık sular oluşmaktadır. Bunlardan miktar olarak en fazla olanları; bira yapımında kullanılan ham maddelerden arpa, malt, şerbetçiotu atıkları, atık su, atık maya ve bira mayşe atığıdır. Bu atıklar zengin karbon, azot ve mineral madde içerikleri nedeniyle biyoteknolojik süreçler için potansiyel ham madde/substrat kaynağı olarak görülmektedir. Ayrıca, bu atıkların biyoteknolojik süreçlerde değerlendirilerek katma değeri yüksek ürünler üretilmesi ekonomik açıdan önemli olmasının yanı sıra, bu atıkların çevreye verdikleri zararın bertaraf edilmesi açısından da önemlidir. Bira sanayinde ortaya çıkan atıkların ekonomik olarak değerli ürünlerin üretiminde kullanılması ve diğer sanayi dallarına bir endüstriyel simbiyoz örneği oluşturması açısından önemlidir.

Bira prosesinde en büyük yan ürün olan malt küspesi farklı ve biyo-yararlılığı yüksek ürünlere dönüştürülebilir. Düşük değerli bir üründen katma değerli yeni ürün elde etmek ve ekonomiye kazandırılabilir. Bira üretim prosesi çıktısının hayvan yemi dışında değerlendirilme olanakları mümkündür. Yüksek biyo-yararlılıktaki arpa yağı bileşenlerinin ilave prosesle ilaç ve kozmetik endüstrisine kazandırılması ve yeni bir ürüne geri dönüşümünün sağlanabileceği görülmektedir. Biracılık sektöründeki atığa ilave prosesler ekleyerek arpa yağı üretiminin artırılabilir. Aynı zamanda değerli bir ürüne dönüştürülmesi ile kazanç sağlanabilir.

Arpa yağı piyasadaki en güçlü tokotrienol kaynağı olarak gösterilen hurma yağından bile daha yüksek ve güçlü tokotrienol kaynağıdır. Bu bileşenin piyasadaki ulaşım zorluğu ve az bulunmasından dolayı tokotrienol takviyeleri ve kapsülleri oldukça pahalı fiyatlara piyasada yer almaktadır.

Anahtar Kelimeler: Atık, Biyodönüşüm, Yan Ürün, Arpa Yağı

ABSTRACT

Within the food industry, beer production is a dynamic sector that has a strategic and economic position. According to the data of the Turkish Statistical Institute, the production of barley production for beer in 2017 and 2018 amounted to 400,000 tons. The total beer produced in Turkey in 2017 was 9.597 million hectoliters, and in 2018 it was 10.149 million hectoliters. In Germany, which is the leader in beer production, 93.013 million hectoliters (hl) of beer were produced in 2017, while 85.582 million hl of beer were consumed. Beer production and consumption values were recorded as hl 40.480 million and hl 44.051 million in the United Kingdom, hl 40.382 million and hl 37.223 million in Poland, hl 37.621 million and hl 39.572 million in Spain, respectively.

During the production of beer, various wastes, by-products and wastewater are inevitably formed. The most abundant of these in quantity are barley, malt, hop waste, waste water, waste yeast and beer wort waste from the raw materials used in brewing. These wastes are seen as a potential raw material/substrate source for biotechnological processes due to their rich carbon, nitrogen and mineral substance contents. In addition, besides being economically important to produce products with high added value by evaluating these wastes in biotechnological processes, it is also important to dispose of the damage these wastes cause to the environment. It is important in terms of using the waste generated in the brewing industry in the production of economically valuable products and creating an example of industrial symbiosis for other industrial branches.

Malt pulp, which is the largest by-product in the brewing process, can be converted into different and bio-useful products. Obtaining a new value-added product from a low-value product and it can be brought into the economy. It is possible to evaluate the output of the brewing process outside of animal feed. It is seen that barley oil components with high bio-usefulness can be brought to the pharmaceutical and cosmetic industry by additional process and recycled into a new product. Barley oil production can be increased by adding additional processes to the waste in the brewing sector. At the same time, profit can be achieved by converting it into a valuable product.

Barley oil is a higher and stronger source of tocotrienol even than palm oil, which is shown as the strongest source of tocotrienol on the market. Due to the difficulty of transportation and the low availability of this component on the market, tocotrienol supplements and capsules are on the market at quite expensive prices.

Keywords: Waste, Biomass, By-Product, Barley Oil

**TÜRKİYE'DE BİR AK PELİKAN'DA (*PELECANUS ONOCROTALUS*) İLK
EUCLINOSTOMUM SP. OLGUSU**
**THE FIRST CASE OF *EUCLINOSTOMUM* SP. ON A WHITE PELICAN (*PELECANUS
ONOCROTALUS*) IN TÜRKİYE**

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ÖZET

Euclinostomum cinsindeki parazitler, Digenea alt sınıfında, Clinostomidae Lühe, 1901 ailesinde yer alan ve heteroksen gelişim gösteren digenik trematodlardır. Avrupa, Asya, Afrika ve Amerika'da yaygın olarak görülen bu trematodların erişkinlerine balıkla beslenen kuş türlerinin ağız, farinks, larinks, trakea ve özafagusunda rastlanırken, metaserkerlerine farklı balık türlerinin böbrek, karaciğer ve kaslarında rastlanmaktadır. Bu parazitler, konaklarında yerleştikleri organ ve dokulara bağlı olarak değişmekle birlikte ciddi hasarlara sebep olabilirler. Bunların yanı sıra çiğ ya da az pişmiş balıkla beslenen insanlar için zoonotik, balık kaslarında lezyonlara sebep olduğu için de ekonomik öneme sahiptirler. Bu çalışmanın materyalini Hatay'ın Samandağ ilçesi sahilinde kanadından yaralanmış halde bulunan bir *Ak Pelikan* (*Pelecanus onocrotalus*) oluşturdu. Hatay Doğa Koruma Milli Parklar Şube Müdürlüğü tarafından Hatay Mustafa Kemal Üniversitesi Yaban Hayvanı Kurtarma ve Rehabilitasyon Merkezi'ne getirilen pelikanın klinik muayenesi esnasında yutak bölgesinde 4 adet parazit tespit edildi. Toplanan parazitler %70'lik etil alkol içerisine alındıktan sonra teşhis amacıyla Kırıkkale Üniversitesi Veteriner Fakültesi Parazitoloji Anabilim Dalı Laboratuvarı'na gönderildi. Laktofenol içerisinde şeffaflandırıldıktan sonra ilgili literatürler yardımıyla teşhiste önem arz eden morfolojik yapıları dikkate alınarak mikroskopik incelemeleri gerçekleştirildi. Böylelikle parazitlerin cins düzeyinde teşhisleri yapıldı. Mikroskopik muayeneye ilaveten yapılan moleküler analizlerde jel elektroforezinde belirgin bant görüntüsü elde edilemediği için tür düzeyinde teşhis yapılamadı. Yapılan identifikasyon çalışmalarına göre *Ak Pelikan*'dan (*Pelecanus onocrotalus*) izole edilen parazitler, *Euclinostomum* sp. olarak identifiye edildi. Türkiye'de yalnızca *Gri Balıkçıl*'dan (*Ardea cinerea*) bildirilen bu trematodlar

ile ilgili sınırlı sayıda çalışma bulunmaktadır. Sonuç olarak bu bildiri ile Türkiye’de *Ak Pelikan*’dan *Euclinostomum* sp. ilk kez rapor edilerek söz konusu parazitle ilgili sınırlı olan verilere katkı sağlanmıştır.

Anahtar Kelimeler: *Ak Pelikan*, *Pelecanus onocrotalus*, *Euclinostomum*, Hatay, Türkiye

ABSTRACT

The parasites of the genus *Euclinostomum* sp. are digenic trematodes, subclass Digenea, family Clinostomidae Lühe, 1901 and they have a heteroxene life cycle. Adults of these trematodes, common in Europe, Asia, Africa and America, are found in the mouth, pharynx, larynx, trachea and oesophagus of fish-feeding bird species. In contrast, their metacercariae are located in the kidneys, liver and muscles of different fish species. These parasites can cause serious damage, depending on the organs and tissues in their hosts. In addition, they have economic importance due to lesions in fish muscles and zoonotic significance for people fed raw or undercooked fish. The material of this study was a *White Pelican* (*Pelecanus onocrotalus*), which was found with an injured wing on the coast of Samandağ district of Hatay. During the clinical examination of the pelican, which was brought to Hatay Mustafa Kemal University Wild Animal Rescue and Rehabilitation Center by Hatay Nature Conservation National Parks Branch Directorate, 4 parasites were detected in the pharynx. After the collected parasites were put in 70% ethyl alcohol, they were sent to Kırıkkale University Veterinary Faculty Parasitology Department Laboratory for diagnosis. After being transparent in lactophenol, microscopic examinations were carried out with the help of the relevant literature, taking into account the morphological structures that are important in diagnosis. The parasites were diagnosed as the genus. In addition to the microscopic examination, molecular analysis was performed but could not be identified at the species level as a clear band image could not be obtained in gel electrophoresis. According to the identification studies, parasites isolated from *White Pelican* (*Pelecanus onocrotalus*), were identified as *Euclinostomum* sp. There are a limited number of studies on these trematodes, which are only reported from the Gray Heron (*Ardea cinerea*) in Türkiye. In conclusion, with this paper, *Euclinostomum* sp. was reported for the first time, on a *White Pelican* (*Pelecanus onocrotalus*) in Türkiye and contributing to the limited data on this parasite.

Keywords: *White Pelican*, *Pelecanus onocrotalus*, *Euclinostomum*, Hatay, Türkiye

ASTERACEAE FAMILİYASINA AİT BİTKİLERİN ETNOVETERİNER
UYGULAMALARINDA KULLANIMLARI
APPLICATIONS FOR ETHNOVETERINARY USES OF PLANTS FROM THE
ASTERACEAE FAMILY

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ÖZET

Bitkiler, potansiyel olarak önemli biyolojik aktiviteye sahip ikincil metabolitleri sentezleme yeteneklerinden dolayı, tıbbın geliştirilmesinde uzun süredir çok önemli bir rol oynamıştır. Geleneksel tıpta bitkiler birçok farklı rahatsızlığı tedavi etmek için çeşitli şekillerde kullanılmıştır. Dünya Sağlık Örgütü'ne göre, küresel nüfusun %80'inden fazlası hala geleneksel ve halk tıbbına bağlı ve bunların çoğu bitki ilaçlarına dayanıyor. Geleneksel tedavide kullanılan bitkilerden yapılan ilaçlar sıklıkla daha ucuzdur, daha kolay bulunur ve sentetik muadillerine göre daha az yan etkiye sahiptir. Çok sayıda şifalı bitkinin daha ileri teknikler kullanılarak yapılan son analizleri, çok sayıda ilginç kimyasalın keşfedilmesiyle sonuçlanmıştır. Bu bitki kaynaklı maddeler, mevcut ilaçları değiştirmek veya tamamen yenilerini oluşturmak için kullanılabilir. Asteraceae familyası 25.000 – 35.000 arası türden oluşan, çiçekli bitkilerin en geniş familyasıdır. Yaklaşık 1600 cinse sahip olan Asteraceae familyası halk arasında insan sağlığının korunması ve hastalıklarının iyileştirilmesinde tıbbi amaçlarla kullanılan birçok bitki türüne sahiptir. Farklı etnobotanik çalışmalara göre bu familyaya ait bitkiler halk arasında insan sağlığı için karın ağrısında, hemoroitte, öksürükte, astımda, baş ağrısında, diyabette, böbrek taşlarında, romatizmada, kırık kemiklerde, depresyonda, egzamada, laksatif, diüretik, ağrı kesici, tonik olarak ve yara iyileştirici amaçlarla kullanılmaktadır. Geçmişten günümüze insanlar geleneksel tıp uygulamalarında hayvanları iyileştirmek için çeşitli tıbbi bitkilerden yararlanmıştır. Bu bitkiler arasında önemli yer tutan Asteraceae familyasına ait birçok tıbbi bitkiden de hayvan hastalıklarının tedavisinde faydalanılmaktadır. Dünya genelinde yapılan etnoveteriner çalışmalarda halk arasında Asteraceae familyasına ait bitkiler galaktagog, yara iyileştirici, antihelmintik, ateş düşürücü, antiparazit olarak, deri hastalıklarında, gastrointestinal sistem hastalıklarında, abdominal ağrılarda, ishali durdurmak için, sinirsel bozukluklarda, üreme bozukluklarında, ödem tedavisinde, mastitis tedavisinde ve solunum yolu hastalıklarında kullanımları tespit edilmiştir. Günümüzde hayvan hastalıklarının tedavisinde geleneksel olarak halk tıbbında kullanılan ve güvenliği bilinen bitkiler ilaç geliştirme çalışmalarında bilim insanlarını yönlendirmektedir. Çalışmamızda hem insan sağlığı hem de hayvan sağlığı için önem arz eden bitkileri bulunduran Asteraceae familyasının Türkiye ve dünyada hayvan sağlığını korumak için halk arasında kullanılan bitkileri derlenmiştir. Çalışmamızın amacı Asteraceae familyasının bu konudaki zenginliğini göstermek ve gelecekte yapacağımız zoofarmakognozi çalışmaları için bir ön çalışma oluşturmaktır.

Anahtar Kelimeler: Asteraceae, Halk Tıbbı, Etnoveteriner Uygulama, Farmakoloji, Biyoaktivite

ABSTRACT

Due in large part to their capacity to produce secondary metabolites with potential biological activity, plants have played a vital role in the development of medicine for a very long time. Plants were employed in diverse ways to cure a wide range of diseases in ancient medicine. The World Health Organization estimates that more than 80% of the world's population still uses traditional and folk medicine, the majority of which is based on plant medicines. Drugs made from plants that are used in conventional treatment are frequently less expensive, more readily available, and have less adverse effects than their synthetic counterparts. Recent analysis of numerous traditional medicinal plants using more advanced techniques has resulted in the discovery of numerous interesting chemicals. These plant-derived substances can be utilized to alter current medications or create entirely new ones. The Asteraceae family is the largest family of flowering plants, comprising between 25,000 and 35,000 species. The Asteraceae family, which has about 1600 genera, has many plant species that are used for medicinal purposes in the protection of human health and healing of diseases. According to different ethnobotanical studies, plants belonging to this family are used for purposes such as stomachache, hemorrhoids, cough, asthma, headache, diabetes, kidney stones, rheumatism, broken bones, depression, eczema, laxative, diuretic, pain reliever, tonic and wound healing. From past to present, people have benefited from various medicinal plants to heal animals in traditional medicine practices. Many medicinal plants belonging to the Asteraceae family, which have an important place among these plants, are also used in the treatment of animal diseases. In ethnoveterinary studies conducted around the world, plants belonging to the Asteraceae family are among the people as galactagogue, wound healing, anthelmintic, antipyretic, antiparasitic, in skin diseases, gastrointestinal system diseases, abdominal pains, to stop diarrhea, nervous disorders, reproductive disorders, edema treatment, mastitis treatment and their use in respiratory tract diseases has been determined. Today, plants that are traditionally used in folk medicine and known to be safe in the treatment of animal diseases lead scientists in drug development studies. In our study, the plants of the Asteraceae family, which have plants that are important for both human and animal health, are compiled, which are used among the people to protect animal health in Turkey and in the world. The aim of our study is to show the richness of the Asteraceae family on this subject and to create a preliminary study for future zoopharmacognosy studies.

Keywords: Asteraceae, Folk Medicine, Ethnoveterinary Practice, Pharmacology, Bioactivity.

**COMPARISON OF LAYING PERFORMANCE, EGG QUALITY AND BONE
CHARACTERISTICS OF COMMERCIAL AND TURKISH LAYING HEN GENOTYPES
KEPT IN A FREE-RANGE SYSTEM**

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ABSTRACT

This study was designed to compare of laying performance, egg quality and bone characteristics of commercial and Turkish laying hen genotypes kept in free-range system. A total of 720 laying hens (Atabey, Lohmann White, Atak-S, Lohmann Brown; n=180 hens/genotype) were used in the experiment. Production performance was determined as the mean of egg production, egg weight and efficiency of feed utilization between 54 and 66 weeks of age. Egg quality parameters and bone characteristics of tibia and femur was measured at 66 weeks of age. Mean value of egg production were found to be higher in Lohmann Brown and Lohmann White genotypes compared to other genotypes between 54 and 66 weeks of age ($P<0.01$). The brown eggs obtained from Lohmann Brown and Atak-S hens tended to be heavier than the white eggs obtained from Lohmann White and Atabey hens ($P<0.01$). The lowest mean value of feed efficiency was observed in Atabey hens with a value of 2.15 between 54 and 66 weeks of age ($P<0.01$). The brown eggs obtained from Lohmann Brown and Atak-S (3.350 g/cm^2 and 3.300 g/cm^2) had a stronger shell structure with a higher mean value of eggshell breaking strength compared to the white hens (2.847 g/cm^2 in Lohmann White and 2.910 g/cm^2 in Atabey, $P<0.01$). The breaking strength of tibia was found to be higher in Lohmann Brown (366.0 N) and Atak-S (381.2 N) hens, than Lohmann White (267.0 N) and Atabey (322.2 N) hens ($P<0.01$). These findings related to brown and white genotypes could be instructive for arranging new management rules and nutritional advice for stronger eggshell and bone strength of hens in free range system.

Keywords: laying hen, Turkish genotypes, egg production, tibia strength, eggshell breaking strength

**BESİNSEL OKSİKLOZANİDİN *GALLERIA MELLONELLA*'NİN ORTA BAĞIRSAK VE
YAĞ DOKUSU ÜZERİNE OKSİDATİF ETKİSİ**
**OXIDATIVE INFLUENCE OF DIETARY OXYCLOZANIDE ON MIDGUT AND FAT BODY
TISSUE OF *GALLERIA MELLONELLA***

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ÖZET

Tarımsal alanlarda zararlı böceklerle karşı birçok mücadele yöntemi kullanılmaktadır. Bunlar arasında en çok tercih edilen yöntem kimyasal mücadeledir. Bu çalışmada, oksiklozanid 0,003, 0,03, 0,3 ve 1,5 g içeren yapay besinlerde yetiştirilen 7. evre larvalarından orta bağırsak ve yağ dokuları izole edildi. Bu dokulardaki oksidatif stres belirteçlerinin miktarları (malondialdehit (MDA) ve protein karbonil (PCO) miktarları) ile antioksidan enzimler olan süperoksit dismutaz (SOD), katalaz (CAT), glutatyon peroksidaz (GPx) ve glutatyon-S-transferaz (GST) enzimlerinin aktivite seviyeleri incelendi. Oksiklozanidin *G. mellonella*'nın orta bağırsak MDA miktarı kontrol grubunda $0,0592 \pm 0,012$ nmol/mg protein olarak tespit edildi. Oksiklozanidin kullanılan en yüksek konsantrasyonunda MDA miktarı ise $0,0333 \pm 0,011$ olarak belirlendi. Kontrol grubunda PCO miktarı $223,89 \pm 44,79$ nmol/mg protein iken, kontrol grubu ile 0,03, 0,3 ve 1,5 g'lar karşılaştırıldığında PCO miktarlarında istatistiksel olarak da anlamlı olan azalışlar bulundu. Böceğin orta bağırsağında antioksidan enzim aktiviteleri üzerine oksiklozanidin etkisi incelendiğinde ise GST enzim aktivitesinde istatistiksel olarak da anlamlı azalışlar tespit edildi. *G. mellonella*'nın yağ dokusunda kontrol grubu ile denenen 0,3 ve 1,5 g oksiklozanid konsantrasyonları karşılaştırıldığında MDA miktarı $0,1299 \pm 0,029$ nmol/mg protein'den sırasıyla $0,2203 \pm 0,034$ ve $0,2117 \pm 0,050$ nmol/mg protein'e yükseldi. PCO miktarında ise kontrol grubu ile denenen tüm oksiklozanid konsantrasyonları karşılaştırıldığında azalış tespit edildi. Oksiklozanidin CAT enzim aktivitesi üzerine etkisi incelendiğinde, kontrol grubunda $186,83 \pm 0,0038$ µmol/mg protein/dk olarak kaydedildi. CAT aktivitesinde oksiklozanidin 0,03, 0,3 ve 1,5 g konsantrasyonlarında istatistiksel olarak anlamlı olan artışlar tespit edildi. Sonuçlar, oksiklozanidin böcekler üzerinde oksidatif etkilerinin yanı sıra antioksidan enzim aktivitelerinde de önemli değişiklikler olduğunu gösterdi. Bu çalışma ile zararlılar ile kimyasal mücadelede çevreye ve hedef olmayan canlılara olumsuz etkileri bilenen insektisitlere alternatif bir madde arayışı kapsamında katkı sağlayacaktır.

Anahtar Kelimeler: *Galleria mellonella*, oksiklozanid, oksidatif stres, antioksidan enzimler.

ABSTRACT

Many methods of management against pest insects are used in agricultural areas. Chemical control is the most preferred method among them. In this study, midgut and fat body tissues were isolated from

7th instar larvae with grown on artificial diet containing oxyclozanide 0.003, 0.03, 0.3 and 1.5 g. The content of oxidative stress markers (malondialdehyde (MDA) and protein carbonyl (PCO) amounts) in these tissues and the activity of antioxidant enzymes superoxide dismutase (SOD), catalase (CAT), glutathione peroxidase (GPx) and glutathione-S-transferase (GST) enzymes levels were examined. The midgut MDA content of oxyclozanide *G. mellonella* was determined as 0.0592 ± 0.012 nmol/ mg protein in the control group. In the highest concentration of oxyclozanide, MDA content was determined as 0.0333 ± 0.011 nmol/ mg protein. While PCO content was 223.89 ± 44.79 nmol/mg protein in the control group, statistically significant decreases were found in PCO content when 0.03, 0.3 and 1.5 g were compared to control group. When the effect of oxyclozanide on antioxidant enzyme activities in the midgut of the insect was examined, statistically significant decreases were found in GST enzyme activity. When the 0.3 and 1.5 g oxyclozanide concentrations tested in the fat body tissue of *G. mellonella* were compared with the control group, the content of MDA increased from 0.1299 ± 0.029 nmol/mg protein to 0.2203 ± 0.034 and 0.2117 ± 0.050 nmol/mg, respectively. A decrease was found in the content of PCO when the control group and all tested oxyclozanide concentrations were compared. When the effect of oxyclozanide on CAT enzyme activity was examined, it was recorded as 186.83 ± 0.0038 μ mol/mg protein/min in the control group. Statistically significant increases in CAT activity were detected at 0.03, 0.3 and 1.5 g concentrations of oxyclozanide. The results showed that oxidative effects of oxyclozanide on insects and also significant changes in antioxidant enzyme activities. With this study, it will contribute to the search for an alternative substance to insecticides, which are known to have negative effects on the environment and non-target organisms in the chemical control of pests.

Keywords: *Galleria mellonella*, oxyclozanide, oxidative stress, antioxidant enzymes.

**KOYUN VE SIĞIR ATIKLARINDAN ELDE EDİLEN *BRUCELLA* İZOLATLARININ TÜR-
BİYOTİP TAYİNİ**
**SPECIES-BIOTYPE DETERMINATION OF BRUCELLA ISOLATES OBTAINED FROM
SHEEP AND CATTLE ABORTIONS**

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ÖZET

Brusellozis, sığırlarda *Brucella abortus*, koyunlarda *Brucella melitensis* tarafından oluşturulan ve ülkemizde yaygın olarak görülen zoonotik karakterde bir enfeksiyöz hastalıktır. Çiftlik hayvanlarında başta abort ve infertilite olmak üzere, mastitis, eklem iltihabı ve çeşitli organlarda kronik yangılara yol açarak önemli ekonoik kayıplara neden olmaktadır. Ayrıca hastalık, zoonotik tabiatı nedeniyle önemli bir halk sağlığı problemi oluşturmaktadır. Bu çalışmada Kars Yöresinde sığır ve koyun aborte fötuslarından elde edilen *Brucella* izolatlarının Bruce-Ladder multipleks PCR ile identifikasyonu ve konvansiyonel yöntemlerle biyotiplendirilmesi amaçlanmıştır.

Bu çalışmada 2019-2022 yılları arasında Kafkas Üniversitesi Veteriner Fakültesi Mikrobiyoloji Anabilim Dalı Laboratuvarına gönderilen 30 koyun ve 30 sığır aborte fötusundan elde edilen toplam 60 *Brucella* spp. izolatu materyal olarak kullanılmıştır.

İzolatların tür tayini amacıyla Bruce-Ladder multipleks PCR yöntemi uygulanmış; biyotiplendirilmeleri amacıyla da CO₂ ihtiyaçları, H₂S üretimi, tıyonin ve bazik fuksin boyalarına duyarlılık, A ve M monospesifik antiserumlarıyla aglütinasyon özellikleri değerlendirilmiştir.

Çalışma sonunda 29 koyun izolatu *B. melitensis*, bir koyun izolatu *B. abortus* olarak tanımlanırken, sığır izolatlarının ise tümü *B. abortus* olarak identifiye edilmiştir. Biyotiplendirme amacıyla uygulanan testler sonucunda ise koyun *Brucella* izolatlarının 17'si *B. melitensis* biyotip 2, 12'si *B. melitensis* biyotip 3 ve 1'i *B. abortus* biyotip 1 olarak; sığır izolatlarının 15'i *B. abortus* biyotip 1, 10'u *B. abortus* biyotip 2 ve 5'i *B. abortus* biyotip 3 olarak biyotiplendirilmiştir.

Bu çalışmadan elde edilen bulgular ışığında yöremizde yaygın olarak görülen biyotiplerin koyunlarda *B. melitensis* biyotip 3 ve farklı olarak *B. melitensis* biyotip 2, sığırlarda ise yapılan birçok çalışma ile paralel olarak *B. abortus* biyotip 1 olduğu görülmüştür. Ayrıca, tür dominantlığına bakıldığında etkenlerin konak tercihlerindeki değişimleri gösteren az sayıda da olsa çapraz enfeksiyonlar koyunlarda belirlenmiştir.

Sonuç olarak atık olgularında *Brucella* tür çeşitliliğinin ortaya konulması ve türlerin biyotiplerinin belirlenmesi farklı coğrafyalarda yetiştirilen hayvanların hastalıklarının ve yetiştiricilik yönlerinin anlaşılmasında yarar sağlayacaktır.

Anahtar kelimeler: Koyun, Sığır, *Brucella* spp., PCR, Biyotiplendirme.

ABSTRACT

Brucellosis is a zoonotic infectious disease caused by *Brucella abortus* in cattle and *Brucella melitensis* in sheep, is common in our country. It causes significant economic losses in farm animals by causing abortion and infertility, mastitis, joint inflammation and chronic inflammation in various organs. In addition, the disease constitutes an important public health problem due to its zoonotic nature. In this study, it was aimed to identify *Brucella* isolates obtained from bovine and sheep aborted fetuses in Kars region by Bruce-Ladder multiplex PCR and biotyping them with conventional methods.

In this study total of 60 *Brucella* spp. isolates obtained from aborted foetuses of 30 sheep and 30 cattles sent to Kafkas University, Faculty of Veterinary Medicine, Department of Microbiology Laboratories between 2019-2022 years were used as material.

Bruce-Ladder multiplex PCR method was performed for the identification of the isolates; for biotyping purposes, CO₂ requirements, H₂S production, sensitivity to thionine and basic fuchsin dyes, agglutination features with A and M monospecific antisera of isolates were evaluated.

At the end of the study, 29 sheep isolates were identified as *B. melitensis*, one sheep isolate as *B. abortus*, while all cattle isolates were identified as *B. abortus*. As a result of the tests applied for biotyping, 17 of the sheep *Brucella* isolates were identified as *B. melitensis* biotype 2, 12 isolates as *B. melitensis* biotype 3, 1 isolate as *B. abortus* biotype 1; 15 of the cattle isolates were biotyped as *B. abortus* biotype 1, 10 of isolates as *B. abortus* biotype 2 and 5 of isolates as *B. abortus* biotype 3.

In the light of the findings obtained from this study, it was seen that the common biotypes in our region were *B. melitensis* biotype 3, *B. melitensis* biotype 2 differently in sheep, and *B. abortus* biotype 1 in cattle, in parallel with many studies. In addition, when the species dominance is examined, cross infections were detected in sheep, albeit in a small number, showing the changes in the host preferences of the agents.

As a result, revealing the diversity of *Brucella* species in abortion cases and determining the biotypes of the species will be useful in understanding the diseases and aquaculture aspects of animals raised in different geographies.

Keywords: Sheep, cattle, *Brucella* spp., PCR, biotyping.

**TİCARİ OLARAK SATIŞA SUNULAN BAZI SALLAMA ÇAYLARIN ANTİMİKROBİYAL
POTANSİYELLERİNİN BELİRLENMESİ**

**DETERMINATION OF ANTIMICROBIAL POTENTIALS OF SOME SHAKING TEAS FOR
SALE COMMERCIALY**

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ÖZET

Bitkilerin insanlar tarafından çeşitli şekillerde kullanılması, hastalıkları iyileştirme gücüne olan inanç, insanın var olduğu döneme kadar uzanır. Fitoterapi alanında kullanılan bitkisel çaylar; tedavi edici veya tedaviye yardımcı, aynı zamanda koruyucu özellik gösteren sulu bitkisel preparatlardır. Kokularının cezbedici ve tatlarının güzel olmasının yanında iyileştirici, antioksidan, antikanserojen, kalp koruyucu etkilerinden ötürü bu çaylar sıklıkla tercih edilmektedir. Bu bakımdan özellikle adaçayı, ıhlamur, kekik, kuşburnu, rezene, papatya, yeşil çay, tarçın, karanfil, ıhlamur gibi bitkilerden elde edilen çayların tüketiminde artış meydana gelmiştir. Bu çalışmada ticari olarak satışa sunulan bazı sallama çayların antimikrobiyal potansiyellerinin tespiti amaçlanmıştır.

Mevcut çalışmada tek bir markanın satışa sunulan farklı çayları (yeşil çay, siyah çay, rezene, tarçın-karanfil, papatya) materyal olarak kullanılmıştır. Bu çayların antimikrobiyal aktiviteleri amacıyla agar kuyu difüzyon yöntemi kullanılarak belirlenmiştir. Gram (-) bakteriler olarak *Escherichia coli* (NCTC-9001) ve *Pseudomonas aeruginosa* (ATTC-9027); Gram (+) bakteriler olarak *Bacillus cereus* (NCTC-7464) ve *Staphylococcus aureus* (ATCC-25923) standart suşlarının taze kültürleri kullanılmıştır. Bu kültürlerden McFarland No. 0.5 standartına göre hazırlanan her bir bakteri süspansiyonundan Mueller Hilton Agara yayma ekim yapıldı. Daha sonra petrilere 5 mm çapında kuyucuklar açıldı. Bu kuyucuklara 80°C'de 25 dk boyunca bekletilen çaylardan 50 µl aktarıldı. Petriler aerobik ortamda 37°C'de 24 saat inkübasyona bırakıldı. İnkübasyon sonunda kuyucukların etrafında oluşan inhibisyon zonu oluşumu değerlendirildi.

Çalışma sonucunda kullanılan yeşil çay, siyah çay, rezene, tarçın-karanfil ve papatya çaylarının *E. coli* ve *P. aeruginosa* kültürlerine etkili olmadıkları görülürken, yeşil çay ve tarçın-karanfilin *S. aureus* ve *B. cereus* üzerine ve kuşburnu çayının da yine *B. cereus* üzerine etkili olduğu gözlenmiştir.

Kullanılan çayların oluşturdukları inhibisyon zon çapları dikkate alındığında antibakteriyel aktivitelerindeki farklılıkların, içeriğin konsantrasyonu ve doğası, fonksiyonel gruplar, bileşenlerin yapısal konfigürasyonu ve olası sinerjistik etkileşimleri gibi faktörlerin etkili olabileceği düşünülmektedir. Bitkilerin antibakteriyel etkilerinin araştırıldığı in vitro çalışmaların belirli sonuçları ortaya koyması ile birlikte bunların bu amaçla kullanılabilirliği hiç şüphesiz in vivo çalışmalarla desteklenmesi halinde anlamlı olacaktır.

Anahtar kelimeler: Sallama çay, antibakteriyel etki, agar kuyu difüzyon yöntemi.

ABSTRACT

The use of plants by people in various ways, the belief in their power to heal diseases dates back to the era of human existence. Herbal teas used in the field of phytotherapy are aqueous herbal preparations that show therapeutic or therapeutic, as well as protective properties. In addition to their attractive smell and beautiful taste, these teas are often preferred due to their healing, antioxidant, anticarcinogenic, heart-protective effects. In this regard, there has been an increase in the consumption of teas obtained from plants such as sage, linden, thyme, rose hips, fennel, chamomile, green tea, cinnamon, cloves, linden, in particular. In this study, it was aimed to determine the antimicrobial potentials of some shaking teas sale commercially.

In the current study, different teas of a single brand offered for sale (green tea, black tea, fennel, cinnamon-clove, chamomile) were used as materials. The antimicrobial activities of these teas were determined using the agar well diffusion method. Fresh cultures of *Escherichia coli* (NCTC-9001) and *Pseudomonas aeruginosa* (ATTC-9027) as Gram (-) bacteria and *Bacillus cereus* (NCTC-7464) and *Staphylococcus aureus* (ATCC-25923) standard strains as Gram (+) bacteria were used. Bacterial suspensions prepared according to McFarland No 0.5 standard were transferred to Mueller Hilton Agar and spread planting was done. Then wells with a diameter of 5 mm were drilled into the petri dishes. 50 µl of the teas were transferred to these wells, which were kept at 80 °C for 25 minutes. The petri dishes were incubated for 24 hours at 37 °C in an aerobic environment. The inhibition zone formation formed around the wells at the end of incubation was evaluated.

As a result of the study, while it was seen that green tea, black tea, fennel, cinnamon-clove and chamomile teas were not effective on *E. coli* and *P. aeruginosa* cultures, green tea and cinnamon-clove were effective on *S. aureus* and *B. cereus*, and rosehip tea was effective on *B. cereus*.

Considering the inhibition zone diameters of the teas used, it is thought that factors such as differences in antibacterial activities, concentration and nature of the content, functional groups, structural configuration of the components and possible synergistic interactions may be effective. With the in vitro studies investigating the antibacterial effects of plants reveal certain results, their usability for this purpose will undoubtedly be meaningful if supported by in vivo studies.

Keywords: Shaking tea, antibacterial effect, agar well diffusion method.

**ARDAHAN YÖRESİNDEKİ RAHVAN ATLARDA ALKALEN FOSFATAZ, TOTAL
PROTEİN, GLUKOZ VE ALBUMİN SEVİYELERİ**
**ALKALINE PHOSPHATASE, TOTAL PROTEIN, GLUCOSE AND ALBUMIN LEVELS IN
RAHWAN HORSES IN ARDAHAN REGION**

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ÖZET

Tarih boyunca insanlığa büyük hizmetler sunmuş olan Atlar; günümüzde toplumun ekonomik gücüne paralel olarak spor ve yarış amacıyla yetiştirilmektedir. Atlar kendilerine özgü yürüyüş şekilleri olan hayvanlar olup 4 farklı yürüyüş (adeta, tırıs, dörttnala ve rahvan) şekli mevcuttur. Bir atın rahvan yürüyebilmesi için en az %50 rahvan ırkı kanına sahip olması gerekmektedir, aksi takdirde atın rahvan yürüyüşü öğrenme ihtimali çok düşüktür. Yapılan bu çalışma ile Ardahan Yöresinde bulunan rahvan atlarda Alkalen fosfataz (ALP), Total protein (TP), Glukoz (Glu) ve Albumin (Alb) seviyelerinin belirlenmesi amaçlanmıştır. Çalışma 5 ocak- 31 ocak 2023 tarihleri arasında Ardahan ilinde Ardahan Rahvan At Binicilik ve Spor Kulübü Derneğine kayıtlı olan 30 adet erkek at üzerinde gerçekleştirildi. Klinik olarak sağlıklı olan atlardan V. jugularis'den serum tüplerine (BD Vacutainer, BD, Franklin Lakes, NJ) 5'er mL kan alındı. Atlardan alınan kan örnekleri 3000 devirde 10 dakika santrifüj edildikten sonra serumları ayrıştırıldı. Serumlar; ALP, TP, Glu ve Alb seviyeleri ölçülene kadar -20°C'de muhafaza edildi. ALP, TP, GLU ve Alb seviyeleri ticari spektrofotometrik kitlerle (Randox RX series, Randox Laboratories Ltd., Crumlin, United Kingdom) belirlendi. Sağlıklı atlarda ALP, TP, Glu ve Alb seviyeleri sırasıyla 106.50 ± 4.94 U/L, 6.57 ± 0.11 g/dL, 77.07 ± 3.36 mg/dL, 3.84 ± 0.08 g/dL olarak belirlendi. Sonuç olarak; Ardahan yöresindeki rahvan atlarda Glu ve Alb seviyesinin diğer ırklara göre yüksek ALP seviyesinin ise düşük olduğu belirlendi. Ayrıca yapılan bu çalışma bir ön çalışma olup bölgedeki rahvan at sayısının artırılması durumunda çalışma sonucunun istatistiksel açıdan daha anlamlı olacağı düşünülmektedir.

Anahtar Kelimeler: Alkalen fosfataz, Ardahan, rahvan yürüyüş, total protein.

ABSTRACT

Horses, which have provided great services to humanity throughout history; today, in parallel with the economic power of the society, it is grown for sports and racing purposes. Horses are animals with their own unique walking styles and there are 4 different walking styles (common step, trot, gallop and rahvan). In order for a horse to be able to walk rahvan, it must have at least 50% of the rahvan breeds blood, otherwise, the probability of the horse learning the rahvan gait is very low. In this study, it was aimed to determine the Alkaline phosphatase (ALP), Total protein (TP), Glucose (Glu) and Albumin (Alb) levels in rahvan horses in Ardahan Region. The study was carried out on 30 male horses registered to Ardahan Rahvan Horse Riding and Sports Club Association in Ardahan province between January 5 and January 31, 2023. 5 mL blood was collected from V. jugularis from clinically healthy horses into serum tubes (BD Vacutainer, BD, Franklin Lakes, NJ). Blood samples taken from horses were centrifuged at 3000 rpm for 10 minutes and their serums were separated. Serums; ALP, TP, Glu and Alb levels were stored at -20°C until measurement. ALP, TP, GLU ve Alb levels were determined with commercial spectrophotometric kits (Randox RX series, Randox Laboratories Ltd., Crumlin, United Kingdom). ALP, TP, Glu and Alb levels in healthy horses were determined as 106.50 ± 4.94 U/L, 6.57 ± 0.11 g/dL, 77.07 ± 3.36 mg/dL, 3.84 ± 0.08 g/dL, respectively. In conclusion; It was determined that Glu and Alb levels were higher in rahvan horses in Ardahan region compared to other breeds, and ALP levels were lower than other breeds. In addition, this study is a preliminary study and it is thought that

the result of the study will be more statistically significant if the number of rahwan horses in the region is increased.

Keywords: Alkaline phosphatase, Ardahan, rahwan, total protein.

ASSESSING THE EFFICACY OF IOT (INTERNET OF THINGS) AND ITS APPLICATION IN AGRICULTURE

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ABSTRACT

The outspreads and applications of internet technology into real world have cut across all sphere including agricultural practices. Almost all devices are equipped with sensors that can be controlled and monitored at any point and at any time. The interconnectivity that exists among these devices to leverage data gathered through the internet by embedded sensors is referred to as the Internet of Things (IoT). In this manner, a thing might be a shirt embedded with micro camera to facilitate real-time monitoring in an investigation or a locomotive accelerometer attached to the cow in a farm yard (Bruce, et al., 2016). This paper is a descriptive survey of efficacy of IOT (Internet of Things) in the agriculture industry. The paper discussed is focused on IOT and its applications. The paper also highlighted some of the challenges of IoT applications in agriculture. For the purpose of this paper discussion, carefully formulated questions were drafted and administered to respondents using online Google form questionnaire instrument. The gathered responses were subjected to reliability analysis. Conclusively, the paper inferred that the incorporation of IOT – based solutions such as weather forecasts, crop data analysis, pest detection, etc. into agricultural practices have improved its productivity.

Keywords: Technology, IOT, Internet of Things, Agriculture.

INTRODUCTION

The effect of development and outspread of advance technology are now being felt in all industries including agriculture. Many new technology concepts are introduced into the various fields of agriculture with greater impacts in crop production. The incorporation and use of Internet of Things (IoT) devices for sensing data in different variations of agricultural applications are attracting deep interest. According to Patricio & Rieder (2018), the acquisition of spectral data can effectively improve data accuracy using IoT technology. Internet of Things (IoT) ensures the gathering of leverage data that could facilitate real-time monitoring of agricultural productivity. IoT enabled devices can efficiently be used to reduce monitoring cost and manage operational cost. E.g., Air born IoT enabled device such as drone can be used for remote sensing in order improve soil, water and environmental condition in agricultural practices.

RELATED LITERATURE

Kopetz (2011) sees Internet of Things (IoT) as the interconnectivity of physical objects to the internet in order to access remote sensor data and control the real world from any point at any time. According to Weber & Weber (2010), the purpose of using IoT enhanced devices is bridge the gap between physical objects in the real world and their digital representation in information systems. IoT designated devices such AgriBot and FarmBot are integrated as agricultural machinery to enhance farm productivity (Open Ag Data Alliance, 2016). Yongxian, et al. (2012) and Aqueel-ur-Rehman, et al. (2012) denote that a lot of work have be enhanced by the application of the evoking Wireless Sensor Networks (WSNs) in agriculture domain. Vidya & Kumari (2013) emphasize that WSNs have made it possible to control and monitor greenhouse parameter in precision agriculture. Nandurkar, et al. (2014) depicts that the use of

temperature and moisture sensor through WSNs has enabled the monitoring of crops at suitable locations. Mitsuyoshi, et al. (2012) Infer that cloud computing application is made possible for storing details of agriculture information using IoT enabled devices.

IOT APPLICATION DOMAINS IN AGRICULTURE

The application domains of IoT in agriculture are enumerable. Below are the major ones ranging from fork to farm. Viz:-

1. Livestock monitoring:

Precision farming is an essential part of agriculture. Farmers are able to collect information about the health conditions and location of their cattle using IoT based sensors. This is vital because it help to reduce the cost of using manual labor for monitoring stocks.

2. Monitoring soil, plants and climate conditions:

Sensors can be used to collect data about variety of conditions including that of soil, plant and climate. These collected data are stored in integrated database template using internet of Things.

3. Water Irrigation:

IoT enabled sensors are used for controlling and monitoring of water usage in order to ensure optimal plant growth. The use of this sensor is necessary to help prevent irrigation problems via schedule irrigation timings.

4. Waste Reduction:

Farmers can use IoT technologies to ensure controlled and accurate growing of crops. This practice will help to enhance productivity and reduce generated wastes.

5. Smart Greenhouses:

IoT sensors can be used in constructing affordable and healthy green houses in farm yards. These sensors which are solar powered are useful for providing information about humidity, light, pressure and temperature levels.

Challenges of IoT applications in agriculture

Having discussed the major IOT applications domain in agriculture, a number of challenges are being confronted: These include:-

1. Reliability and scalability

In order to sustain an effective IoT applications in agriculture, a significant amount are needed for data processing in order to make efficient data-driven decisions. Hence, the use of reliable and scalable network applications is needful to tactically handle this complex task.

2. Dreadful climate conditions

IoT devices are often exposed to physical hazards including droughts, rain, humidity and windy climate conditions in most agricultural regions. T adverse influence on the system networks thereby degrading the accuracy and performance of IoT hardware.

3. Security and privacy

The integration of IoT technology exposes the smart agricultural environment to new risks such as communication and network interruptions, hacking of host properties and accumulated farming data. Hence, the smart agricultural environment becomes vulnerable to potential malicious attacks.

4. Negative attitude towards the adoption of IoT technology

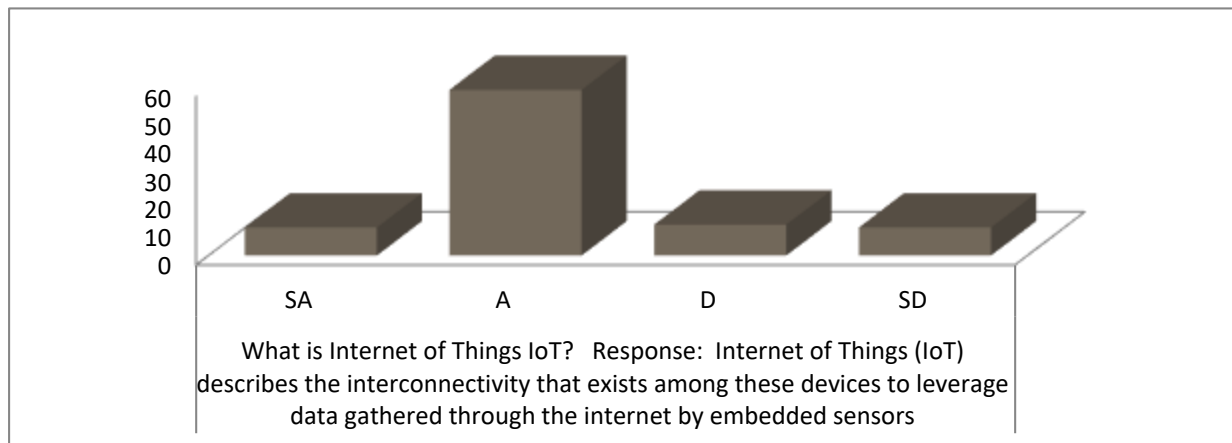
The repulsive attitude of farmers towards the adoption of IoT technology is a major factor that could negatively affect the adoption of the evoking smart technology. Proper awareness needs to be done to effectively promote the adoption of IoT technology.

MATERIALS AND METHODS

This paper is descriptive survey of IOT (Internet of Things) concept. Carefully selected population was used for data collection. In order to collect vital information that can help in the paper discussion, drafted copies of questionnaires by agriculture experts were administered to respondents using online Google form questionnaire instrument. The responses gathered were subjected to Cronbach's alpha reliability analysis. The result of 0.91 gave a good reliability index of the instrument. The entire exercise took place within three and half ($3\frac{1}{2}$) weeks before completion.

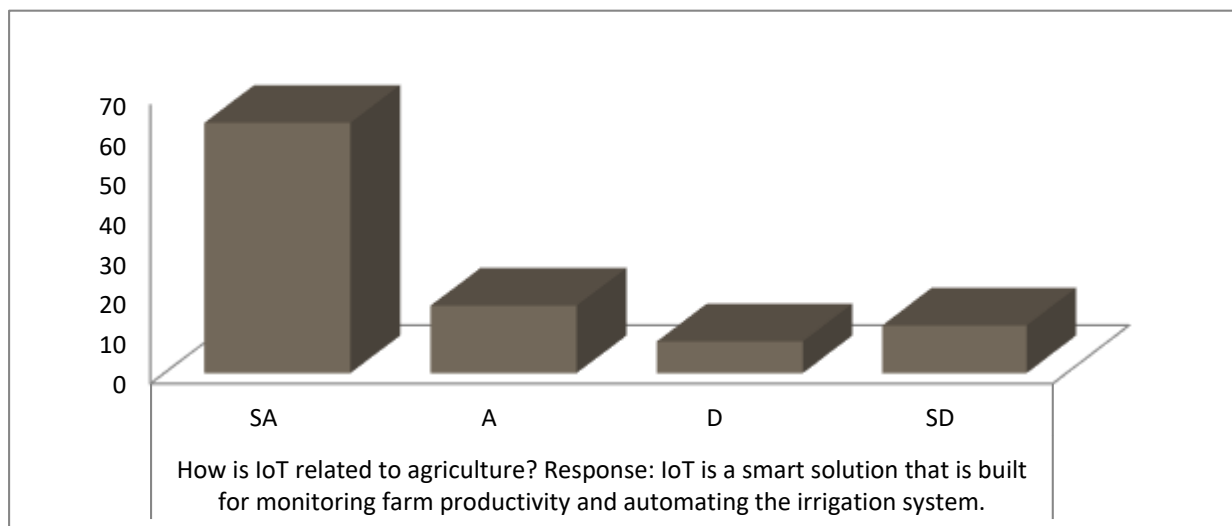
RESULT AND DISCUSSION

Fig.1: Chat Analysis



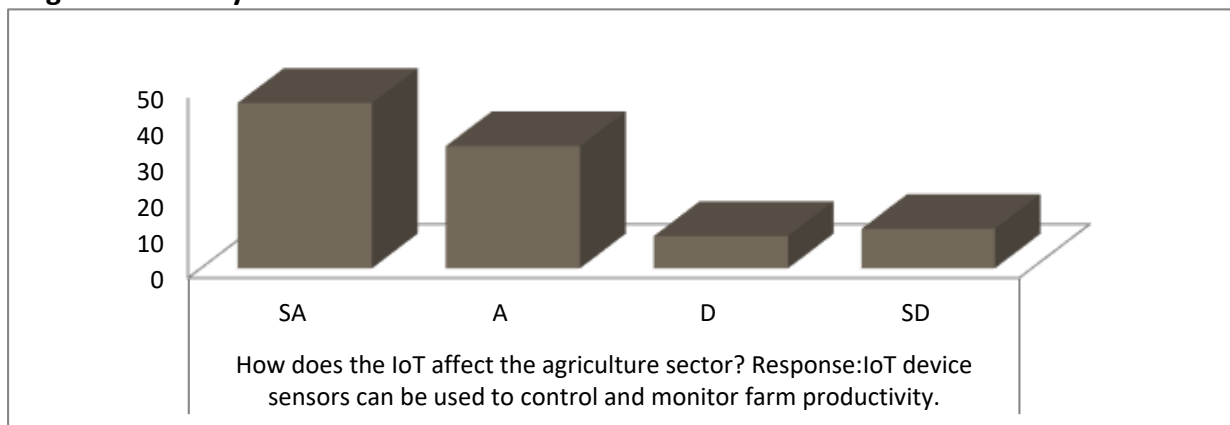
The graph plotted in fig.1 clearly shows that a huge amount of respondents describes the Internet of Things (IoT) as the interconnectivity that exists among many objects or devices in order to gather data by embedded sensors through the use of the internet. The respondents denote that IoT technology allows its users to add a specific device to an inert object capable of generating associative data thereby transmitting them through communication networks.

Fig.2: Chat Analysis



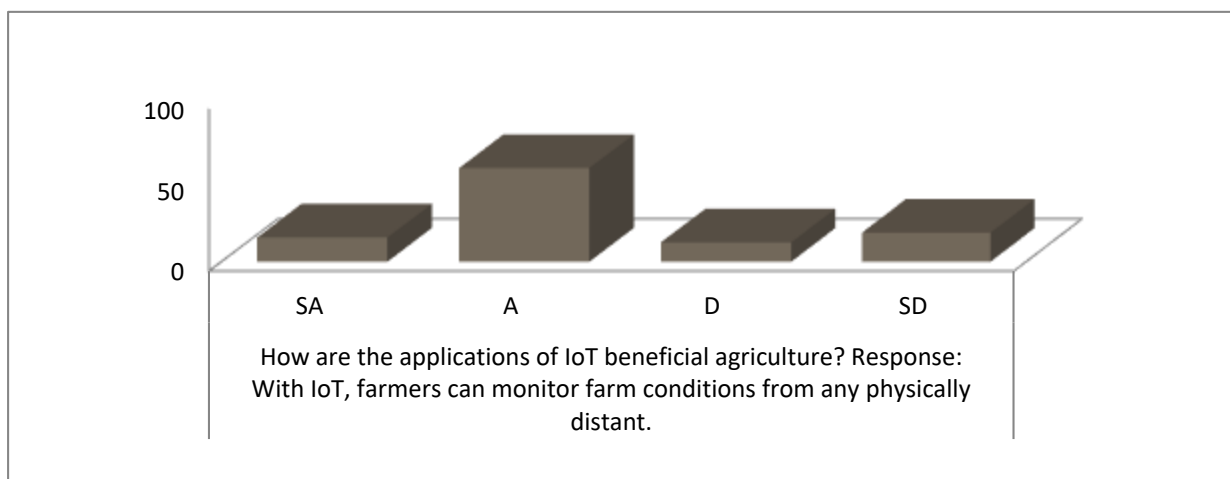
The graph plotted in fig.2 depicts that a greater number of the respondents concur with the statement that IoT is a smart solution that is built for monitoring farm productivity and automating the irrigation system. The respondents explain further that this smart farming solution is embedded with of sensors built for monitoring crop field conditions and automating of irrigation system.

Fig.3: Chat Analysis



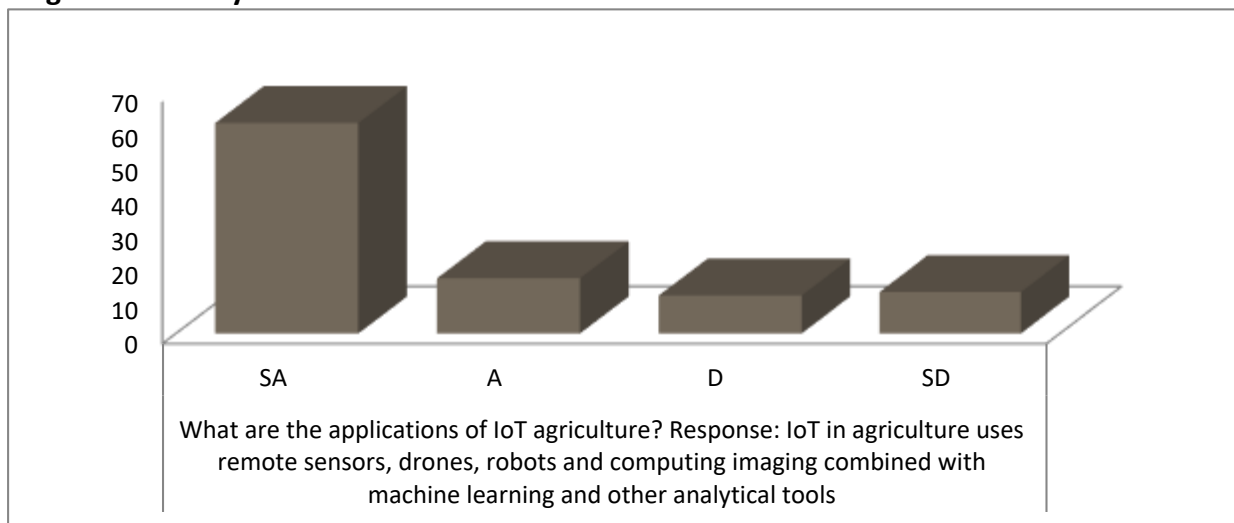
The chart analysis in fig.3 shows that a significant amount of the respondents state that IoT device sensors can be used to control and monitor farm productivity. The respondents added that air born IoT devices such as drones can be used monitor farm yards including planting procedures, crop spraying and over all crop health.

Fig.4: Chat Analysis



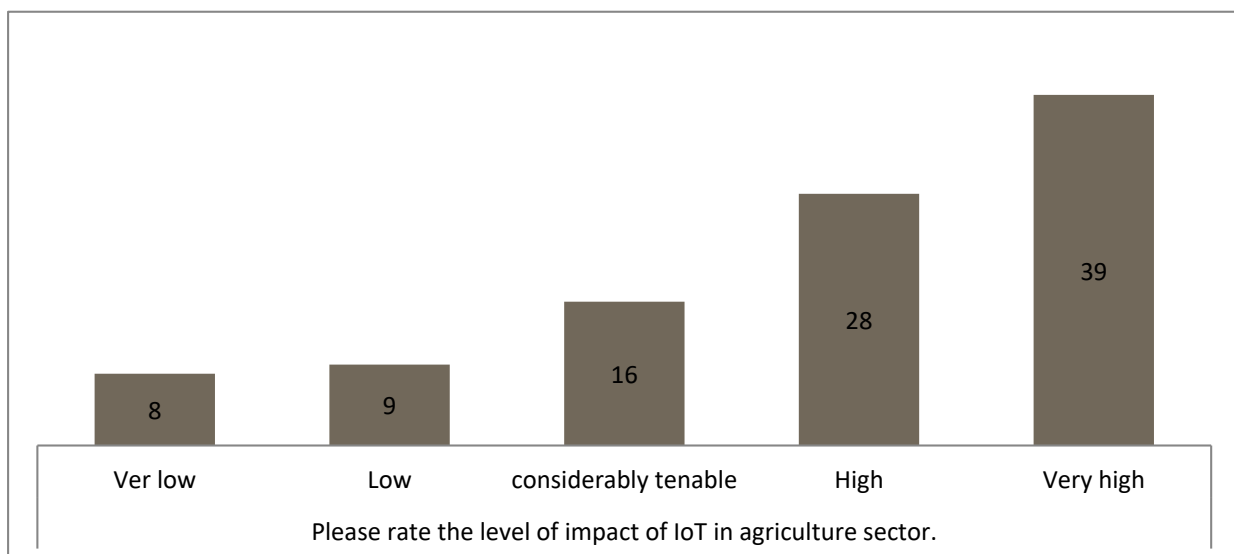
The graph plotted in fig.4 clearly shows that a greater number of the respondents are of the opinion that farmers can monitor farm conditions using IoT technology from any physically distant. The respondents inferred that the evoking technologies of Internet of Things the potentials could increase farm productivity. The respondents further explain that one of the key features of IoT is that it can used to determine soil quality (pH), rainfall, temperature and humidity.

Fig.5: Chat Analysis



The chart analysis in fig.5 shows that greater number of the respondents are informed that IoT technology uses remote sensors, drones, robots and computing imaging combined with machine learning and other analytical tools for mapping farm yards, surveying and monitoring of crops. According to the respondents, the technology behind IoT is capable of providing data to farmers thereby enabling rational farm management plans could help to save time and money.

Fig.6: Chat Analysis



The graph shown in fig.6 depicts that a larger number of the respondents indicated that the impact of IoT as being 'very high'. The respondents stressed that IoT technology has helped farmers to enhance farm productivity and reduction of farm waste.

CONCLUSION

The discussion of this paper is focused on the impact of IOT (Internet of Things) in the agriculture sector. Some of the IoT application domains and challenges were discussed in the paper. The paper informed that IOT (Internet of Things) technologies have all the characteristic features that potentials that could allow farmers to evaluate moisture level, soil conditions, level of pest control and livestock feeds density.

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İlgili makama;

5. Uluslararası Gıda, Tarım ve Veteriner Bilimleri Kongresi” 17-19 Mart 2023 tarihleri arasında Kafkas Üniversitesinde 38 farklı ülkenin akademisyen/araştırmacılarının katılımıyla gerçekleşmiştir. Kongre kapsamında sunumu yapılan 426 bildirinin 202 adeti Türkiye’den katılımcılar tarafından; 224 bildiri ise 38 ülkeden katılımcılar tarafından sunulmuştur. Kongre 16 Ocak 2020 Akademik Teşvik Ödeneği Yönetmeliğine getirilen *“Tebliğlerin sunulduğu yurt içinde veya yurt dışındaki etkinliğin uluslararası olarak nitelendirilebilmesi için Türkiye dışında en az beş farklı ülkeden sözlü tebliğ sunan konuşmacının katılım sağlaması ve tebliğlerin yaridan fazlasının Türkiye dışından katılımcılar tarafından sunulması esastır.”* değişikliğine uygun düzenlenmiştir.

Bilgilerinize arz edilir,

Saygılarımla,

A handwritten signature in blue ink, likely belonging to Ass. Prof. Mükremin ÖLMEZ.

Ass. Prof. Mükremin ÖLMEZ
Kafkas University Laboratory Animals Research
and Application Centre, Director
Düzenleme Kurulu Başkanı