INTERNATIONAL BALKAN AGRICULTURE CONGRESS

IBAC

15-18 OCTOBER 2025 BALIKESİR

TRAKYA UNIVERSITIES ASSOCIATION

BALIKESİR UNIVERSITY

International Balkan Agriculture Congress

15 - 18 OCTOBER 2025
BALIKESİR



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Abstracts of

International Balkan Agriculture Congress

IBAC 2025

15-18 October 2025 Balıkesir

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PRESENTATION

Oral-Online-Poster Presentation

ISBN: 978-975-6993-39-2

❖ **We would like to thank Derya ALTINTAŞ, a student at Balıkesir University's Faculty of Fine Arts, for her Assistance in preparing the conference poster.**

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Conference Program

16 OCTOBER THURSDAY 2025 ŞEHİT FETHİ SEKİN CONFERENCE HALL

ORAL PRESENTATIONS	
1.SESSION	
Congress Session Chair Prof. Dr. Ergün DEMİR Assoc.Prof. Dr. Murad GÜRSES	
09.00 Ülkü TEKKESIN	The Effects of Microalgae Use on the Fruit Quality of Cucumber
09.15 Bora Onur HALLAÇ	Micropropagation of Philodendron birkin Using Temporary Immersion System
09.30 Büşra OLER	Effect Of Priming Treatments With Seaweed Extract On Seedling Quality Of Carrot
09.45 Yeşim BEKYUREK	Sustainable Organic Agriculture Project: KAPTAR and the Kayseri Model
10.00 COFFEE BREAK	
2.SESSION	
Congress Session Chair Prof. Dr. Zeynep KARAPINAR	
10.30 Göksen AYALP	Comparison of the Efficacy of Propolis, Honey, Amoxicillin-Clavunic Acid, and Clindamycin on Microorganisms Isolated from Cats with Periodontal Disease
10.45 Münire TURHAN	A Different Approach to Fighting Varroa: Artificial Intelligence
11.00 Ali KORKMAZ	The Foundation of Life in Honey Bees: Protein and Colony Health
11.15 Mustafa KÖSOĞLU	Traditional Hives of Anatolia
3.SESSION	
Congress Session Chair Prof. Dr. Osman İrfan İLHAK	
11. 45 Nisanur EKTİK SEZEN	Bactericidal Activity of Lactiplantibacillus plantarum Postbiotics Against Salmonella spp., Listeria monocytogenes and Escherichia coli O157:H7 on Eggshells
12.00 Serdar GÜNDOĞAN	Ascorbic Acid and Wheat Dough Rheology
12.15 Hande Işıl AKBAĞ	The Effect of Different Sources of Bran on the Gowth Performance of Mealworms
12.30 Mustafa Furkan CEYLAN	Artificial Intelligence Applications for Fish Age Estimation and Sustainable Fisheries Management
12.45 Onur YETİK	Effects of Rumen-Protected Choline Supplementation on Colostrum Quantity and Quality, Metabolism, Lactation Performance, and Liver Steatosis in Dairy Cow

13.00 LUNCH BREAK	
4.SESSION	
Congress Session Chair **Prof. Dr. Fatma İLHAN**	
14.00 Büşra AVCILAR	Outcomes of surgical management for temporomandibular joint ankylosis in two cats
14.15 Sedef ALKUT	Feline Bilateral Nephroureterolithiasis: A Case Report
14.30 Oğuzhan ŞAHİN	Surgical Management of Lumbosacral Fracture in the Cat: A Case Report
14.45 Derya GÖRGÜN	Clinical and Radiographic Evaluation of Dental Diseases in Small Domestic Rabbits: Four Case Reports
5.SESSION	
Congress Session Chair **Prof. Dr. Musa KARAMAN** **Assoc.Prof. Dr. Muharrem EROL**	
15.00 Yiğit KARABULUT	A case of ehrlichiosis with anterior uveitis and severe aplastic pancytopenia
15.15 Nurşah OYKAN	Lateral Ventricular Enlargement Associated with Hydrocephalus in an Adult Pointer Dog: Clinical Case Report
15.30 Barış AKDEMİR	Platelet-Rich Plasma in a Canine Non-Union Fracture: Clinical and Radiographic Case Report
15.45 Neslişah TARGAL	Clinical Course and Diagnostic Approach of Cervical Soft Tissue Osteosarcoma in a Cat: A Rare Tumor
16.00 Nebahat Merve TANIŞ	Dorsal Rhinotomy in a Cat Postoperative Recovery Process
16.30 POSTER PRESENTATIONS DISCUSSION **Congress Session Chair** **Prof. Dr. Faruk AYDIN**	

17 OCTOBER 2025 FRIDAY
ŞEHİT FETHİ SEKKİN CONFERENCE HALL

15.30 Figen ÇUKUR	Evaluation of Geographically Indicated Products in Terms of Olive and Olive Oil Tourism: The Case Study of Milas District in Muğla Province

16 OCTOBER 2025 THURSDAY
MALAZGİRT CONFERENCE HALL

ORAL PRESENTATION	
1.SESSION	
Congress Session Chair **Prof. Dr. Rahim AYDIN**	
09.00 Oğuz Koray BACAKSIZ	Approaches to Animal Feeding with Heat-Resistant Alternative Feeds
09.15 Ezgi TEGÜN	From Silage to Cheese: The Role of Clostridium spp. Spores in Late Blowing Defect and Control Strategies
09.30 Beşir Berhun POSTACI	Mitigation Strategies for Methane Emissions in Ruminants
09.45 Mehmet Ali AZMAN	The Use of Controlled-Release Boluses in Ruminants
10.00 COFFEE BREAK	
2.SESSION	
Congress Session Chair **Prof. Dr. Şahver Ege HİŞMİOĞULLARI**	
10.30 Büşra YARANOĞLU	Effect of propolis supplementation on oxidative status and hemato-biochemical changes of New Zealand rabbits
11.00 Nevzat SAAT	The Relationship Between Serum Reproductive Hormone Levels and Body Temperatures Measured at Different Anatomical Sites in Female Dogs
11.15 Göksen AYALP	Effects of Water Quality, Vitamin-Mineral Levels in the Ration, and Management Factors on Foot Health in Beef Cattle
11.30 Berkay ERDOĞMUŞ	Nutritional Strategies to Mitigate Enteric Methane of Ruminants
3.SESSION	
Congress Session Chair **Prof. Dr. Ziya İLHAN**	
11.45 Faruk ÖKSÜZ	Cultural And Molecular Diagnosis of Staphylococcus aureus in Clinical and Subclinical Mastitis and Determination of Antibiotic Sensitivities of Isolates
12.15 Sabiha Sena ÖZDEMİR	The Importance and Molecular Dynamics of Foot and Mouth Disease
12.30 Sude SAVAŞ	Comparison of Sexual Behavior in Rams and Bucks in Group Conditions
13.00 LUNCH BREAK	
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1.ONLINE SESSION	
Congress Session Chair **Assoc.Prof. Dr. Elif SAVAŞ**	
14.00 Cenap YILMAZ	Current status and potential of cherry cultivation in Eskişehir

14.15 Cenap YILMAZ	Selection and Pomological Assessment of Mulberry (Morus spp.) Genotypes in Eskişehir
14.30 Cenap YILMAZ	Sycamore Fig (Ficus sycomorus L.): Nutritional, Medicinal, and Agricultural Potential
14.45 Gülizar ACAR	Important Viral Infections Affecting the Gastrointestinal System of Mice and Rats: MPV-1, EDIM, Reo-3
15.00 Murat DOĞU	Effects of Cold-Pressed Black Cumin Seed (Nigella Sativa) and Pelemir Seed (Cephalina Syriaca) (PSM) Meals on Egg Quality Under Different Storage and Temperature Conditions
15.15 Gökhan BAĞIŞLAR	Summary of the Research on Information Technology Use Among Goat Breeders in Balıkesir
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Congress Session Chair Prof. Dr. Bige KARAMAN	
16.00 Ali Kürşat ŞAHİN	Survival Rates of Ephestia kuehniella and Plodia interpunctella (Lep.: Pyralidae) First Instar Larvae in Different Storage Temperatures and Periods
16.15 Selda YEŞİLYURT	Mycotoxins: Danger from Egg to Table
16.30 Arzu ÜÇTEPE	Legendre Polynomial-Based Random Regression Models for Genetic Analysis of Longitudinal Body Weight in Japanese Quails
16.45 Merve Begüm NARLI	Current Sustainable Practices in the Dairy Industry
17.00 İlkay ÇETİN	Effects of Some Environmental Factors on Buffalo Calves Live Weight and Lactation Milk Yield in Anatolian Buffaloes
17.15 Kadir KARASABAN	Effect of Tarsal Joint Lesion Degree on Milk Yield and Reproductive Parameters in Holstein Cows
17.30 Enise SUKUŞU	The Potential Use of Certain Weed Species for Phytoremediation of Heavy Metal-Contaminated Soils
17.45 Mehmet Emin YÖRÜKSOY	Propagation Methods of Cornelian Cherry (*Cornus mas* L.): Generative, Vegetative and Tissue Culture Approaches

POSTER PRESENTATIONS

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Esma CİVELEK	P.2.Management of Dystocia in a Chihuahua Dog
Mehmet Faruk AYDIN	P.3.Determination of Certain Blood Parameters and Alpha-Naphthyl Acetate Esterase (Anae) Enzyme Activities Of Peripheral Blood Lymphocytes in Suffolk Sheep
Ramazan ÇELİK	P.4.Investigation of Efficacy of Intramammary Administration of Ceftiofur at Dry Period in Assaf Ewes
Berat ALTIN	P.5.Use of Propolis in Poultry and Its Potential Effects
İrem VATANSEVER	P.6.Otitis Externa in Cats and Dogs and the Potential Role of Propolis
Fatih Mehmet KILINÇ	P.7.Essential Oils Against Varroa Mite in Honey Bees
Emincan BAHAR	P.8.The Effects of Different Feed Sources on Growth Characteristics of Mealworm Larvae (Tenebrio Molitor L.)
Ayhan YARDIMCI	P.9.Sustainability of Agricultural Waste in Agricultural Production: A Review
Ersin KARADAŞ	P.10.Determination of Forage Yields and Quality in Wheat Vetch Mixed Cultivation
Taha BAŞTUĞ	P.11.An Efficient Protocol for In Vitro Regeneration of Maize (Zea mays L.) Immature Embryos for Synthetic Seed Technology Applications
Murat ŞEKER	P.12.Determination of Some Important Pomological and Biochemical Characteristics of Gökçeada Olives
Serdar GÜNDOĞAN	P.13.Effect of Hemicellulose Addition on Farinograph and Extensograph Properties of Wheat Flour Dough
Gizem Taylan YALÇIN	P.14.Predictive Microbiology as a Tool for Modeling Risks of Pathogens and Spoilage in Foods
Melike Nur Tosun DEMİR	P.15.Microbiological Quality Assessment of Brines from Local Market-Sold Green Olives
	P.16.One Health Perspective in Food Safety
Fatma KORKMAZ	P.17.Designing Polyphenol-Protein Complexes with Black Carrot Extracts and Pea Protein
	P.18.Modification of Safflower Proteins by Ultrasound-Asst.ed pH Shifting
Cansu GÜNSEL	P.19.Effects of Ultrasonic Pretreatments on Freeze- Dried Products

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INVITED SPEAKERS' PRESENTATIONS

New Generation Beekeeping Applications

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(İ. ÇAKMAK)

The honeybee, *Apis mellifera*, plays a crucial role in the ecosystem. In addition to providing pollination services that enable the production of one-third of the food we consume, it also ensures the survival of many species in the food chain through its foraging on natural forage plants. For this reason, the increasing number of colony losses in recent years has attracted attention not only in the beekeeping community but across all sectors. There are many reasons for colony losses. Thanks to recent technological advancements, certain measures can be taken to mitigate these losses. Changing climate conditions, new diseases and parasites, resistance and residue problems, the use of foreign queens, habitat loss, monoculture planting, and the use of new generation agricultural pesticides are known to have an increasingly negative impact on beekeeping every day. Although it may seem challenging to resolve all these problems quickly, some issues can be effectively addressed through the application of new technologies. In particular, sensor technologies, high-tech cameras, and artificial intelligence can enable the diagnosis of diseases or determine the number of parasites, allowing for the autonomous management of hives and the adequate control of diseases and parasites. Work in this area is progressing rapidly. Hive heating and cooling systems, as well as autonomous heating, ensure the survival of weak colonies in winter and cooling in summer, thereby minimizing the adverse effects of climate change. Similarly, to reduce bee losses caused by agricultural pesticides, the number of foraging bees can be determined autonomously, and precautions can be taken in advance.

Keywords: Artificial intelligence, honey bees, colony losses, climate change, pathology.

Api Tourism (Bee Tourism) and Its Future in Muğla Province

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Api tourism has the potential to become one of the most important activities in the rural tourism sector, both today and in the future. Api tourism, a multifaceted and bee-focused tourism activity, allows for the diverse use of bees and bee products. Activities such as bee safaris and honey tasting workshops can be considered attractive activities within api tourism. Api tourism contributes to the economy at both micro and macro levels, particularly in terms of domestic and international tourism. Muğla province is among the important provinces in the beekeeping sector in Turkey with its hive presence, honey production and other bee products production. This creates a significant opportunity for Muğla province in terms of the viability of api tourism. Furthermore, the sustainability of api tourism directly impacts the future of api tourism. This study will present the current status of api tourism's applicability in Muğla province, followed by recommendations and assessments for future efforts that will ensure its sustainability.
Keywords: Api tourism, economy, Milas, Muğla, rural tourism.

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- Api Tourism (Bee Tourism) and Its Future in Muğla Province

New Generation Beekeeping ApplicationsThe Effects of Microalgae Use on the Fruit Quality of Cucumber

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Excessive use of chemical fertilizers to boost yield and quality in cucumber *(Cucumis sativus* L.) may adversely effect plant and soil health in long term. Therefore, the utilization of biostimulants has become significant for sustainable agriculture. In this study, the effects of fertilization with microalgae (*Spirulina platensis*) solutions on quality parameters in cucumber plants were investigated. A homogenized mixture of peat, perlite, and soil was used as the plant growth medium. Six treatment groups were established: Control, MA1 (250 ppm microalgae), MA2 (500 ppm microalgae), chemical fertilizer, MA1+ CF, and MA2+ CF. The initial application was achieved 15 days after seedling planting with subsequent applications were conducted at 10-day intervals. Following the harvest of fruits, some fruit quality parameters were assessed including fruit chlorophyll and total phenolic contents, pH, EC (electrical conductivity), fruit color (L, a, b), titratable acidity, fruit flesh firmness, and water-soluble dry matter. The results demonstrated that microalgae treatments enhanced fruit quality compared to the control group. In particular, microalgae treatments combined with chemical fertilizer yielded more efficacious outcomes. Consequently, *Spirulina platensis* solutions, when used with chemical fertilizers in cucumber can increase fruit quality, while also potentially decreasing the reliance on chemical fertilizers.
Keywords: *Cucumis sativus*, fertilization, fruit quality, microalgae.

Micropropagation of Philodendron Birkin Using Temporary Immersion System

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Philodendron birkin (Araceae) is an ornamental plant valued for its distinctive white-striped foliage and increasing market demand. Conventional propagation is limited by low efficiency and disease risks, whereas tissue culture enables rapid, uniform, and disease-free plant production. Solid culture, however, often results in limited shoot proliferation and requires high labor. The temporary immersion system (TIS), which immerses explants in liquid medium at intervals, combines the benefits of liquid culture with reduced stress and better aeration, making it a promising alternative. This study compared solid culture and TIS for the in vitro propagation of P. birkin. Sterile shoot tips were used as explants, with 100 explants per treatment. For induction, MS medium supplemented with 0.1, 0.5, or 1 mg/L BAP was tested, and the best initiation was obtained with 0.5 mg/L BAP. During multiplication, 0.1 mg/L BAP was most effective, yielding 3.6 shoots per explant in solid culture and 18.2 in TIS, a nearly fivefold increase. For rooting, MS medium containing 0.1, 0.5, or 1 mg/L IAA was tested. The best results were obtained with 1 mg/L IAA, giving 100% rooting in both systems. Shoot elongation was also greater in TIS, with an average of 5.1 cm compared to 3.5 cm in solid culture. These results confirm that TIS significantly improves both shoot multiplication and growth compared to solid culture. High proliferation rates, longer shoots, and complete rooting highlight its superiority. Achieving these results with low cytokinin concentrations also suggests reduced costs and fewer physiological problems. TIS therefore represents a reliable and scalable method for meeting the rising demand for P. birkin in the ornamental plant industry.

Keywords: Philodendron birkin, micropropagation, shoot multiplication, temporary immersion system.

Effect Of Priming Treatments With Seaweed Extract On Seedling Quality of Carrot

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In this study, the effects of priming applications with *Ascophyllum nodosum* seaweed extract were investigated on carrot seeds of the Dragon genotype in order to improve seed quality during the initial stages of germination and early seedling development. Carrot seeds were kept in continuously aerated seaweed extract solutions at different concentrations (0, 250, 500, 1000, 1500, and 2000 ppm) for 1 day at 16°C. Seeds that did not receive any treatment were considered as the control group. After priming applications, the seeds were dried back to their initial moisture content and subjected to germination tests at 20±1 °C. The experimental results were evaluated in terms of seed viability [normal germination rate (NGR)], germination vigor parameters [mean germination time (MGT), germination index (GI), seedling vigor index (SVI)], and seedling dry weights [root dry weight, shoot dry weight, total dry weight]. According to the results, the most effective improvement in the physiological quality of carrot seeds was obtained at 1000 ppm concentration in the Dragon genotype. The findings of this study demonstrated that improving seed quality is possible by using seaweed extract as a priming agent, thus providing an alternative for sustainable agricultural practices. It is predicted that priming applications with seaweed can offer an environmentally friendly and applicable contribution to the seed and seedling industry.
Keywords: *Ascophyllum nodosum* L., *Daucus carota* L., normal germination rate, seedling vigor index.

Sustainable Organic Agriculture Project: KAPTAR and the Kayseri Model

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Organic farming is an agricultural system that increases soil fertility and does not harm the environment compared to conventional farming. Therefore, organic farming is a more sustainable agricultural model. Modern conventional agriculture, which involves the use of pesticides and fertilizers, harms the environment by affecting soil fertility, polluting water resources, developing insect resistance, and increasing toxic residues, which leads to increased health problems and environmental degradation. Organic farming is the best alternative method to avoid the negative effects of chemical farming. However, the low yield of organic farming products, high organic farming certification fees, and market problems have negatively affected the development of organic farming in Turkey. For this reason, conventional farming is practiced intensively in our country. For the past 16 years, organic farming has been practiced through the support of the Cappadocia Organic Farmers Association (KAPTAR), based in Kayseri, and producers' incomes have increased thanks to the organic market, which opens every year without interruption and attracts great interest. This article details how organic farming has become sustainable in a region like Kayseri, where the vegetation period is very short, despite the low yield per decare and high certification costs, through the "Kayseri model."

Keywords: Organic farming, organic market, **s**ustainable agriculture.

Comparison of the Efficacy of Propolis, Honey, Amoxicillin-Clavunic Acid, and Clindamycin on Microorganisms Isolated from Cats with Periodontal Disease

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Although antimicrobial agents have been used for many years in the treatment of periodontal diseases (PD), interest in alternative treatment approaches has increased due to the resistance problem that has developed against these agents and their inadequacy in the management of chronic cases.The aim of this study was to compare the in vitro antibacterial activities of propolis, honey, amoxicillin-clavulanic acid, and clindamycin against microorganisms isolated from the oral cavities of cats diagnosed with PD.
Twenty-four cats diagnosed with PD at the Department of Surgery, Faculty of Veterinary Medicine, Balıkesir University, were included in the study. Microorganisms isolated from the cases were identified using standard microbiological methods, and antibiogram tests were performed with four different agents. As a result, a total of 29 bacterial strains and 3 yeast strains were isolated from the 24 cats. Among these isolates, Staphylococcus aureus showed the highest prevalence. Amoxicillin-clavulanic acid exhibited the strongest antibacterial activity against all tested bacterial species. Clindamycin and alcohol-based propolis extract demonstrated high antibacterial activity against 25 out of 29 isolates (86.2%). The findings revealed that propolis had a marked effect, particularly against Gram-positive bacteria. Moreover, chestnut and thyme honeys displayed notable antibacterial activity against both Gram-positive and Gram-negative bacteria [19 (65.5%) and 16 (55.2%), respectively]. Chestnut honey exhibited the highest inhibitory effect on all strains at 100% concentration, although its activity declined at 25% concentration.
These results suggest that combining conventional antibiotic therapies with natural products such as propolis may represent a promising approach to enhance the effectiveness of PD treatment.
Keywords: Cats, honey, periodontal disease, propolis.

A Different Approach To Fighting Varroa: Artificial Intelligence

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Varroa mites are a very dangerous external parasite that has plagued beekeepers worldwide and in Turkey for years, and continues to do so. Many methods have been tried to combat Varroa mites, but complete eradication has not been possible. In fact, many chemical pesticides have created resistance in Varroa mites, and not only has the effectiveness of these pesticides diminished on subsequent generations of Varroa mites, but they have also significantly increased the Varroa population. Consequently, new methods for eradicating Varroa mites are being sought every day.With the increasing use of artificial intelligence in agriculture, including organic acids, mechanical treatments, and herbal practices, AI applications have also been implemented in beekeeping, a branch of agriculture. Many studies have monitored honeybees using remote sensing or imaging systems within the hive. In one study, varroa mite detection in honeybee colonies was performed using a deep learning algorithm that attempted to identify varroa mite-infested adult bees within the colony in real time.The device's camera module is embedded in the brood cells within the hive. It is equipped with offline detection in remote areas with limited network coverage or online image data transmission via the cloud, as well as mite detection. The proposed deep learning algorithm uses a deep learning network for bee object detection and an image processing step to identify mites in previously detected objects. Finally, the researchers demonstrated a proof-of-concept of their approach, which can deliver nearly 70% overall bee and varroa detection accuracy. The researchers share and discuss their experimental results in detail. This review article presents a new application method for beekeepers to combat varroa mites using a camera module embedded in the honeycombs, supported by a deep learning algorithm, for the early detection of varroa mite infestations.
Keywords: Artificial Intelligence, deep learning algorithm, honeybees, Varroa.

The Foundation of Life in Honey Bees: Protein and Colony Health

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Honeybees (Apis mellifera) are indispensable creatures for the sustainability of the ecosystem and the continuity of agricultural production.

One of the key determinants of colony health is protein. Protein, naturally provided by pollen, plays a critical role in larval development, the functionality of nurse bees' glands, the strengthening of the immune system, and colony resilience. Insufficient protein intake leads to brood losses, low-quality adult bees, weakened immunity, and a decline in colony population, even causing colony deaths in later stages.

Factors such as climate change, monoculture farming, and pesticide use, in particular, limit natural pollen sources and exacerbate this problem. Therefore, in beekeeping, alternative feed sources such as pollen cakes or specially formulated protein supplements made from various products become important when pollen is insufficient.

This study highlights the biological, physiological, and ecological effects of protein feeding on honeybee colonies, demonstrating that adequate protein supplementation is a critical element for sustainable beekeeping and ecosystem health.

Keywords: Honeybees, nutrition, pollen, protein.

Traditional Hives of Anatolia

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Throughout history, Anatolia has been the cradle of important civilizations. These ancient lands, with their diverse geographical conditions and resulting diversity of vegetation, serve as a genetic center. There are five different honeybee races (*Apis mellifera anatoliaca, Apis mellifera caucasica, Apis mellifera carnica, Apis mellifera syrica, and Api mellifera meda*), as well as different ecotypes of the Anatolian bee. The relationship between humans and bees in Anatolia is documented in Hittite inscriptions found in Boğazköy around 1300 BC. When we examine traditional beekeeping in Anatolia, we see that different types of hives were used in different apiaries depending on the regional conditions. Today, traditional hives are used in many regions, both out of habit and for commercial reasons.
Keywords: Beekeeping, history of beekeeping, traditional hive.

Bactericidal Activity of *Lactiplantibacillus plantarum* Postbiotics Against *Salmonella* spp., *Listeria monocytogenes* and *Escherichia coli* O157:H7 on Eggshells

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In this study, the antimicrobial effects of postbiotics obtained from *Lactiplantibacillus plantarum* at different concentrations (1x, 2x, 4x) against *Salmonella spp.*, *Escherichia coli* O157:H7, and *Listeria monocytogenes* inoculated on eggshells were evaluated at 7 °C and 23 °C. After inoculation, the eggs were treated with postbiotics at the specified concentrations using the spray method, and microbial analyses were performed on days 0, 5, 10, and 20. The results showed a significant decrease in *Salmonella* spp. and *E. coli* O157:H7 loads at 7 °C (p<0.05), while an increase was observed in *L. monocytogenes* at high concentrations. At 23 °C, postbiotic applications promoted bacterial growth in all pathogens, with rapid increases observed particularly in *Salmonella spp.* and *E. coli* O157:H7. The findings indicate that *L. plantarum* postbiotics may be effective to a limited extent on certain pathogens under cold chain conditions, but may increase contamination at room temperature. Therefore, it is recommended that postbiotics be used in food safety applications under appropriate temperature conditions and by considering the susceptibility of the target pathogen.

Keywords: Eggshell, *Escherichia coli* O157:H7, *Lactiplantibacillus plantarum*, *Listeria monocytogenes*, postbiotics, *Salmonella spp.*.

Ascorbic Acid and Wheat Dough Rheology

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Ascorbic acid (vitamin C) is one of the most widely used oxidizing agents in breadmaking due to its ability to strengthen gluten and improve dough performance. Acting as an oxidant in dough systems, it enhances the formation of disulfide bonds within gluten proteins, thereby modifying dough rheology and baking quality. In this study, the influence of different levels of ascorbic acid on the rheological performance of wheat flour dough was evaluated through farinograph and extensograph analyses. Flour samples were enriched with ascorbic acid at concentrations of 0, 10, 20, and 30 mg/kg. Farinograph analysis revealed that ascorbic acid supplementation increased dough stability from 12.7 min in the control to 15.3 min with the addition of 30 mg/kg ascorbic acid, indicating enhanced resistance to mixing. Concurrently, the reduction in softening degree reflected an improvement in dough strength. The addition of ascorbic acid was found to reduce water absorption values by approximately 1–1.5%.m Dough development time showed no significant reduction in quality, suggesting enhanced gluten formation under oxidative conditions. Extensograph analysis showed that ascorbic acid supplementation increased resistance to extension (R5) and maximum resistance (Rmax), whereas extensibility and energy values decreased. These changes highlighted a substantial strengthening of the gluten network, with the dough becoming firmer and less stretchable, depending on the ascorbic acid level. In conclusion, ascorbic acid addition significantly enhanced dough strength and mixing tolerance, although it reduced extensibility. These findings confirm the functional role of ascorbic acid as an effective dough improver, offering technological advantages for industrial breadmaking applications where stronger dough with improved handling properties is desired.
Keywords: Extensograph, farinograph, gluten, oxidizing agents.

The Effect of Different Sources of Bran on the Gowth Performance of Mealworms

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The global population is expanding, which is anticipated to result in an increase in global food demand. Animal products constitute a substantial proportion of global food demand, and it is projected that demand for animal products will increase in the future. In meeting the increasing demand for animal products, the livestock sector must enhance its productivity and environmental sustainability. In this regard, the role of feed production in ensuring the environmental and economic sustainability of the livestock sector is critical. In this context, the utilisation of insects in the nutrition of animals constitutes a significant alternative. The advantages of this approach include the competitive nature of shared resources in human and animal nutrition, its high environmental sustainability, and its high yield per unit area. The feeding of insects is frequently undertaken using agricultural and/or food industry byproducts. Although wheat bran is the most widely used of these, alternative feed sources for insect nutrition need to be evaluated. In light of the previously mentioned points, the present study set out to evaluate the effects of feeding mealworm larvae with starch from various bran sources on growth and nutrient composition. The larvae were divided into four groups based on the type of feed used, and weight measurements were taken at two-week intervals. The feeding process was terminated upon the observation of the first pupa. At the end of the study, the larvae were dried and prepared for analysis before being subjected to chemical analyses. The results demonstrated that the levels of crude protein and phenolic compounds in the larvae were significantly influenced by the feeding practices employed ($P \leq 0.05$). The larval weights exhibited no significant difference between the wheat bran and corn bran groups ($P \leq 0.05$), with the lowest larval weights observed in the wheat starch-fed group.
The study concluded that corn bran can be used as an alternative to wheat bran in the feeding of mealworm larvae.
This research was funded by TUBITAK with grant number 1919B012337214.
Keywords: Alternative feed, mealworm, nutrients, protein, phenolic compound.

Artificial Intelligence Applications for Fish Age Estimation and Sustainable Fisheries Management

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Effective fisheries management requires reliable estimates of fish population size and accurate age determination. Traditional methods such as visual inspection of catches, manual counting of otolith growth rings, and conducting comprehensive field surveys are often costly, time-consuming, and susceptible to expert bias. Recent research indicates that artificial intelligence (AI) offers a powerful alternative by standardizing and automating these critical tasks. Computer vision methods like deep convolutional neural networks and Mask R-CNN can segment growth rings in otolith or scale photographs, yielding reproducible age estimates. Other deep learning approaches combine spectral analysis with image data to identify age-related chemical signatures without extensive manual preprocessing. In parallel, large-scale monitoring systems now integrate automated species identification, estimation of fish length and weight, and real-time analysis of catch composition. Evidence from the Black Sea, the North Atlantic, and Pacific island fisheries shows that such AI-enabled pipelines significantly shorten analysis time, reduce monitoring costs, and provide near-real-time data for setting quotas and planning conservation measures. By lowering dependence on manual expertise and ensuring consistent, repeatable results, AI enables scientists and policy makers to respond more rapidly to changes in fish stocks, strengthen compliance, and involve fishers in collaborative management. These developments demonstrate that AI has moved beyond experimental applications and now serves as a practical and essential tool for achieving sustainable fisheries management.

Keywords: Computer vision, deep learning, fishery management, otolith analysis, sustainable fisheries.

Effects of Rumen-Protected Choline Supplementation on Colostrum Quantity and Quality, Metabolism, Lactation Performance, and Liver Steatosis in Dairy Cow

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Feed additives used in dairy cattle nutrition play an important role in the dairy industry, along with the growing world population and number of animals. In the constantly evolving dairy cattle industry, eliminating disease agents and implementing appropriate feeding strategies in conjunction with preventive medicine has become more important than treating diseases. The period when metabolic and reproductive problems are most frequently observed is the 21 days before and after calving. This critical period is considered the most important stage in the life cycle of a dairy cow. Supplementing rations with rumen-protected choline (RPC) has significant effects on hepatic steatosis, metabolic diseases, colostrum quantity and quality, and lactation performance.

Choline is an essential nutrient for dairy cows. It plays an important role in various physiological functions such as milk production, lipid and liver metabolism. Rumen-protected choline increases milk yield by supporting more efficient nutrient utilization and energy balance in cows.

Increasing intestinal choline supply increased milk production in lactating dairy cows by approximately 7% compared to the control group. Cows receiving choline supplementation produced up to 85% more colostrum than cows not receiving supplementation. In some studies, in addition to higher volumes, improvements in colostrum quality have also been reported with increased immunoglobulin G (IgG) levels. It has been determined that cows supplemented with rumen-protected choline produce an additional 667 to 1,072 kilograms of milk per year. In our study, the aim was to share all the effects of adding RPC to rations with industry stakeholders and producers to enable them to achieve profitable and sustainable farming practices.

Keywords: Colostrum quantity and quality, lactation performance, liver steatosis, metabolism.

Outcomes Of Surgical Management For Temporomandibular Joint Ankylosis İn Two Cats

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Temporomandibular joint (TMJ) ankylosis is a rare condition in cats that restricts mandibular mobility. Left untreated, it can lead to serious, potentially life-threatening consequences, including aspiration pneumonia, impaired thermoregulation, or malnutrition. The purpose of this study is to share the clinical presentation, diagnostic imaging findings, and surgical management outcomes in two cats that developed TMJ ankylosis following falls from height.

Two 3-year-old cats, one Scottish Fold (Case 1: male, weighing 2.2 kg) and the other British Shorthair (Case 2: female, weighing 2.5 kg), who had fallen from the 4th floor, were brought to the hospital approximately 2 months after the trauma with complaints of marked limitation in mouth opening (~1-1.5 mm), salivation, and difficulty feeding. In the clinical examination, only the tip of the tongue was out, there was no jaw movement, increased salivation and dehydration in Case 1, while the tip of the tongue was out, very limited jaw movement and pain were observed in Case 2. Radiological and computed tomography (CT) evaluations of the cases were performed. Radiologically, joint ankylosis and degenerative changes were observed, while CT revealed irregular bone proliferation in intraarticular and periarticular structures. Both patients underwent excision arthroplasty of the temporomandibular joint (mandibular condylectomy). Postoperative jaw opening measurements were 1 cm and 1.4 cm (Cases 1 and 2), respectively. At a follow-up visit two months later, the jaw opening remained the same, and the cats gained weight (Case 1: 3.3 kg, Case 2: 3.2 kg).

In cases of TMJ ankylosis, early diagnosis, effective use of imaging methods, and appropriate surgical approach increase the success of treatment. CT imaging, in particular, is essential for the diagnosis and surgical planning of TMJ ankylosis in cats. In both cases where mandibular condylectomy was performed, significant postoperative functional improvement and quality of life were achieved.

Keywords: Cat, computed tomography, mandibular condylectomy, temporomandibular joint ankylosis.

Feline Bilateral Nephroureterolithiasis: A Case Report

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Nephroureterolithiasis in cats has been increasingly recognized in recent years, accounting for less than 2% of all urolithiasis cases. The most common type of stone is calcium oxalate. Although bilateral involvement is rare, it can lead to acute or chronic kidney damage, requiring urgent intervention. Bilateral cases, in particular, can cause severe renal function loss and increase the risk of mortality. Many patients are asymptomatic, and nephroureteroliths may not be detected until abdominal imaging is performed for any reason. This case report describes the clinical findings, diagnostic methods, and therapeutic approach of a cat diagnosed with bilateral nephroureterolithiasis.

An 8-year-old, unspayed female crossbred cat presented with anorexia, vomiting, and significant weakness. After receiving symptomatic treatment at a private veterinary clinic, she was referred to our clinic after imaging examination revealed stones in both kidneys. Physical examination revealed the patient in lateral recumbency, mild lethargy, abdominal distension, and a hunched back. She had also been supported with a nasogastric tube at an external clinic due to prolonged anorexia. Biochemical analysis revealed marked azotemia (BUN: 24.36 mmol/L; creatinine: 376.2 µmol/L). Abdominal ultrasonography revealed multiple hyperechoic stones in both renal pelvises and ureters, and radiography confirmed bilateral mineral-dense structures. Initially, a medical approach was implemented, including fluid therapy, analgesic and antiemetic administration, and supplements for struvite and calcium oxalate uroliths. Due to persistent obstruction, a ureterolithotomy was performed on the right kidney to remove stones from the ureter and pelvis. Analysis of the stones revealed the presence of struvite mineral. The patient had a normal urine output three times a day until the sixth postoperative day. On the sixth day, urinary bladder catheterization and bladder lavage were performed due to the accumulation of massive sand. Biochemical analysis revealed hyperglycemia and elevated creatinine levels, and the cat began vomiting, prompting renewed medical support. However, the patient died on the seventh day while vomiting.

Bilateral renal and ureteral stones are rare and cause significant morbidity and high mortality. If nephroureteroliths are composed of minerals amenable to dissolution (e.g., struvite, urate, and cysteine), dissolution may be attempted with medical therapy. Indications for surgical treatment of nephroureteroliths include ureteral obstruction, increasing urolith size and/or number despite appropriate medical therapy, deterioration of renal function, and recurrent or persistent clinical symptoms.

This case illustrates the clinical course and treatment challenges of bilateral nephroureterolithiasis, a rare condition in cats. Despite both medical and surgical approaches, complications and deterioration in renal function increased the risk of mortality. This case

highlights the importance of early diagnosis, regular monitoring, and appropriate treatment planning for bilateral uroliths. Furthermore, determining medical or surgical treatment strategies based on the mineral content of the stone plays a critical role in patient prognosis.
Keywords: Cat, nephrolithiasis, nephroureterolithiasis, struvite stone, ureterolithiasis.

Surgical Management of Lumbosacral Fracture in the Cat: A Case Report

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Trauma to the lumbosacral region in cats is a serious injury that can cause ischiatic nerve insufficiency, tail paralysis, and bladder dysfunction, and is rarely seen in cats. The extent of vertebral column involvement should be considered when determining whether surgical stabilization is indicated. The purpose of presenting this case is to evaluate the clinical findings resulting from lumbosacral region trauma using clinical, radiographic, and computed tomography (CT) imaging and to demonstrate the outcomes of surgical stabilization.
A 4-year-old, male Tuxedo cat with a lumbosacral fracture due to a fall from a height had normal forelimb function and paraparesis in the hindlimbs. Proprioception could not be assessed because the cat was reluctant to stand. Patellar and hindlimb withdrawal reflexes were diminished. The bladder was quite full. Anal tone was present but diminished. Tail motor function was present but weak. Palpation of the lumbosacral region was painful, and movement was felt in the area. The patient was hospitalized and received corticosteroid, antibiotic, and vitamin B1-B6 injections for a week to stabilize his condition. For the first three days, the patient's urine was expressed manually, and on the fourth day, spontaneous urination was observed. Surgery was performed on the seventh day. Kirschner wires and polymethylmethacrylate (PMMA-bone cement) were used for surgical stabilization. Postoperatively, the cat received supportive care, analgesia, and physiotherapy. Neurological recovery was observed within two weeks, and walking function was regained by week six.
In this case, Kirschner wires and PMMA were used to stabilize a lumbosacral trauma that required surgery. This method provides practical, economical, and biomechanically adequate stabilization, offering an alternative to other stabilization techniques.
Keywords: Cat, Kirschner wires, lumbosacral fracture, polymethylmethacrylate, tomography.

Clinical and Radiographic Evaluation of Dental Diseases in Small Domestic Rabbits: Four Case Reports

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Dental diseases are considered one of the most common and important health problems in domestic rabbits (Oryctolagus cuniculus). The aim of this study is to present the clinical and radiographic findings of common dental diseases in small domestic rabbits and to emphasize the importance of radiological evaluations in guiding the diagnostic process and treatment of the disease.

Clinical and radiological examinations of four domestic rabbits of different ages and sexes revealed the following: odontogenic abscess (n=1; Case 1), malocclusion due to retrograde tooth growth, nasolacrimal duct compression and resulting dacryocystitis (n=1, Case 2), malocclusion causing abnormal contact or pressure on the mandible (n=1; Case 3), malocclusion not causing abnormal contact or pressure on the mandible, and digestive problems associated with dental problems (soft stool) (n=1; Case 4). Additionally, cystolith (n=1, Case 1) and perianal hair loss (n=1, Case 2) were noted as additional findings not thought to be directly related to the dental problem. In the medical treatment of the cases, Marbofloxacin (2-10 mg/kg sc po q24h) was preferred for antibiotic purposes and Meloxicam (0.6mg/kg q12-24h by all routes) was preferred for pain control. Dental rasping was performed in cases where dental surgery was necessary. Clinical progress was also monitored with dental radiographic evaluations during follow-up examinations.

These findings, consistent with the literature, demonstrate that dental diseases in rabbits are chronic and associated with recurring pathologies and systemic complications. Regular health checks and radiographic follow-up are important in identifying dental problems in domestic rabbits, and appropriate diet and dental rasping are of prophylactic importance.

Keywords: Dental pathology, dental radiology, rabbit.

A case of ehrlichiosis with anterior uveitis and severe aplastic pancytopenia

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Canine monocytic ehrlichiosis (CME), caused by the gram-negative bacterium *Ehrlichia canis,* is considered an important infectious disease of dogs worldwide. The aim of this case report is to evaluate the clinical presentation and response to treatment of a dog with ehrlichiosis accompanied by anterior uveitis and severe aplastic pancytopenia. A 3-year-old male Kopay dog was brought to a private veterinary clinic complaining of anorexia and decreased performance after hunting. Physical examination revealed a normal body temperature (T=38.7), submandibular lymphadenopathy, lameness, and increased opacities in the eyes. Hematological analysis revealed severe aplastic pancytopenia (WBC=1.2 109/L, RBC=4.09 1012/L, and PLT=0 109/L). Anterior uveitis was detected in the eyes. Based on the physical and hematological examination results, ehrlichiosis was suspected, and an immunochromatographic rapid diagnostic kit was performed. Analysis revealed that the dog was infected with *E. canis* and was treated. Treatment included doxycycline at a dose of 10 mg/kg once daily (for 4 weeks), prednisolone 1 mg/kg, ranitidine 2 mg/kg, fluid therapy (balanced electrolyte solution containing isotonic sodium chloride and dextrose), and vitamin B complex. The dog's appetite increased during the first week of treatment, and complete recovery was observed by the end of the fourth week. Interviews with the owner confirmed that the dog is still living a healthy life. Consequently, it was concluded that dogs with severe aplastic pancytopenia can be successfully treated with this treatment procedure.
Keywords: Anterior uveitis, dog, *E. canis*, pancytopenia.

Lateral Ventricular Enlargement Associated with Hydrocephalus in an Adult Pointer Dog: Clinical Case Report

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Lateral ventricular enlargement in dogs is a condition resulting from the accumulation of cerebrospinal fluid (CSF) in the ventricular system and is often associated with hydrocephalus. The present case aims to describe the clinical findings and successful treatment of a dog with lateral ventricular enlargement consistent with hydrocephalus on magnetic resonance imaging (MRI).

A six-year-old, 15 kg male Pointer dog was brought to the Balıkesir University Veterinary Faculty Surgery Clinic with clinical findings such as loss of balance, inability to stand up, urinary incontinence, persistent neck hyperextension, tremor and muscle contractions. On physical examination, the patient was in a left lateral recumbent position, unresponsive to the environment, and did not react to visual stimuli. The patient was anorexic, with hyperemic conjunctivae and oral mucosa, and exhibited nystagmus. When Asst.ed to stand, the limbs remained tense, and upon release, there was a tendency to fall to the right side. The patient was unable to maintain balance or take steps. The patient's neck movements were normal, but the panniculus reflex was absent and the right hindlimb was hyperreflective. Following the clinical examination, a series of diagnostic procedures, including radiologic and MRI, were performed to investigate the underlying cause of the disease. MRI revealed mild ventricular enlargement consistent with hydrocephalus (lateral ventricular width 13.38 mm), and medical treatment was initiated. The treatment protocol included supportive fluid therapy, prednisolone, furosemide and acetazolamide, vitamins B1 and B6, and cephalosporin antibiotics. Although partial improvement was achieved with medical treatment, overall clinical improvement remained limited, and therefore, surgical intervention was deemed necessary one week later. The patient was placed under general anesthesia for microbiological and pathological examination, as well as for therapeutic purposes, including CSF puncture. Two cc of CSF was collected via puncture from the cerebellomedullary cistern. CSF analysis revealed very few degenerated neutrophils. No growth was found in the CSF culture. The same day following CSF collection, the animal was able to hold its neck normally and maintain balance in a sitting position. The following day, it began eating wet food and was able to drink water on its own. The patient was prescribed 10 days of medical treatment with famotidine (2 mg/kg, once daily), prednisolone (1 mg/kg, twice daily), clindamycin (20 mg/kg, once daily), and ceftriaxone (15 mg/kg, once daily). At the follow-up visit one week later, the patient was able to stand, balance, and walk independently.

Hydrocephalus, when recognized early and managed with appropriate treatment, can improve the quality of life in dogs. However, if left untreated, it may lead to permanent brain damage

and life-threatening complications. This case demonstrates that in an adult dog diagnosed with lateral ventricular enlargement and hydrocephalus, a combination of medical and surgical interventions can result in significant clinical improvement and enhanced quality of life.
Keywords: Cerebrospinal fluid, dog, hydrocephalus, lateral ventricular enlargement.

Platelet-Rich Plasma in a Canine Non-Union Fracture: Clinical and Radiographic Case Report

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Failure of long bone healing represents a potential complication after traumatic fractures. Although non-union fractures in dogs are rare, they are associated with morbidity that can be severe enough to necessitate amputation or euthanasia. While platelet-rich plasma (PRP) appears to be an attractive biological modality for enhancing fracture healing, its role in promoting bone union remains controversial. The purpose of this study was to evaluate the clinical and radiographic effects of PRP on a canine non-union of the humerus.
The case was an 11-month-old male Terrier crossbreed. According to the patient's history, he had undergone two orthopedic surgeries approximately one month prior: the first involved pin and plate fixation, and the second involved plate removal, leaving only the intramedullary pin. Clinical examination revealed mild abnormal mobility and pain at the fracture site. The fracture ends had perforated the skin, creating an infected open wound. The dog's general condition was stable, and hematological and biochemical parameters were within normal limits. Radiological examination revealed a thin intramedullary pin fixed to the humerus, which was bent and the fracture ends were dislocated. Following this, a new surgical intervention was performed, including renewed fixation, debridement of infected tissue, and wound closure. Postoperatively, intravenous antibiotic therapy and local wound care were administered. To promote bone healing, PRP was prepared from whole blood collected from a dog by double centrifugation. For this purpose, 15-ml pyrogen-free, DNA/RNA-free tubes were used. Nine ml of blood was drawn into the tubes, and 1 ml of sodium citrate anticoagulant was added. Approximately 0.5–1 ml of the resulting PRP was administered in a controlled manner to the fracture line on the medial aspect of the humerus. The first PRP injection (day 0) was administered on postoperative day 15. Subsequent injections were administered on days 4 and 7. Radiographic follow-up revealed progressive callus formation and significant improvement in fracture healing.
This case demonstrates that PRP can promote bone healing when combined with surgical fixation in non-union fractures. Furthermore, the technique can be considered a practical biological adjunct in clinical practice because it is low-cost, easy to implement, and requires no commercial kits.
Keywords: Dog, non-union fracture, platelet-rich plasma, PRP.

Clinical Course and Diagnostic Approach of Cervical Soft Tissue Osteosarcoma in a Cat: A Rare Tumor

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Osteosarcoma (OSA) is a rare malignant bone tumor in cats, typically reported in axial skeletal regions such as the mandible and maxilla. Cases of extraskeletal osteosarcoma (ESOSA) are relatively rare and have been described primarily in association with vaccine sites. To our knowledge, this case report is the first to describe a soft tissue osteosarcoma in the cervical region. The aim is to discuss the diagnostic process and clinical course.

A 7-year-old, neutered, long-haired mixed-breed male cat was brought in with wheezing, an inability to eat, malaise, and a mass in his right neck area noticed by the owner. The mass had been gradually growing over the past two weeks. The cat had no history of trauma or illness and was regularly vaccinated. On physical examination, findings of Horner syndrome were noted: miosis in the right eye, third eyelid occluding the eye, and eyeball retraction toward the head. There was stridor on inspiration and expiration. A firm, painless, ill-defined mass, thought to be communicating with the underlying tissues, was palpated in the right cervical region. The patient's complete blood count, serum biochemical profile, urinalysis, cervical, thoracic, and abdominal radiography, and cervical ultrasonography were performed. A head and neck radiography revealed a mass with irregular borders, located in the retropharyngeal region at the end of the axis, with diffuse, increased opacity. An air rifle bullet was incidentally discovered in the cranium. No pathological findings were detected in the axial or appendicular skeleton. There was no evidence of metastasis. Ultrasonography revealed a 2.47 x 3.09 cm heterogeneous mass with central calcified foci in the right regiocolli. Laboratory test results were within reference ranges. Due to the anatomical structure of the mass, a needle or incisional biopsy was not considered. Due to respiratory distress and loss of appetite, the patient underwent surgery. Since intubation could not be performed due to mass pressure on the patient, surgery was performed in the right cervical neck region under solid anesthetic and isoflurane anesthesia administered via mask. The mass was nodular and infiltrative, and resection was performed. Pathology revealed a soft tissue osteosarcoma. Two weeks after surgery, the cat was reported to be trying to eat but was unable to. Radiological follow-up revealed similar growth. A repeat operation was performed, revealing that the mass had invaded deeper tissues. All accessible masses were removed. Postoperatively, it was noted that the animal was still unable to eat. When a nasogastric tube was inserted, it was found that the tube was directed into the trachea due to the presence of the mass. The esophageal lumen was found to be completely obstructed. The decision was made to euthanize the patient.

Extraskeletal osteosarcomas in cats generally exhibit aggressive biological behavior, with a high tendency for local invasion. In the presented case, the rapid recurrence of the mass and its

infiltration into surrounding tissues supported the high risk of local recurrence of these tumors. While the literature has reported a lower propensity for metastasis in cats compared to dogs, the short lifespan in this case limited the ability to assess metastasis. Surgical resection was performed as a treatment option, but due to its aggressiveness, no results were obtained. The tumor's significant capacity for local invasion and rapid recurrence suggest that the prognosis for such cases is generally poor.
Keywords: Cat, cervical soft tissue osteosarcoma.

Dorsal Rhinotomy in a Cat Postoperative Recovery Process

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Rhinotomy is a surgical procedure performed in cats to relieve chronic nasal obstructions, usually caused by nasal polyps, foreign bodies, or infections. In this case report, we shared the clinical recovery and postoperative course achieved with the dorsal rhinotomy operation we performed on a cat that was previously diagnosed with a nasal tumor by computed tomography (CT) evaluation and decided to be euthanized.

A 2.9 kg, mixed breed, adult, female cat was brought with a fistulized wound on the nose, severe respiratory distress, open mouth breathing signs and hair loss in patches on the back. A physical examination, complete blood count analysis, and radiographs of the thorax and head were obtained. Following stabilization and preoperative evaluation, a dorsal rhinotomy was decided. A dorsal midline incision was made on the nasal bones, and a small portion of the os nasale was carefully lifted to reach the nasal meatus. During the exploration, many tissue pieces with a caseous structure and plaque appearance of different sizes were removed. Additionally, a round, hypertrophic mass measuring approximately 0.5 cm in diameter was excised from the left nasal passage. The operation concluded with nasal cavity lavage and hemostasis. Tissues were sent for pathological and microbiological examination. Pathological examination revealed atypic cell proliferation, but fungal culture yielded no growth. After 5 days of postoperative antibiotic therapy and 2 days of anti-inflammatory therapy, the patient was taken for follow-up and was prescribed antifungal therapy (fluconazole, 10 mg/kg, twice a day, peros, 1 month) due to the presence of whitish mucus and intraoperative plaque formation. At the 10th postoperative day follow-up, the patient was breathing easily and had no discharge. At the 1.5-month postoperative follow-up, the patient's general condition was excellent, his hair structure had improved, and he had no clinical complaints.

In the presented case, although there was no growth in fungal culture, rapid improvement in clinical findings was observed after antifungal treatment. This can be explained by the fact that some fungi may not grow in standard cultures and require different media and special conditions. The presence of atypic cells in pathological examination can be interpreted as low-grade dysplasia and is associated with chronic inflammatory processes. Dorsal rhinotomy is a valuable surgical option for cats in treating chronic nasal problems that do not respond to

conservative treatments. The postoperative recovery process should be closely monitored and the patient should be supported with individualized treatment protocols.
This case emphasizes that imaging diagnostic methods alone are not sufficient to determine the prognosis in the evaluation of chronic nasal obstruction; the patient's clinically must be evaluated thoroughly, and pathological and microbiological analyses are important in the diagnostic and prognostic process.
Keywords: Cat, dorsal rhinotomy, fungal plaques, nasal hypertrophy.

Evaluation of Geographically Indicated Products in Terms of Olive and Olive Oil Tourism: The Case Study of Milas District in Muğla Province

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Geographically indicated products are one of the most important tools for rural development. The tourism sector is a leading sector where geographically indicated products create added value. Geographical indications play a significant role in olive and olive oil tourism, which has become increasingly important within the tourism sector in recent years. Geographical indications support the mobilization and acceleration of both domestic and international tourism. The district of Milas holds a significant position in Turkey, boasting two European Union registered olive and olive oil products and 14 geographically indicated products, along with its olive groves and olive oil production. Furthermore, Milas olive oil is the first Turkish olive oil to be granted a geographical indication by the European Union. In this context, the evaluation of geographically indicated products in terms of olive and olive oil tourism is considered important. This study will examine the evaluation of geographically indicated products in the Milas district in terms of olive and olive oil tourism, considering various criteria such as gastronomic tourism, branding and promotion, and rural tourism.

Keywords: Geographical indication, Milas, Muğla, olive, olive oil, tourism.

Approaches to Animal Feeding with Heat-Resistant Alternative Feeds

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(O. K. BACAKSIZ, M. ZENGİN, E. DEMİR, M.A. AZMAN)

Global climate change has profound impacts on the agriculture and livestock sectors, leading to a decrease in water resources, a decline in agricultural productivity, and consequently, problems in food security. Rising temperatures, irregular rainfall patterns, and the risk of drought cause deterioration in the production and quality of forage crops. The decline in pasture productivity, the decrease in the nutritional value of feed resources, and the increase in risks such as mycotoxins create direct stress on animal production. This situation not only results in production losses but also has negative consequences on animal welfare, productivity, economic sustainability, and environmental balance.

The livestock sector accounts for approximately 14.5% of global greenhouse gas emissions, placing it in a position where it both contributes to and is affected by climate change. Decreases in feed consumption due to heat stress reduce milk, meat, and egg production, while also disrupting the physiological balance of animals and potentially increasing mortality rates. In this context, heat-resistant forage crops (e.g., amaranth, sorghum, lenox, teff), phytonutrient-rich feed additives (e.g., moringa, thyme, cinnamon), industrial by-products, and fruit and vegetable residues are emerging as alternative feed sources in livestock farming. These sources have the potential to reduce both water consumption in feed production and the carbon footprint. Furthermore, the development of animal and plant varieties with high stress tolerance through genetic selection and biotechnological breeding methods forms the basis of adaptation strategies to climate change.

In conclusion, to mitigate the effects of climate change on livestock farming, it is necessary to use water efficiently, promote alternative feed sources, support genetic and biotechnological innovations, and develop producer education programs. The comprehensive implementation of these strategies will ensure sustainability in livestock farming and alleviate the feed crisis and food security issues that are likely to increase in the future.

Keywords: Animal feed, alternative feeds, climate crisis, heat stress.

From Silage to Cheese: The Role of *Clostridium* spp. Spores in Late Blowing Defect and Control Strategies

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Clostridium species are Gram-positive, spore-forming, and obligate anaerobic bacteria. In particular, species such as *Clostridium tyrobutyricum*, *C. butyricum*, *C. sporogenes*, and *C. bifermentans* degrade lactic acid and sugars in silage into butyric acid, and proteins into amino acids, thereby causing a deterioration in silage quality. This deterioration leads to teat contamination via silage consumed by animals, and consequently to the occurrence of the "late blowing" defect in raw milk, primarily affecting hard and semi-hard cheeses.
This review addresses the contamination chain of *Clostridium*-related spoilage from silage to milk and cheese, and evaluates control strategies aimed at breaking this chain, with a particular focus on biological and chemical additives applicable during silage production. Findings in the literature indicate that lactic acid bacteria inoculants accelerate fermentation, ensuring a rapid pH drop and thereby suppressing the growth of *Clostridium* species. In addition, chemical additives such as formic, propionic, and sorbic acids exhibit direct antimicrobial effects that inhibit the proliferation of these bacteria, while salt-based additives such as sodium formate, calcium propionate, and sodium nitrite have been reported to effectively reduce both the number and metabolic activity of *Clostridium* spores. In this context, the appropriate and controlled use of additives is of great importance for improving silage quality and reducing microbial risks in dairy products.
Keywords: Additives, dairy products, fermentation, silage quality, spore-forming bacteria.

Mitigation Strategies For Methane Emissions in Ruminants

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The rapid growth of the world population has led to an increased demand for animal-based foods. To meet this growing demand, the expansion of livestock production systems has intensified and thus resulting in an important rise in greenhouse gas emissions. Among those gases, methane and carbondioxyde constitute the primary greenhouse gases associated with livestock emissions. Their increased atmospheric concentrations are strongly linked to the acceleration of global warming and the progression of climate change.
In recent years, extensive research has focused on nutritional strategies designed to mitigate greenhouse gas emissions and promote sustainable livestock production.
In this context, changing the ration composition and adding various additives to the ration are among the prominent methods. Findings in the literature indicate that increasing the proportion of concentrated feed in the ration relative to roughage can reduce methane emissions. In addition, it has been reported that adding bromoform, red seaweed (Asparagopsis taxiformis), live yeast cultures, probiotic preparations, and certain plant extracts to the ration can also reduce enteric methane production.
This review compiles and evaluates studies in the literature on dietary composition adjustments and the use of various feed additives aimed at decreasing greenhouse gas emissions in livestock production.
Keywords: Animal nutrition, feed additives, greenhouse gas emissions, methane mitigation.

The Use of Controlled-Release Boluses in Ruminants

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(M. A. AZMAN)

In ruminants, vitamins and minerals play a crucial role in maintaining physiological activities. Although it contains a variety of vitamins and minerals in feeds, their effective concentrations may be variable. Mineral deficiencies are particularly likely to occur on farms that use to pasture for long periods of time or in animals that are fed a diet high in roughage. Besides, additional feed additives are required to completely meet the metabolic needs of high-yielding animals on farms. These feed additives, which can be provided to animals as vitamin and mineral supplements, can take various forms. In recent years, vitamin-mineral balls, often called "boluses," that are swallowed by animals in this form have emerged as one of the most common feed additives. Depending on the intended outcome and the animal's physiological state, the bolus that is chosen may include minerals including calcium, phosphorus, magnesium, selenium, cobalt, iodine, manganese, copper, and zinc in addition to vitamins, lipids, biotin, and amino acids. Besides, combinations of pharmacological agents with potential anthelmintic, antibacterial, and anticoccidial effects or probiotic/prebiotics can be produced. The potency of boluses may vary depending on factors such as formulation, particle size of active ingredients, binders such as waxes or paraffin, and the force used for pressing. Consequently, the effectiveness of bolus supplements, whose use has become widespread in recent years, should be monitored through R&D studies, and animal trials should be conducted to test whether some boluses remain in the reticulo-rumen regions for 240 days with slow release, as claimed. Based on study findings and animal breeder data, a price/performance analysis of the generated boluses can also be carried out.

Keywords: Bolus, feed additive ruminant, vitamin-mineral.

Effect Of Propolis Supplementation On Oxidative Status And Hemato-Biochemical Changes Of New Zealand Rabbits

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Propolis is a complex mixture of waxes, plant resins, essential oils, salivary secretions. It has antioxidant, antimicrobial, anti-inflamatory, immunomodulatory and anticancer properties. The aim of the present study was to determine effects of dietary supplementation of propolis extract as a feed additive on oxidative stress, haematology and serum biochemical indices in growing rabbit diets. In the study 72 weaned mixed-sex New Zealand rabbits at 1 month of age were used. The rabbits were grouped into 3 categories as 1 control (C) and 2 experimental groups (P_1 and P_2) (n=24). The control group was fed with standard ration. Propolis extract was added to the same ration at 1000 mg/kg for P_1 group and 5000 mg/kg for P_2 group. Experiment was lasted 8 weeks. HCT value of P_2 group was determined lower than control group ($P<0.05$) and had the highest MCH ($P<0.001$) Eosinophilis count detected higher comparing control group ($P<0.05$). The lowest ALT value was found for P_2 group ($P<0.05$). Control group had higher HDL values comparing P_2 group ($P<0.05$). As oxidative stress parameters, there was no significant differences between IMA and SOD parameters ($P<0.05$) but control group had higher HDL values comparing P_2 group ($P<0.05$). In conclusion the use of propolis extract as a dietary supplement was determined to have effects on liver functions and the immune system. The lower TAS value observed in the P_2 group can be explained by the high antioxidant effect of propolis. By reducing the oxidative load, propolis may have eliminated the need for endogenous antioxidant mobilization. These results indicate that propolis, particularly at a high dose, can be a beneficial feed additive that improves metabolic efficiency and immune response in rabbits through its antioxidant and anti-inflammatory properties.

Keywords: Blood parameters, oxidative stress, propolis, rabbit, SOD.

The Relationship Between Serum Reproductive Hormone Levels and Body Temperatures Measured at Different Anatomical Sites in Female Dogs

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This study aimed to investigate the relationship between body temperature, perianal region temperature and reproductive hormones (estrogen and progesterone) in female dogs. The study was conducted on 33 clinically healthy, intact female dogs presented to the Kastamonu University, Faculty of Veterinary Medicine, Animal Hospital for routine reproductive examinations. The mean age of the animals was 3.11±1.59 years, and the mean body weight was 20.1±10.66 kg. A thorough clinical examination was performed for each dog to ensure the absence of systemic or reproductive disorders. Body temperatures were recorded at four anatomical sites: perianal, perivulvar, intravaginal, and rectal. Rectal temperature was obtained by inserting (contact) the thermometer probe into the rectum. Intravaginal temperature was measured by inserting (contact) the probe into the vaginal canal from the vestibule. Perianal and perivulvar temperatures were recorded by placing the probe gently on the respective external area for approximately 30 seconds to allow stabilization. Perianal and perivulvar temperatures measurements were performed using a Pet Thermometer. All measurements were taken in a quiet environment at a room temperature of 22–24 °C to minimize stress-related variability. Each parameter was measured three consecutive times, and the mean value of the three readings was used for analysis. Blood samples (5 mL) were collected from the cephalic vein of each dog into serum separator tubes. Samples were centrifuged at 3,000 rpm for 10 minutes, and the serum was stored at −20 °C until analysis. Serum canine estradiol (E2) and progesterone (P4) concentrations were determined using commercial ELISA kits. No significant correlation was found between estradiol (E2) and any of the temperature parameters ($p>0.05$). Specifically, the correlations between E2 and perianal temperature ($\rho=0.008$; $p=0.966$), perivulvar temperature ($\rho=0.245$; $p=0.169$), intravaginal temperature ($\rho=0.063$; $p=0.727$), and rectal temperature ($\rho=-0.048$; $p=0.792$) were weak and statistically non-significant. In contrast, progesterone (P4) levels showed significant moderate negative correlations with both intravaginal temperature and rectal
temperature. A statistically significant negative correlation was observed between P4 and intravaginal temperature ($\rho=-0.475$; $p=0.005$), as well as between P4 and rectal temperature ($\rho=-0.516$; $p=0.002$). These results suggest that as P4 concentrations increase, intravaginal and rectal temperatures tend to decrease. Although the correlation between P4 and perianal temperature did not reach statistical significance, it showed a weak negative trend ($\rho=-0.314$; $p=0.075$). Results indicated that serum concentrations of reproductive hormones influence intravaginal and rectal temperatures. The sexual cycle of dogs should be taken into account when measuring body temperature.

Keywords: Bitch, body temperature, estrogen, perianal temperature, progesterone.

Effects of Water Quality, Vitamin-Mineral Levels in the Ration, and Management Factors on Foot Health in Beef Cattle

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Foot health in beef cattle is critical for animal welfare and production performance. Foot diseases lead to significant economic losses in farms by reducing feed intake, decreasing daily live weight gain, and increasing treatment and labor costs. This study aimed to demonstrate the extent to which water quality, ration vitamin and mineral levels, and certain management factors (e.g., footbath use, hoof trimming) can influence the etiology of foot diseases observed in cattle in a beef cattle farm.

In a herd of 150 Holstein cattle of different age groups, clinical and radiological evaluations conducted due to an increase in lameness cases over the past six months revealed that subclinical laminitis and associated claw capsule diseases were prevalent throughout the herd. In some cases, it has been determined that sidewall ulcers and foot joint infections develop as nail capsule lesions progress. Additionally, orchitis, postitis, and ulcerative lesions at the tip of the preputium accompanying foot diseases were observed in some animals. In comprehensive investigations to elucidate the etiological factors, it was determined that the nitrate level in drinking water was above the limit values (106.3 mg/L in feed water). When the levels of minerals and vitamins related to foot health in the ration premix were examined, it was determined that selenium, zinc and copper levels were above tolerable limits (20 mg/kg, 3750 mg/kg and 1000 mg/kg, respectively), and daily biotin intake per animal was high (20 mg). The starch level in the ration was determined to be over 28%. It was observed that foot baths were not administered regularly at the farm, and when they were administered, formaldehyde and copper sulfate concentrations were used at very high levels (10%). It has been understood that routine and therapeutic applications cannot be carried out effectively due to the lack of adequate tools and equipment for nail cutting. Evaluation of urine (microscopic and strip examination) and blood samples taken from randomly selected animals revealed signs of moderate kidney and liver damage as well as urinary tract infection. Histopathological examination of preputial ulcerative lesions revealed signs of severe inflammation. In addition, liver abscesses were found in the internal organ examinations of some animals sent for slaughter, and it was determined that the blood color in these animals was darker than normal and the carcasses darkened more rapidly. The findings showed that high nitrate levels in drinking water caused structural deformations in the nails due to circulatory disorders and triggered aseptic inflammation. Additionally, consistent with the literature, it has been determined that high nitrate levels cause liver and kidney pathologies. It has been thought that lameness and hoof deformations observed in herds are caused by high selenium levels, which negatively affect keratin formation; however, high zinc and copper levels, which change the ratios of other mineral substances in the plasma, may also have negative effects on the production of hoof tissue and the preservation of epithelial integrity.

Identifying etiological factors is crucial for maintaining foot health in herds and preventing foot diseases. The study findings demonstrate the critical importance of considering water quality, ensuring a balanced mineral and vitamin diet, and implementing appropriate management practices holistically in preventing and controlling foot diseases in beef cattle.

Keywords: Beef cattle, foot disease, lameness, nitrate level, ration.

Nutritional Strategies to Mitigate Enteric Methane of Ruminants

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This paper focuses on the nutritional strategies to mitigate enteric methane of ruminants, including issues such as the modes of action, effectiveness, and applicability of these strategies. Methane plays an important role in the digestive system of ruminants. Methanogenic archaea, found particularly in the rumen environment, produce methane as a by-product of their metabolism. Considering that approximately 15% of anthropogenic greenhouse gas emissions originate from livestock farming, reducing enteric methane emissions from ruminants has become important. Nutritional strategies play an important share among the ways to reduce enteric methane. Algae, 3-nitrooxypropanol, saponins, essential oils, probiotics, nitrates and tanniferous forages are some of the substances used in feeding aiming enteric methane mitigation. By examining the positive and negative aspects of all these strategies together, it is possible to determine the correct and effective methods for reducing methane emissions in a sustainable manner. Although these nutritional strategies are very promising, more intensive research is needed on mitigating methane production by ruminants. This will provide more comprehensive information on topics such as effectiveness, applicability, impact mechanisms, and potential risks of enteric methane mitigation strategies.

Keywords: Emission, methane, mitigation, nutrition, ruminant.

Cultural and Molecular Diagnosis of Staphylococcus Aureus In Clınıcal and Subclınıcal Mastıtıs And Determınatıon of Antıbıotıc Sensıtıvıtıes of Isolates

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Mastitis is inflammation of the breast tissue and mammary gland due to bacterial, viral, fungal and parasitic factors or trauma. Bovine mastitis is one of the important infectious infections in ruminant breeding. It causes significant economic losses due to treatment, veterinary service, removal of the animal from breeding, decrease in milk production, deterioration in milk quality and the unsuitability of the milk obtained for consumption. More than 150 bacterial, fungal and viral mastitis agents have been identified in cow milk. Among infectious agents, bacterial pathogens pose a major threat to the mammary gland. Common bacterial mastitis agents: Staphylococcus aureus, Streptococcus agalactiae, Streptococcus dysgalactiae, Streptococcus uberis, Enterococcus faecalis and Escherichia coli. Chemical, physical, bacteriological and pathological factors cause forms such as clinical mastitis, subclinical mastitis and nonspecific mastitis. Mastitis is a multifactorial disease and usually results from the interaction of various factors related to the host, pathogens, environment, and management. The main sources and routes of transmission of pathogens include infected areas, lack of cleaning of the udder, contaminated milking machines, hands, insects and surgical instruments. In addition, lactation stage, number of lactations, trauma to the breast, teat and teat canal, loose nipple sphincters, breast skin lesions, immunological status of each mammary gland, infection intensity in the surrounding area and administrative conditions are also among the determinants. Mastitis is very complex in terms of etiology and treatment strategy. The most important point in controlling the disease is the correct identification of the etiology of mastitis. Considering the diversity of pathogens that need to be identified, it is extremely important to develop a rapid/effective diagnostic method for early diagnosis of mastitis, agent isolation, control and treatment.

This project was supported by the Scientific Research Projects Unit of Balıkesir University (Project No: 2023/149).

Keywords: Cattle, identification mastitis, isolation, pathogen

The Importance and Molecular Dynamics of Foot and Mouth Disease

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Foot-and-Mouth Disease (FMD) is a fast-spreading, zoonotic viral disease that causes significant economic losses, especially in cloven-hoofed animals like cattle, sheep, goats, and pigs. The causative agent is the foot-and-mouth disease virus, which belongs to the genus Aphthovirus within the family Picornaviridae. Controlling the disease is very difficult due to the existence of seven different serotypes (A, C, O, Asia-1, SAT-1, SAT-2, SAT-3) and numerous subtypes, as well as the lack of cross-immunity between the serotypes. Additionally, some animals that recover can become long-term carriers, playing a critical role in spreading the infection. Although the disease has been eradicated in some parts of the world, it remains endemic in many regions, including the Middle East, Africa, and large parts of Asia, including Turkey.The FMD virus spreads easily through the secretions of infected animals, as well as contaminated equipment, feed, and water. The potential for airborne transmission means the disease can rapidly spread over large areas. The long-term carrier state in recovered animals also poses a significant epidemiological challenge.Clinical signs include high fever, vesicles and ulcers in the mouth and between the toes, excessive salivation, lameness, and a significant decrease in milk yield. In young animals, the myocarditis form can be fatal. However, since other diseases can present with similar symptoms, laboratory tests are essential for an accurate diagnosis.Three main control strategies are used: culling only, stamping-out (culling and vaccination), or mass vaccination. In endemic countries like Turkey, regular mass vaccinations are carried out using inactivated vaccines. However, since current vaccines require compatibility with field strains and only provide limited protection, research into new-generation vaccines has become a priority. Modern approaches, such as DNA vaccines, peptide vaccines, and virus-like particle vaccines, are currently being researched.FMD directly affects not only animal health but also international trade. It can be controlled with a strong veterinary health infrastructure, effective vaccination programs, and rapid diagnostic methods. In the future, the most important steps toward eradication will be developing effective vaccines against circulating field strains, clarifying carrier mechanisms, and widespread implementation of new diagnostic methods.

Keywords: Aphthovirus, Foot-and-Mouth Disease, picornaviridae, serotype, vaccine.

Comparison of Sexual Behavior in Rams and Bucks in Group Conditions

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In animal agriculture, one must know the fundamental ethological traits of animals to improve their environment. Although sheep and goats belong to the small ruminant, their ethological traits may differ. This study compared the mating behavior of rams and bucks during the pen mating method in goats and sheep with synchronised estrus. The study was conducted at the Animal Production Research and Application Unit of the Faculty of Agriculture, Çanakkale Onsekiz Mart University. The study involved 4 rams and 27 does, 8 rams and 86 ewes. Eight pens were created for the rams, and each pen housed one ram and 10-11 ewes. Four pens were created for the bucks, and each pen housed one buck and 6-7 goats. The oestrus cycles of the females were synchronised using intravaginal sponges and PMSG hormone administration. Twenty-four hours after the removal of the intravaginal sponges, the females were placed in pens and introduced to rams and bucks, which were identified according to the farm's pedigree records. The females were housed together with the males for three consecutive nights. Behavioral observations were conducted for 17 hours (16:00–09:00) using time sampling (10 min) from camera recordings and continuous observation. Rams performed mating behaviour at a higher rate, while bucks exhibited mating behaviour at a lower rate ($P \leq 0.05$). In both species, the rate of mating behavior decreased over the days, while resting behavior increased ($P \leq 0.05$). Bucks exhibited higher resting behavior ($P \leq 0.05$) and higher agonistic behavior ($P = 0.0508$) than rams. Depending on the oestrus cycle, mating behavior decreased in both species as the days progressed ($P \leq 0.05$). The daily total number of mounts corrected for the number of females and mating numbers was similar in rams and ewes ($P > 0.05$). The duration of courtship interaction with ejaculation was found to be 0.89±0.15 min in rams and 0.84±0.18 min in ewes ($P > 0.05$). The mating rate with the same female within the total mating was determined to be 22.0% (11/50) in bucks and 14.7% (28/190) in rams. The probability of a buck mating with the same female was found to be 60.7% ± 3.54%, while that of a ram was found to be 64.0% ± 6.85% ($P = 0.7690$). In conclusion, while rams exhibited significantly higher rates of courtship behavior compared to bucks, the duration of courtship interaction with ejaculation, frequency of total mounting, mating number, mating efficiency, and consecutive mating frequency with the same ewe were similar.

Keywords: Courtship duration, mating frequency, pen mating method, Tahirova sheep, Türk Saanen goat.

Current status and potential of cherry cultivation in Eskişehir

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Eskişehir has significant potential for sweet cherry *(Prunus avium* L.) cultivation due to its favorable climate and soil conditions. In recent years, cherry production in the region has been increasing, with particular attention to the expansion of high-quality cultivars suitable for export. However, climatic fluctuations, insufficient irrigation, limitations in cultivar and rootstock selection, and marketing problems remain the main factors restricting yield and fruit quality. Adoption of appropriate cultivars and modern orchard establishment techniques, improvement of irrigation infrastructure, and strengthening of producer organizations are expected to enhance the competitiveness of cherry production in Eskişehir. In this study, the current production status of the region was evaluated, the challenges faced were discussed, and solutions were proposed for sustainable cherry cultivation.

Keywords: Cherry, Eskişehir, production, *Prunus avium.*

Selection and Pomological Assessment of Mulberry (*Morus* spp.) Genotypes in Eskişehir

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(C. YILMAZ)

Abstract

In this study, 20 mulberry (*Morus* spp.) genotypes collected from the Odunpazarı district of Eskişehir were evaluated for their pomological characteristics. Significant variation was observed among genotypes in terms of fruit weight (1.53–5.57 g), fruit length (20.23–30.44 mm), and fruit width (11.78–18.04 mm). Skin color parameters (L*, a*, b*) also showed wide differences, indicating diversity in external fruit appearance. Soluble solid content (SSC) ranged from 7.0% to 21.5%, reflecting considerable variation in sweetness and potential consumer preference. Some genotypes such as Dut5, Dut6, Dut13, Dut15, and Dut16 exhibited notably high SSC values (>20%), suggesting potential for fresh consumption and processing. Meanwhile, larger-fruited genotypes including Dut2, Dut4, and Dut20 showed promise for commercial table use. The observed diversity highlights the importance of Eskişehir mulberry germplasm as a valuable source for breeding and selection programs aimed at improving fruit quality traits. Overall, these results demonstrate that the region possesses rich mulberry genetic resources with potential applications in sustainable fruit production and local economy development.

Keywords: Selection, Mulberry, pomological traits, Eskişehir.

Sycamore Fig (*Ficus sycomorus* L.): Nutritional, Medicinal, and Agricultural Potential

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(C. YILMAZ)

Ficus sycomorus L., commonly known as sycamore fig or "cümbez" in Turkey, is a perennial fruit tree species of the Moraceae family with a long history of domestication and cultural significance across Africa and the Eastern Mediterranean. This species is characterized by its large canopy, rapid growth, and tolerance to semi-arid and saline environments, making it a valuable genetic resource for sustainable agriculture under climate change conditions. The fruits of *F. sycomorus* are edible, rich in carbohydrates, minerals, and bioactive compounds, while the leaves and bark possess traditional medicinal uses due to their antioxidant, antimicrobial, and anti-inflammatory properties. Despite its nutritional and pharmacological potential, scientific studies on *F. sycomorus* remain relatively limited compared to the common fig (*Ficus carica*). Recent investigations emphasize the importance of evaluating its pomological traits, phytochemical composition, and ecological adaptability, as well as exploring its potential applications in functional foods and natural product development. Systematic research on *F. sycomorus* can contribute not only to the conservation of local plant genetic resources but also to the diversification of fig cultivation and the enhancement of agro-biodiversity in Mediterranean ecosystems.

Keywords: Cümbez, *Ficus sycomorus*, Mediterranea, sycamore fig

Some Important Viral Infections in the Digestive System of Laboratory Animals

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(M.O. TIMURKAN, G. ACAR)

Laboratory animals can harbor various microorganisms in their bodies. These microorganisms generally do not cause overt clinical disease; however, they may alter the physiology of the animals, rendering them unsuitable for experimental use. Although the number and prevalence of these microorganisms in laboratory animal facilities have significantly decreased in recent years, many of them still appear in laboratory animals and cause the emergence of undesirable variables in research (physiology, biochemistry, immune system parameters, etc.). The use of laboratory animals has been steadily increasing both worldwide and in Türkiye. Researchers employing laboratory animals such as mice, rats, and rabbits in various experimental studies must be aware of the potential impact of these microorganisms on research outcomes. This study focuses on significant viral infections primarily localized in the gastrointestinal tract of mice and rats, specifically Mouse Parvovirus type 1 (MPV-1), Mouse Rotavirus [Epizootic Diarrhea of Infant Mice–EDIM], and Reovirus type 3 (Reo-3), addressing their etiology, epidemiology, clinical signs and pathology, as well as prevention and control strategies.
Keywords: Laboratory animals, mouse parvovirus type 1 (MPV-1), mouse rotavirus (EDIM), reovirus type 3 (Reo-3), viral infections

Effects of Cold-Pressed Black Cumin Seed (Nigella Sativa) and Pelemir Seed (Cephalina Syriaca) (PSM) Meals on Egg Quality Under Different Storage and Temperature Conditions

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(M. DOĞU, R. ALBAYRAK DELİALİOĞLU, S. YEŞİLYURT, A. AŞKIN KILINÇ, A. Ö. CÜREOĞLU)

Eggs are one of the fundamental components of human nutrition due to their complete protein content and economic value, making them indispensable to the food industry. However, the increasing cost of conventional poultry feeds has created an urgent need to identify natural and functional alternatives. In this context, cold-pressed oilseed meals of black cumin (*Nigella sativa;* NS) and pelemir seed (*Cephalaria syriaca*; CS), which are rich in oil, protein, and flavonoids, have gained prominence. While previous research has predominantly focused on the effects of these diets on the performance of laying hens, studies investigating how eggs maintain their quality under different storage durations and temperatures remain limited. In this study, conducted with 10 replications, the effects of storage temperature, storage period, and dietary factors on quality parameters such as egg weight, Haugh unit, yolk colour score, albumen height, weight loss, shell breaking strength, shell thickness, and yolk weight were evaluated in eggs collected from the laying house, using a factorial analysis of variance design. The variance analysis revealed that the dietary factor (Control, NS, and CS) significantly influenced all traits except for the Haugh unit, shell breaking strength, and shell thickness ($p < 0.05$). For most of the evaluated traits, the mean values of the Control group were found to be higher than those of the other treatments.

Keywords: Black Cumin Seed (*Nigella sativa*), egg quality, egg storage conditions, Pelemir Seed (*Cephalana syriaca*), temperature condition**.**

Summary of the Research on Information Technology Use Among Goat Breeders in Balıkesir

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This research aimed to determine the information technology (IT) usage trends of goat breeders in the Balıkesir province of Turkey. The study sought to contribute to the existing literature on the information sources and technology use of goat breeders. It's widely known that the agricultural sector is at a disadvantage in accessing information and is less open to innovations compared to other sectors, and this is even more pronounced for goat breeding.
The study's primary data were collected through face-to-face surveys with 119 goat breeders in the Altıeylül, Karesi, Dursunbey, Bigadiç, and Susurluk districts of Balıkesir.
Demographics: The average age of the breeders surveyed was 44, with ages concentrated between 38 and 50. The majority of participants were male (77.4%), while 22.6% were female. The educational level was relatively high, with 37.9% having a high school diploma and 26.7% being university graduates.
Socio-economic Status: 80% of the breeders considered themselves to be in the low-income group.
Farming Practices: More than half (51%) of the breeders had herds with fewer than 50 animals. The majority of herding work (69.3%) was performed by a family member. About 52.2% of the breeders kept farm records, such as birth rates, yields, and feed quantities. Additionally, 53.5% of them expressed a desire to expand their herds.
Technology Use: The use of advanced systems like computerized weighing systems (90.4% non-usage) and herd management software (92.2% non-usage) was found to be very low, indicating a prevalence of traditional production methods. The most commonly used mobile application was
e-Devlet (87.2%), followed by the Meteorology app (47.7%) and the Ministry of Agriculture Mobile Application (30.2%). This suggests that breeders are open to technology, but agricultural applications have not yet become widespread. The study also found that as the level of education increases, so does the inclination to use technology.
Satisfaction: 74.8% of the breeders were satisfied with the Short Message Service (SMS) Project used to access agricultural information.
Recommendations
Based on these findings, the research suggests increasing
training and extension activities related to agricultural innovations and technology use, especially in a disadvantaged sector like goat breeding. It also recommends integrating agricultural services more efficiently into widely used platforms like e-Devlet to encourage the adoption of new technologies.
Keywords: Adoption, goat breeding, information technologies, sustainability, trend.

Survival Rates of *Ephestia kuehniella* and *Plodia interpunctella* (Lep.: Pyralidae) First Instar Larvae in Different Storage Temperatures and Periods

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(H. E. GENÇLER, A. K. ŞAHİN)

In biological control, mass production of host insects is essential for the production of beneficial insects, as they are used as food and breeding grounds. To produce sufficient numbers of beneficial insects, it's crucial to have a high host insect population not only during production but also during application periods to boost beneficial insect populations. To achieve this, low-temperature storage studies are of great importance for both backup and synchronization with the beneficial insects during periods when the host population is high. This study aimed to determine the survival rates of first-instar larvae of *Ephestia kuehniella* Zeller (Lepidoptera: Pyralidae) and *Plodia interpunctella* Voegele (Lepidoptera: Pyralidae), which are mass-rearing hosts for many beneficial insects, at two different temperatures and six different storage durations. For this purpose, larvae were stored at 5°C and 8°C for 2, 4, 6, 8, 10, and 12 days in refrigerators. The experiments were set up with 10 replicates for each storage duration. Each replicate consisted of 10 first-instar larvae, 0-6 hours old, in an Eppendorf tube. At the end of the storage periods, the Eppendorf tubes were removed from the refrigerators and placed in a climate chamber (25 ± 1°C temperature, 60-65% relative humidity). After a 30-minute acclimatization period, the number of live and dead larvae was determined under a stereobinocular microscope. Survival rates were calculated from these data, and ANOVA was used to compare the means to determine the effect of different storage temperatures and durations. In cases where significant differences were found, Tukey's multiple comparison test was used to identify which means were statistically different from each other. The study's results showed no significant difference in the survival rates of first-instar *E. kuehniella* and *P. interpunctella* larvae at 5°C across all storage durations. However, at 8°C, the survival rates of *E. kuehniella* larvae were statistically higher than those of *P. interpunctella* larvae across all storage durations. For *Ephestia kuehniella* stored at 5°C, no significant difference was observed between 2-day and 4-day storage, but the survival rate progressively decreased with longer storage periods. For the same species at 8°C, the 2-day storage duration resulted in a significantly higher survival rate compared to all other storage periods. When comparing the storage temperatures for the same storage durations for *E. kuehniella*, the survival rate of larvae stored at 8°C was significantly higher than at 5°C for all storage durations. Regarding the survival rates of *P. interpunctella* larvae at 5°C, the 2-day and 4-day storage durations resulted in significantly higher survival rates compared to other durations. The 6-day storage duration also showed a statistically significant higher survival rate compared to the 8, 10, and 12-day storage periods. For the same species at 8°C, the 2-day storage duration had a significantly higher survival rate than other durations, and the 4-day storage duration also showed a higher survival rate than the other days. When examining the differences between temperatures for *P. interpunctella* at different storage durations, no significant difference was found between temperatures for the 2, 6, 8, and 10-day storage periods. However, at 4 days of storage, the survival rate at 5°C was determined to be higher than at 8°C. A statistical comparison could not be made for the 12-day storage duration as all larvae died at both temperatures. In conclusion, both storage temperature and duration have a significant impact on the survival rates of first-instar *E. kuehniella* and *P. interpunctella* larvae. In both species, the survival rates of larvae significantly decreased as the storage duration increased, with nearly all larvae dying after 12 days of storage. The only exception was *E. kuehniella* at 8°C, where some larvae remained alive

on the 12th day. This suggests that 8°C is a more suitable temperature for longer-term storage of *E. kuehniella*. The complete mortality of *P. interpunctella* larvae even at 8°C indicates that this species is more sensitive to the adverse effects of low temperatures than *E. kuehniella*. The data obtained from this study are considered preliminary and valuable for future research on the storage of host insects in other life stages.
Keywords: Biological control, cold storage, host, mass production, synchronization.

Mycotoxins: Danger from Egg to Table

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Mycotoxins, toxic secondary metabolites producted by variety fungi, including Aspergillus, Fusarium and Penicillium, pose significant health risks and production losses in laying hens. In laying hens, these toxins can lead to weakened immune responses, liver damage, decreased egg production,and defects in both internal egg and eggshell quality. There are five mycotoxins or groups of mycotoxins that frequently ocur in food: fumonisins, zearalenone, deoxynivalenol/nivalenol, ochratoxin and aflatoxins, which have been linked to a variety of negative effects, creating potential public health risks. Favourable conditions for mycotoxins production arise from poor hygienic conditions during storage and transportation,heavy rains, high moisture and temperature content. The Enzyme-Linked Immunosorbent Assay (ELISA) is cost-effective and rapid method for analyzing feed samples, while the Liquid Chromatography-Tandem Mass Spectrometry (LC-MS/MS) offers high sensitivity and confirmatory accuracy. Effective mycotoxin monitoring plays a pivotal role in enhancing productivity, maintaining animal health and ensuring food chain safety. Incorporating mycotoxin detection into regular feed analysis programs, particularly those conducted by public institutions, is a strategic measure to protect both consumer welfare and laying hens performance. This method not only reduces the risks associated to contaminated feed but also strengthens public health protection. Consequently, systematic surveillance of mycotoxins is indispensable for sustainable and secure food production systems.

Keywords: Aflatoxins, feed contamination, laying hens, mycotoxins, table egg.

Legendre Polynomial-Based Random Regression Models for Genetic Analysis of Longitudinal Body Weight in Japanese Quails

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(A. ÜÇTEPE, A. KOMINAKIS)

This study evaluated the use of Legendre polynomial-based random regression models (RRM) for the genetic analysis of body weight in Japanese quails. A total of 5,745 longitudinal records from 575 birds (423 females and 152 males) were analyzed from hatch to six weeks of age. Model selection based on BIC indicated that a fifth-order RRM with heterogeneous residual variances across nine age classes provided the best fit. The model showed high predictive accuracy (SMAPE = 2.6%, CV(RMSE) = 5%). Estimates of heritability ranged from 0.15 (late growth) to 0.30 (around three weeks of age). Genetic correlations were strongest between adjacent ages and progressively decreased as the interval increased. Eigenfunction decomposition of the additive genetic covariance structure identified two main components of genetic variation: one related to overall growth level and the other to reallocation between early and late growth phases. These findings highlight the advantages of RRMs for capturing longitudinal genetic variation and demonstrate their utility in developing targeted selection strategies for quail breeding.
Keywords: Body weight, eigenfunctions, heritability.

Current Sustainable Practices in the Dairy Industry

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The production and consumption of nutraceutical milk and dairy products, with their excellent protein, lipid, vitamin, mineral, and essential ingredient content, are increasing worldwide. Rapid population growth, overexploitation of natural resources, declining biodiversity, climate change, and malnutrition are challenging food sustainability in many areas. Therefore, producing reliable and safe products, improving efficiency, controlling quality, optimizing production processes in terms of energy, cost, and time, converting process outputs into accurate data, and minimizing production-related environmental damage are vital to meeting and sustaining demand in this sector. Today, diverse approaches are necessary to enhance efficiency in the dairy sector, overcome recurring sustainability challenges, and ensure environmental, social, and economic well-being.
The global dairy industry is focusing on potential improvement opportunities supported by new technologies. Industrial innovation has been undergoing rapid conceptual evolution in recent years, with the emergence of Industry 4.0, Industry 5.0, and the nascent Industry 6.0. Smart, autonomous, and sustainable systems built on digital foundations present promising industrial paradigms. These approaches emphasize sustainable, people-centered, environmentally friendly production and energy efficiency. This study aims to gather the knowledge used in this area that can promote sustainability. This context will cover several topics, including the effects of current processing technologies on efficiency, the environmental impact of waste recovery and renewable energy sources, the use of innovative technologies like artificial intelligence-based process monitoring or animal health monitoring in terms of traceability and sustainability, current approaches in packaging and logistics, and the use of systems focused on ensuring animal welfare, supporting local production, and evaluating consumers' demands for sustainable products.
Keywords: Dairy sector, efficiency, innovative technologies, sustainability.

Effects of Some Environmental Factors on Buffalo Calves Live Weight and Lactation Milk Yield in Anatolian Buffaloes

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In this study; It was aimed to determine some environmental factors affecting the growth characteristics of the calves and the lactation milk yield of the dams in Anatolian Buffaloes raised within the scope of The National Anatolian Buffalo Breeding Project- Balıkesir Subproject. Six villages where buffalo breeding is carried out in Balıkesir province were selected and 836 cows that gave birth between 2018-2023 and 3693 calves born during this period were used as material. The effects of village, birth year, birth season, sex and parity on the growth characteristics of the calves; the effects of village, birth year, calving season, parity and lactation period on the lactation milk yield of the dams were evaluated as factors. On birth weight; the effects of village, year of birth, season of birth, and sex were significant ($P<0.01$), while parity was non-significant; on 6 month live weight, the effects of village, year of birth, and sex were significant ($P<0.01$), and season of birth and parity were non-significant; on 12 month live weight, the effects of year of birth and sex were significant ($P<0.01$), and village, season of birth, and parity were non-significant; on from birth to 6 months average daily weight gain, the effects of village, year of birth ($P<0.01$) , and sex were significant ($P<0.05$) birth season and parity were non-significant; on from 6 to 12 months average daily weight gain, year of birth and birth season were significant ($P<0.01$), village, sex and parity were non-significant; on from birth to 12 months average daily weight gain, year of birth ($P<0.01$) and sex ($P<0.05$) were statically significant, village, birth season, parity were non-significant; on lactation milk yield of dams, the effects of village, year of birth, season of birth, parity, and lactation period were significant ($P<0.01$), and sex was not a significant factor.
Keywords: Anatolian buffalo, growth characteristics, milk yield.

Effect of Tarsal Joint Lesion Degree on Milk Yield and Reproductive Parameters in Holstein Cows

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In recent years, conventional farming is increasingly being replaced by intensive farming in order to meet the growing human population and demand for animal products. The sustainability of intensive livestock operations is directly related to economic profitability. Among the factors affecting this profitability, metabolic diseases, nutrition, and reproductive problems stand out, but tarsal joint lesions, which directly negatively affect animal welfare and cause pain to the animal, are also included. Tarsal joint lesions not only negatively affect animal welfare but also cause serious economic losses for dairy cattle operations. These economic losses consist of both direct and indirect losses, such as decreased milk yield, impaired reproductive performance, increased treatment and labor costs, and shortened herd life.

Tarsal joint lesions are common hind limb injuries in dairy cows and are considered an important welfare indicator, particularly in free-stall housing systems. Different housing systems and the bedding material used affect the incidence of tarsal joint lesions. In Germany, at least one tarsal joint lesion (hair loss, wound, or swelling) was detected in 66–80% of cows raised in free-stall barns; the prevalence of severe lesions (wounds and/or swelling) was reported to be 8–14%. In the USA, the prevalence of severe tarsal joint lesions in cows raised in barns with sand bedding was reported to be significantly lower than in systems using rubber bedding or water beds.

It has been demonstrated that concrete flooring and inadequate stall dimensions increase the incidence of tarsal joint lesions, leading to losses in milk production and early culling of animals.

These lesions not only cause physical problems but also lead to changes in animal behavior, reduced lying time, and a decline in reproductive performance similar to lameness. Considering that lying time is directly related to rumination activity, milk yield, and general health parameters, stall dimensions and bedding quality are critically important for both welfare and productivity. Although the number of industrial dairy cattle farms in Turkey is rapidly increasing, significant problems still exist regarding the selection and management of appropriate bedding materials.

Determining the prevalence of tarsal joint lesions in the herd and managing them effectively is a critical factor in improving animal welfare and enabling dairy farms to achieve a profitable and sustainable production model.

Keywords: Milk yield, reproductive parameters, tarsal joint lesion.

The Potential Use of Certain Weed Species for Phytoremediation of Heavy Metal-Contaminated Soils

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Heavy metals are concentrated in the Earth's core and are dispersed into the crust and surface through geological activity. However, anthropogenic factors, i.e., human impact, such as air, water, and soil pollution, affect the natural geological and biological distribution of these metals. The main anthropogenic sources of heavy metals are mines, electroplating, foundries, smelting of metal-containing ores, coal-fired power plants, combustion by-products, vehicle emissions, energy and fuel production, application of fertilizers and sewage sludge to soil, and industrial production. These anthropogenic activities cause heavy metals to be released into the environment, accumulate biologically in the food chain, or have toxic effects on certain plants or animals. One method used to remediate heavy metal contamination in soil is phytoremediation, also known as green remediation, botanical remediation, or plant remediation. This method uses weeds that are resistant to high concentrations of heavy metals and grow naturally in contaminated soils to stabilize, improve, reduce, or restore contaminated soil. The use of Malva sylvestris L., Malva parviflora L., Oxalis pes-caprae L., Portulaca oleracea L., and Solanum nigrum L. species as hyperaccumulator plants in phytoremediation has been investigated in the literature. As a result, Cd in Solanum nigrum L., Cu and Cd in Oxalis pes-caprae L., Cu, Zn, Pb, Cd, and Ni in Malva parviflora L., Cu, Zn, Mn, Pb, Cd, Ni, and Cr in Malva sylvestris L., and Fe, Cu, Zn, Mn, Pb, Cd, Ni, Cr, As, and Hg in Portulaca oleracea L. were found to accumulate in high concentrations in different parts of the plants and could be used for phytoremediation purposes.

Keywords: Heavy metal, phytoremediation, soil contamination, weed flora**.**

Propagation Methods of Cornelian Cherry (*Cornus mas* L.): Generative, Vegetative and Tissue Culture Approaches

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Cornelian cherry (*Cornus mas* L.) is a valuable fruit species with high nutritional and bioactive content, but its commercial cultivation remains limited. One of the main challenges for expanding its cultivation is the difficulty in producing high-quality planting stock. Cornelian cherry can be propagated both generatively (by seeds) and vegetatively, and studies on tissue culture techniques have also been conducted. Seed propagation is limited by a long juvenile period, low germination rates, and dormancy. Vegetative propagation methods such as cuttings, layering, root suckers, grafting, and bud grafting are used, although success rates vary depending on genotype and treatments. Recently, tissue culture approaches have been studied, but rooting problems still limit their efficiency, and the technique is under development. This paper reviews the current propagation methods of cornelian cherry, discussing their advantages and limitations, and offers perspectives for commercial cultivation.
Keywords: Cornelian cherry, *Cornus mas*, propagation, tissue culture, vegetative.

POSTER PRESENTATIONS

- P.1.Occurrence of Fungal Agents in Cats with Suspected Dermatophytosis
- P.2.Management of Dystocia in a Chihuahua Dog
- P.3.Determination of Certain Blood Parameters and Alpha-Naphthyl Acetate Esterase (Anae) Enzyme Activities Of Peripheral Blood Lymphocytes in Suffolk Sheep
- P.4.Investigation of Efficacy of Intramammary Administration of Ceftiofur at Dry Period in Assaf Ewes
- P.5.Use of Propolis in Poultry and Its Potential Effects
- P.6.Otitis Externa in Cats and Dogs and the Potential Role of Propolis
- P.7.Ecological Control Methods Against Varroa in Honey Bees
- P.8.The Effects of Different Feed Sources on Growth Characteristics of Mealworm Larvae (Tenebrio Molitor L.)
- P.9.Sustainability of Agricultural Waste in Agricultural Production: A Review
- P.10.Determination of Forage Yields and Quality in Wheat Vetch Mixed Cultivation
- P.11.An Efficient Protocol for In Vitro Regeneration of Maize (Zea mays L.) Immature Embryos for Synthetic Seed Technology Applications
- P.12.Determination of Some Important Pomological and Biochemical Characteristics of Gökçeada Olives
- P.13.Effect of Hemicellulose Addition on Farinograph and Extensograph Properties of Wheat Flour Dough
- P.14.Predictive Microbiology as a Tool for Modeling Risks of Pathogens and Spoilage in Foods
- P.15.Microbiological Quality Assessment of Brines from Local Market-Sold Green Olives
- P.16.One Health Perspective in Food Safety
- P.17.Designing Polyphenol-Protein Complexes with Black Carrot Extracts and Pea Protein
- P.18.Modification of Safflower Proteins by Ultrasound-Asst.ed pH Shifting
- P.19.Effects of Ultrasonic Pretreatments on Freeze- Dried Products

P.1. Occurrence of Fungal Agents in Cats with Suspected Dermatophytosis

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(K. G. ÇETİN, Z. İLHAN)

In this study, the aim was to isolate fungi from cats clinically suspected of having dermatophytosis in the Manisa region. Samples were collected from 20 cats and analyzed using culture methods. The study population consisted of 10 females (50%) and 10 males (50%). The age distribution of the cats was as follows: 12 cats (60%) were between 0–3 years of age, 2 cats (10%) were between 3–5 years, and 6 cats (30%) were 5 years or older. Regarding breed distribution, 7 cats (35%) were British Shorthair, 2 (10%) were Maine Coon, 8 (40%) were Tabby, 1 (5%) was Turkish Angora, 1 (5%) was Scottish Fold, and 1 (5%) was Chinchilla.

Microsporum canis was isolated from 2 cats (10%), and *Trichophyton mentagrophytes* from 1 cat (5%). Additionally, opportunistic fungi such as *Aspergillus niger* (2 cats, 10%), *A. fumigatus* (2 cats, 10%), and *A. flavus* (2 cats, 10%) were also isolated.

In conclusion, these findings suggest that, in addition to classical dermatophytes such as *M. canis* and *T. mentagrophytes*, opportunistic fungi like Aspergillus species may also be involved in dermatophytosis-like lesions in cats. This underscores the importance of accurate mycological diagnosis in suspected cases.

Keywords: *Aspergillus spp.,* Dermatophytosis, *Microsporum* spp., *Trichophyton spp..*

P.2. Management Of Dystocıa In A Chıhuahua Dog

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(N. SAAT, E. CİVELEK)

Small-breed dogs are at high risk of dystocia due to factors such as fetal–pelvic disproportion, uterine atony, disruption of fetal membranes, and insufficient fetal fluids. In miniature breeds such as Chihuahuas, cesarean section is frequently preferred; however, anesthesia-related complications can have adverse effects on neonatal health. Therefore, medical management of parturition is an important alternative when applicable.

In this case, the pregnancy and parturition process of a 2.5-year-old female Chihuahua conceived by artificial insemination was evaluated to emphasize the effectiveness of medical intervention in the management of dystocia in small-breed dogs. The patient, a primiparous Chihuahua, was monitored throughout gestation by ultrasonography, and pelvic canal width was measured radiographically as 4.2 cm. Parturition began on day 60 of gestation, during which inadequate uterine contractions were observed. Intravenous dextrose infusion and multiple administrations of oxytocin via different routes and dosages were performed. Fetal heart rates were monitored ultrasonographically and recorded at approximately 160 beats per minute. Ultrasonographic examination also revealed the absence of fetal fluids. No response was obtained after the first intramuscular oxytocin administration. Short-term contractions were observed following intravenous oxytocin, but uterine activity remained inadequate, leading to continued subcutaneous oxytocin administration. Approximately 30 minutes after the final parenteral application, the first pup was delivered, followed by the second pup one hour later without complications. Neonatal respiratory function was normal, and both the dam and neonates remained clinically stable after delivery.

This case demonstrates that medical management protocols can be successfully applied as an alternative to cesarean section in the treatment of dystocia in small-breed dogs. In planned pregnancies, pre-breeding radiographic evaluation of pelvic dimensions and comparison with expected fetal head diameter are crucial for determining the need for medical versus surgical intervention. Careful monitoring of oxytocin administration, along with supportive agents such as dextrose or calcium when indicated, can enhance the likelihood of successful vaginal delivery, reduce the need for cesarean section, and protect both maternal and neonatal health.

Keywords: Cesarean section, chihuahua, dystocia, neonatal care, oxytocin.

P.3. Determination of Certain Blood Parameters and Alpha-Naphthyl Acetate Esterase (Anae) Enzyme Activities Of Peripheral Blood Lymphocytes in Suffolk Sheep

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(E. TURFAN, B. TEKİN, E. B. ALACA, H. İ. KEKLİK, M. F. AYDIN)

In this study, several hematological parameters (WBC, RBC, HGB, HCT, PLT, MCV, MCH, MCHC) and the Alpha-Naphthyl Acetate Esterase (ANAE) enzyme activities of peripheral blood lymphocytes were determined in Suffolk sheep. Blood samples were collected from 15 healthy, 2–3-year-old female Suffolk sheep, and the hematological values were measured using an automated hematology analyzer. Additionally, ANAE enzyme activity was examined in blood smears using an enzyme histochemistry method. The Suffolk sheep is a meat-oriented breed originating from England. In Turkey, it is raised in limited numbers, mainly in commercial and professional farms. In our study, the ANAE enzyme activity in the peripheral blood lymphocytes of Suffolk sheep was determined, and the percentage of ANAE-positive lymphocytes was found to be 71.45 ± 0.94%. The neutrophil percentage was 23.78 ± 0.84%, and the lymphocyte percentage was 68.99 ± 1.65%. As a result, the findings contribute to defining the hematological reference ranges and breed-specific ANAE enzyme activity values in Suffolk sheep. It is recommended that these data be supported by future comprehensive studies involving different age groups and seasonal conditions.

Keywords: ANAE, hematology, lymphocyte, sheep, suffolk.

P.4. Investigation of Efficacy of Intramammary Administration of Ceftiofur at Dry Period in Assaf Ewes

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(R. ÇELİK, Ş. M. PANCARCI)

It was aimed to investigate the effects of intramammary administration of ceftiofur at dry off on somatic cell count (SCC) in milk, incidences of subclinical and clinical mastitis and milk yield at following lactation in Assaf breed ewes. At dry off, ewes (1-2 years old, at first lactation, [n=60]) were randomly divided into Full Dose (n=20), Half Dose (n=20) and Control (n=20) groups, and dry period intramammary tubes (Spectramast DC®, Zoetis Animal Health Ltd. Company) containing full dose (500 mg; 10 ml) and half dose (250 mg; 5 ml) ceftiofur hydrochloride were applied to both udders in the Full Dose and Half Dose groups, respectively. No application was made in the Control group. Milk samples were taken from both mammary lobes in subgroups (n=10) in each study group for SCC at dry off and on postpartum days 25 +/- 5. Antibiogram tests were performed on milk samples taken from both mammary lobes in each subgroup (n=4) at dry off, and the resistance rate of ceftiofur was 62.5% (5/24). There were no statistical differences for incidences of clinical mastitis among Full Dose (5%; 1/20), Half Dose (20%; 4/20) and Control (15%; 3/20) groups following the dry period. No statistical differences were detected for incidences of subclinical mastitis based on SCC values (>=1 X 10^6/ml) among Full Dose (25%; 5/20), Half Dose (33.3%; 6/18) and Control (40%; 8/20) groups following the dry period. Although SCC median values in Full Dose (89,000) and Half Dose (68,000) groups were lower than that in Control (210,000) group, no statistical differences were detected. There was a significant difference ($P<0.05$) between recovery (64%; 9/14) and ongoing subclinical mastitis (36%; 5/14) rates in Half Dose group following the dry period in mammary lobes with subclinical mastitis determined at dry off; while, no differences were detected between recovery and ongoing subclinical mastitis rates in Full Dose (63%; 5/8 and 37%; 3/8) and Control (45%; 5/11 and 55%; 6/11) groups, respectively. No statistical differences were found among groups (Full Dose [n=17; 42.0 ± 5.6 L], Half Dose [n=20; 41.7 ± 3.0 L] and Control [n=18; 39.6 ± 3.4 L]) for milk yield in the first 27 days of lactation. As a result, the SCC in milk was partially reduced and subclinical mastitis was treated with the use of intramammary antibiotics for the dry period treatment in ewes.

Keywords: Ceftiofur, dry period, ewe, mastitis, SCC.

P.5. Use of Propolis in Poultry and Its Potential Effects

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In poultry production, there has been a growing interest in natural products and alternatives to antibiotics in recent years. Propolis is a natural resinous substance produced by honeybees, rich in flavonoids, phenolic acids, esters and various aromatic compounds. Due to its antimicrobial, antifungal, antiviral, antioxidant and immunomodulatory properties, it has potential applications in poultry both as a feed additive and as a topical or environmental treatment.
According to the literature, propolis supplementation in broiler chickens has been reported to improve growth performance and feed conversion ratio, enhance immune parameters (e.g. antibody titres, lymphocyte responses), modulate gut microbiota and reduce oxidative stress. In addition, propolis has shown in vitro and in vivo antimicrobial activity against important avian pathogens such as *E. coli*, *Salmonella spp.* and *Clostridium perfringens*. However, the chemical composition of propolis varies depending on geographic origin, plant sources and extraction methods, leading to differences in dosage, standardisation and efficacy. Its allergenic potential, long-term safety and production costs also remain areas requiring further research.
Keywords: Antibiotic alternative, immunity, natural feed additive, propolis, poultry.

P.6. Otitis Externa in Cats and Dogs and the Potential Role of Propolis

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Otitis externa is a common and multifactorial inflammation of the external ear canal in cats and dogs. Primary factors include ectoparasite infestations (*Otodectes cynotis*), allergic dermatopathies, endocrine disorders, and anatomical predispositions, while secondary agents such as *Staphylococcus spp.*, *Pseudomonas aeruginosa*, *Proteus spp.* and especially yeasts like *Malassezia pachydermatis* are frequently implicated. Conventional treatment generally consists of topical or systemic antibiotics, antifungals, and anti-inflammatory agents. However, increasing antibiotic resistance, adverse effects and cost have prompted the search for alternative and complementary therapies.

Propolis is a natural resin produced by honeybees containing flavonoids, phenolic acids, esters and various aromatic compounds. Its antimicrobial, antifungal, antiviral and anti-inflammatory properties have been demonstrated in various animal species. In particular, studies with Argentinian and Brazilian propolis preparations have reported reduced *Staphylococcus spp.* and *Malassezia spp.* loads and improved clinical signs in canine otitis externa cases. It has been suggested that adding propolis-containing topical formulations to standard therapy may decrease adverse effects and shorten treatment duration. Nevertheless, the chemical composition of propolis varies with geographic origin and extraction methods, limiting standardization and dosage studies. Furthermore, its allergenic potential, long-term safety, and effects on resistance mechanisms warrant further randomized controlled trials. Identifying the etiological agents of otitis externa in cats and dogs and clarifying the potential role of propolis are important for defining the opportunities and limitations of using propolis as a complementary agent in veterinary clinical practice.

Keywords: Antimicrobial, cat, complementary therapy, dog, otitis externa, propolis.

P.7. Ecological Control Methods Against Varroa in Honey Bees

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Varroa destructor is one of the most significant biotic threats to beekeeping worldwide. Its destructive impact on both individual bee health and overall colony integrity has been identified as a major factor contributing to increasing colony losses in recent years. Although chemical acaricides have been commonly used in Varroa control, their effectiveness has become limited due to residue concerns in bee products, adverse effects on bee health, and the development of resistance in mite populations. In this context, ecological control strategies that are sustainable, environmentally friendly, and compatible with bee health are gaining increasing importance.
The concept of ecological control encompasses methods that preserve ecological balance and minimize harm to the environment and non-target organisms. Among the prominent approaches are natural-based control methods, mechanical-physical applications (such as powdered sugar dusting, drone brood removal, and screened bottom boards), thermal treatments, and the use of plant-derived compounds-especially essential oils. Due to their antimicrobial and acaricidal properties, essential oils have emerged as promising alternatives for Varroa control. These substances, which can be applied through patties, syrup, or vaporization, stand out as residue-free and bee-safe solutions.
In this study, ecological methods used to control Varroa mites were evaluated in light of current literature, using five groups of six bee colonies. A 5 mg/kg combination of thyme, eucalyptus, and clove essential oils was applied to the hives along with bee cake. Regular Varroa counts with powdered sugar and twice-daily Varroa count monitoring in the hive drawer revealed that the essential oil cake had a positive effect on Varroa mite control. Consequently, the importance of ecological methods within integrated management approaches is increasing; multicenter, controlled studies in this area have the potential to provide lasting solutions for the beekeeping sector.
Keywords: Ecological control, essentail oils, honey bees, *Varroa destructor.*

P.8. The Effects of Different Feed Sources on Growth Characteristics of Mealworm Larvae (*Tenebrio Molitor L.)*

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Population growth, climate change, and the scarcity of agricultural land make the sustainability of food resources increasingly crucial. Unsustainable agricultural practices, water scarcity, urbanization, and climate change are all contributing to the rapid decline of arable land. It is anticipated that new feed sources that can replace feed crops that require water to grow, such as alfalfa and soybeans, will become even more important due to droughts caused by global warming and problems in the production and quality of important protein sources for animal nutrition. The cultivation of edible insects is an alternative approach to protein-rich food and feed production. Raising edible insects offers an alternative approach to producing protein-rich food and feed. Furthermore, from an environmental perspective, insect protein production offers advantages over traditional protein sources, as it requires less land, produces fewer greenhouse gas emissions, and requires less water. This study aims to determine the effects of feeding feed sources with different protein and starch contents on their survival and growth characteristics of mealworm larvae. In the study, 90 female and 90 male adult beetles were randomly divided into 3 groups, each group consisting of 10 replicates (3 males and 3 females/replicate). The beetles were allowed to mate for 7 days, and the larvae that became visible approximately 5 weeks after the adult beetles were separated constituted the study material. The feeding regimens for the experimental groups were formulated on the basis of the composition of the larval diets, which included the following ingredients: wheat bran (WB), corn (CG), and corn gluten meal (CGM). In this study, the larvae were weighed with scales at 15-day intervals. The number of dead larvae and pupae was recorded. The weight of larvae has been significantly influenced by factors such as feeding treatments and the measuring date ($P < 0.0001$). The highest mean weight of the larvae was observed in the WB group (40 ± 0.82 mg/larva), followed by the CG (2.3 ± 0.82 mg/larva) and CGM (2.2 ± 0.82 mg/larva) groups, which exhibited similar means. In the present study, the first pupa was observed in the group that was fed on wheat bran (WB) at 15 weeks. However, no pupae were recorded in the groups that were fed on corn grain (CG) or corn gluten meal (CGM). The lowest recorded incidence of larval death was observed in the WB group (35.03%), with the next highest incidence observed in the CG group (62.73%) and the CGM group (90.36%), in that order. In conclusion, it was determined that the groups of larvae that were fed on a diet of wheat bran exhibited superior development in comparison to those fed on a diet of corn grain and corn gluten meal. This was evidenced by a lower increase in weight and survival rate. In further studies, it is recommended to investigate the effects of substituting corn gluten or corn bran for wheat bran on larval growth and chemical composition.

Keywords: Mealworm, mortality rate, protein, starch, weight gain.

P.9. Sustainability of AgriculturalWaste in AgriculturalProduction: A Review

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In recent decades, agricultural activities have undergone significant intensification on a global scale, including in Turkey. This has resulted in a substantial increase in both crop residues andagro-industrialby-products. It is evident that the seplant-basedby-product sare regarded as valuable resources, owing to their high organic matter and nutrient content. They play a critical role in enhancing soil fertility and promoting sustainable agricultural practices, particularly in Turkey, where soil sare often deficient in organic matter. The effective management and utilisation of these residue sare imperative for reducing environmental impacts and enhancing agricultural productivity. The appropriate processing and mixing of agricultural waste has enabled the sewastesto be widely used as a growth medium in plant production and has provided a promising alternative too ther resources whose reserve sare rapidly depleting. Furthermore, residues such as maizes talks, wheat straw, sugar beetpulp, tearesidues, and hazel nutshells can be utilise directly in diverse applications, including the production of biogas, the manufacturing of organic fertiliser, the generation of biochar, and thefeeding of animals. For instance, sugar beetpulp is extensively utilised as an energy- and nutrient-rich feed supplement, while olive oil production residues areunder investigation as sources of bioactive compounds for the food, cosmetic, and pharmaceutical industries. The sustainable recycling of agricultural waste has been proven to provide a range of benefits, including reduced chemical fertiliseruse, protection of soil health, renewable energy production, and industrial raw material supply. Determining the characteristics of this waste and developing appropriateutili sation methods will enhancethe success of agricultural production systems and mini mise environmental losses. The aim of this review is to examine the characteristics of waste and agricultural by-products, the irpotentialuses in agriculture and industry, and studies on environmentally friendly alternatives to non-renewablere sources such as peat, in order to reveal their roles. The common conclusion in the studies examined is understood as emphasising that the sustainable management of agricultural waste is essential to ensure resource efficiency, reduce environmental impacts, and support food security in a world facing increasing population pressure.

Keywords: Agricultural wastes, bioenergy, cropresidues, peatalternatives, sustainability.

P.10. Determination of Forage Yields and Quality in Wheat Vetch Mixed Cultivation

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Mixed planting in forage crop cultivation increases the yield and quality of herbage. In addition, legumes are indispensable plants in sustainable agriculture. In this study, it was aimed to determine the forage yield and quality by planting wheat (Triticum aestivum) with plain and vetch (Vicia sativa) at different rates. The trial was conducted in the 2023-2024 growing season at the Dardonos Campus research areas of Çanakkale Onsekiz Mart University. The experiment was set up according to a randomized block design with three replications. Wheat was planted as plain wheat at the rate of 550 units per m^2, vetch as 10 kg per decare, and vetch at different rates (10% F, 20% F, 30% F, 40% F and 50% F) was planted in the same row by making mixed planting. Harvesting for forage was done during the flowering period of wheat. Green forage yield, dry forage yield, crude protein, NDF, ADF and ADL ratios of the mixtures were determined. While the highest green forage yield was obtained from Wheat+50% Vetch plots, the lowest green forage yield was determined in the mixtures of plain wheat and Wheat+10% Vetch. There was no difference in dry forage yield. As the proportion of vetch in the mixtures increased, the crude protein ratio also increased. The mixtures caused the NDF, ADF and ADL ratios of the forage to decrease, thus improving the quality of the forage. As a result of the study, mixed planting was recommended considering the quality as well as the yield of the forage. Among mixed plantings, the Wheat + 50% Vetch mixture stands out.

Keywords: Forage quality, forage yield, Intercrops, vetch, whea

P.11. An Efficient Protocol for *In Vitro* Regeneration of Maize (*Zea mays* L.) Immature Embryos for Synthetic Seed Technology Applications

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Maize (*Zea mays* L.) is a global staple crop, and the conservation of its valuable germplasm is crucial for future food security. Synthetic seed technology, involving the encapsulation of embryos, presents a promising method for long-term storage and propagation. The success of this technology is highly dependent on an efficient *in vitro* regeneration protocol. Therefore, the objective of this study was to develop and validate a robust protocol for plantlet regeneration from encapsulated immature maize embryos, which will serve as a baseline for subsequent cryopreservation experiments. Immature embryos (30 DAP) were isolated aseptically and encapsulated in a 1% sodium alginate matrix polymerized with 100 mM $CaCl_2$. These non-stored synthetic seeds (control group, n=63) were cultured on hormone-free MS medium at 24±2°C under a 16/8h photoperiod. The protocol's efficacy was evaluated after the designated growth period. An exceptional germination rate of 100% (63 out of 63 embryos) was achieved. All regenerated plantlets exhibited vigorous growth, reaching an average fresh weight of 0.65 ± 0.45 g and an average shoot length of 10.43 ± 6.48 cm. These results demonstrate that the developed protocol is highly effective and reliable for regenerating healthy plantlets from immature maize embryos. This validated method provides a reliable foundation for our ongoing studies, which aim to assess the effects of various storage temperatures on the viability of synthetic seeds.

Keywords: Germplasm conservation, immature embryos, *in vitro* regeneration, maize, synthetic seed technology.

P.12. Determination of Some Important Pomological and Biochemical Characteristics of Gökçeada Olives

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Olive is a species whose cultivation has been of great importance worldwide from ancient times to the present, and whose products have attracted considerable attention in all societies for their health benefits. Interest in olives and their products is expected to increase further in the coming years. Olive oil is the first fruit oil known and consciously used by humanity. In this century, the impact of the olive tree, olive products, and especially olive oil on human health and the natural world is well known, and the importance of its production and consumption is readily understood. Çanakkale is a region in Turkey that is particularly suitable for olive cultivation. Both conventional and organic olive cultivation are practiced in the region. In terms of variety, Ayvalık olive variety is predominant. The districts of Ayvacık, Ezine, Gökçeada, Bayramiç and Eceabat are particularly important olive production centers in the region. Gökçeada olive genotype has a tree feature that can adapt to arid regions as well as regions with high relative humidity. This study was conducted to determine the pomological and genetic characteristics of the Gökçeada olive genotype, which is extensively grown in the Gökçeada district of Çanakkale province. Fruit number (fruit/kg), fruit weight (g), fruit width (mm), fruit length (mm), fruit index (length width), fruit shape, seed weight (g), seed width (mm), seed length (mm), flesh ratio (%) and maturity index were determined in Gökçeada olive genotype used in the research. In addition to pomological characteristics, phytosterols, tocopherols, fatty acids, and phenolic compounds were determined in olive oil of Gökçeada genotype. Research results indicate that olive oils produced from olive trees in Gökçeada are of high quality and have high geographical indication potential.
Keywords: Chromatography, Geographical indication, HPLC, Maturity index, *Olea europaea.*

P.13. Effect of Hemicellulose Addition on Farinograph and Extensograph Properties of Wheat Flour Dough

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The use of dietary fibers in bakery formulations has gained considerable attention due to their nutritional benefits and technological effects on dough systems. Hemicellulose, a major component of cereal cell walls, is known to interact with starch and gluten, thereby influencing dough rheology and bread quality. The present study aimed to investigate the effect of hemicellulose addition on the farinograph and extensograph properties of wheat flour dough. Hemicellulose was incorporated into wheat flour at concentrations of 0, 20, 40, and 60 mg/kg flour. The farinograph results demonstrated that hemicellulose supplementation decreased dough stability and increased the softening degree, confirming its weakening effect on dough consistency. The most pronounced changes were observed at 40 mg/kg addition, where stability reduction and softening increase were significant compared with the control. In addition, hemicellulose addition did not result in any noticeable changes in water absorption capacity. Extensograph measurements revealed a notable increase in dough extensibility. The control sample showed an extensibility of 157 mm, whereas the value increased to 180 mm at 60 mg/kg hemicellulose, suggesting improved stretching capacity and greater dough extensibility. Overall, the study demonstrates that hemicellulose can be used as a functional fiber additive in wheat-based products, contributing both to technological properties and to potential nutritional enhancement. These results provide valuable insights for the bakery industry in developing fiber-enriched products with desirable quality characteristics.

Keywords: Development time, dough rheology, extensibility, softening degree, stability.

P.14. Predictive Microbiology as a Tool for Modeling Risks of Pathogens and Spoilage in Foods

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Predictive microbiology provides a scientific framework for anticipating the behavior of microorganisms in food systems, offering mathematical and computational models to estimate microbial growth, survival, and inactivation under varying conditions. Unlike conventional empirical methods, these models enable simulation of microbial responses to environmental changes such as temperature fluctuations, pH variations, water activity, and storage duration. They are increasingly applied within risk assessment procedures and decision-support tools, contributing to safer and more efficient food production practices.

In perishable foods, including dairy products, predictive models are essential for evaluating the risks posed by foodborne pathogens (e.g., Listeria monocytogenes, Salmonella spp., Clostridium spp.) and spoilage microorganisms. Primary models, such as Gompertz, Baranyi, and logistic models, characterize the kinetics of microbial growth, while secondary models relate these growth parameters to specific environmental factors. More recent developments include tertiary models, comprehensive databases, and software platforms that allow real-time application of predictive tools in industrial settings. Additionally, integrating machine learning and artificial intelligence with predictive microbiology offers promising avenues for improving the precision and adaptability of microbial forecasts.

This review presents an overview of the current methodologies in predictive microbiology, their practical applications in food safety management, and emerging challenges related to incorporating big data, sensor technologies, and AI-based modeling into food industry operations. By enhancing understanding of microbial dynamics, predictive approaches not only support food safety but also aid in shelf-life estimation, process optimization, and the reduction of food waste across the supply chain.

Keywords: Foodborne pathogens, microbial modeling, predictive microbiology, spoilage organisms, risk assessment.

P.15. Microbiological Quality Assessment of Brines from Local Market-Sold Green Olives

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Brined olives are among the most widely consumed fermented foods in Mediterranean countries, and the quality of the surrounding brine plays a critical role in both food safety and consumer acceptability. During spontaneous fermentation, lactic acid bacteria (LAB) typically dominate and contribute to product stability, while variations in salt concentration, acidity, and microbial load of the brine can markedly influence the final quality.

In local markets, green olives are frequently sold in open containers with their brine, often exposed to uncontrolled environmental conditions. Such practices may increase the risk of contamination and compromise product safety. In this preliminary study, microbiological analyses were conducted on brine samples collected from different local market vendors. In addition, pH, titratable acidity, and salt concentrations of the samples were determined.

The microbial populations varied among samples. Yeast loads ranged from 3.5 to 5.5 log CFU/mL, whereas LAB were absent in most brines, with only a single sample showing detectable levels (4.0–4.5 log CFU/mL). No coliforms or *Enterobacteriaceae* were observed in any sample. These findings indicate that market-sold brines of green olives are generally dominated by yeasts rather than LAB. The absence of coliforms and *Enterobacteriaceae* is a positive indicator of hygiene, yet the limited presence of LAB may reflect uncontrolled fermentation conditions, highlighting the need for more standardized practices in brined olive production and marketing.

Keywords: Fermented foods, food safety microbial load, *Olea europaea*, table olives.

P.16. One Health Perspective in Food Safety

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Food safety is a fundamental element in protecting human health and has become increasingly critical due to factors such as globalization, climate change, rapid population growth, and rising food demand. According to the World Health Organization, millions of people are affected by foodborne illnesses each year, making food safety not only an individual concern but also a global public health issue.

At this point, the One Health approach provides an effective framework for ensuring food safety by emphasizing the inseparable connection between human, animal, and environmental health. Zoonotic pathogens (*Salmonella*, *Campylobacter*, *Listeria*), antimicrobial resistance, environmental pollution, and climate change demonstrate that risks in the food chain arise not from a single source but from the interaction of multiple components.

From the One Health perspective, collaboration among veterinarians, food engineers, physicians, environmental scientists, and social scientists plays a critical role. This approach not only secures food production processes but also encompasses sustainable agricultural practices, educational programs, and consumer awareness.

In conclusion, access to safe food cannot be achieved solely through precautions taken along the production chain; it requires interdisciplinary collaboration, policy support, and global awareness. The One Health approach is indispensable for food safety to ensure healthy generations and a sustainable future. This study aims to highlight the importance of the One Health approach in ensuring food safety, emphasize the necessity of joint contributions from different disciplines, and raise awareness in this field.

Keywords: Antimicrobial resistance, foodborne pathogens, interdisciplinary collaboration, public health, zoonotic diseases.

P.17. Designing Polyphenol-Protein Complexes with Black Carrot Extracts and Pea Protein

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Polyphenol-protein interactions have gained growing interest in food science due to their capacity to enhance functional, nutritional, and stability-related properties of food ingredients. Plant proteins, such as pea protein, are extensively studied as carriers of bioactive compounds because of their excellent emulsification ability, environmental sustainability, and compatibility with clean-label product development. Conversely, black carrot (*Daucus carota L.* ssp. *sativus* var. *atrorubens*) serves as a unique source of anthocyanins and phenolic acids, which are recognized for their high antioxidant activity but have limited stability during processing and storage. In particular, polyphenol-pea protein complexes represent a promising approach to stabilizing anthocyanins from black carrot, contributing to the development of novel functional foods and nutraceuticals. Moreover, polyphenol-protein complexes can enhance solubility, thermal stability, and controlled release of sensitive phenolics, while also modifying protein functionality. The binding mechanisms in polyphenol-protein interactions include both covalent bonds and non-covalent bonds, such as hydrogen bonding and hydrophobic interactions, which lead to changes in protein conformation and phenolic bioavailability. Overall, the integration of black carrot phenolics and pea protein into stable complexes holds significant potential for advancing food innovation and health-oriented product design.

Keywords: Anthocyanins, food-protein interactions, functional food ingredients, phenolic compounds, plant protein.

P.18. Modification of Safflower Proteins by Ultrasound-Assisted pH Shifting

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Plant-based proteins are increasingly recognized as sustainable alternatives to animal-derived proteins; however, their limited functionality often restricts their use in food formulations. In this study, ultrasound-Asst.ed pH shifting process was applied to safflower proteins in order to explore its potential for improving their structural and functional properties. The process involved exposing the proteins to either acidic or alkaline pH conditions, followed by adjustment to neutral pH. While pH shifting promoted partial unfolding of protein chains and exposure of buried functional groups, ultrasound treatment enhanced these effects through acoustic cavitation, generating localized shear forces, turbulence, and microstructural rearrangements. This combined treatment influenced safflower protein solubility, hydrophobic characteristics, and protein-protein interactions, which are closely related to its functional properties. The present study highlighted the feasibility of ultrasound-Asst.ed pH shifting as an environmentally friendly and efficient strategy for tailoring the structure and functionality of safflower proteins. These findings provided a foundation for expanding the industrial application of underutilized plant proteins in sustainable food systems.

Keywords: Acoustic cavitation, functional properties, plant-based protein, protein modification.

P.19. Effects of Ultrasonic Pretreatments on Freeze- Dried Products

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In the food industry, consumers' increasing expectations are directed towards products with preserved nutrients, natural color and aroma, and extended shelf life. In this context, freeze-drying (FD), applied under low temperature and vacuum conditions, is considered one of the most effective drying technologies, particularly in terms of preserving thermolabile compounds. However, the long processing time, high energy cost, and, in some cases, the shrinkage and textural deterioration observed in products limit the large-scale industrial application of FD.

In recent years, various pretreatments have been proposed to improve the efficiency of FD, among which ultrasonic applications have attracted significant attention. Ultrasound (20–100 kHz) creates cavitation effects in liquid media, forming microchannels in the cellular structure and increasing cell wall permeability, thereby facilitating mass transfer. As a result, water removal from the tissue accelerates, drying time shortens, and energy efficiency improves. Literature also indicates that combining ultrasound pretreatment with FD contributes to reduced volume loss and shrinkage, formation of a more porous and rehydratable structure, preservation of color and aroma, and maintenance of phenolic compounds, anthocyanins, and antioxidant activity.

This study is a literature review summarizing the effects of ultrasound-Asst.ed FD on the overall quality characteristics of dried products.

Keywords: Food quality, freeze-drying, pretreatment, shrinkage, ultrasound.

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