Agriculture and Food

5th International Conference on Research of Agricultural and Food Technologies (I-CRAFT'2025)

Agricultural and Food Technologies

ISSN: 3062-3235

ESP 10

Scientific Committee

Prof. Dr. Adamo Rombola (İtaly)
Prof. Dr. Şinasi Akdemir (Turkiye)
Prof. Dr. Ali Musa Bozdogan (Sci com)
Prof. Dr. Aslihan Demirdöven (Turkiye)
Prof. Dr. Atılgan Atılgan (Turkiye)
Assoc. Prof. Dr. İbrahim Aytekin (Turkiye)
Prof. Dr. Faheem Shadzad (Turkiye)
Prof. Dr. Caner Koç (Turkiye)
Assoc. Prof. Dr. Cengiz Karaca (Turkiye)
Prof. Dr. Osman Kola (Turkiye)
Prof. Dr. Caner Koç (Turkiye)
Assoc. Prof. Dr. Çağatay Tanriverdi (Turkiye)
Prof. Dr. Yıldız Daşgan (Turkiye)
Assoc. Prof. Dr. Dritan Topi (Albania)
Prof. Dr. Subhan Gureshi (Pakistan)
Prof. Dr. Ebubekir Altuntas (Turkiye)
Prof. Dr. Şeküre Şebnem Ellialtioğlu (Turkiye)
Prof.Dr. Emin Ünal (Turkiye)
Prof. Dr. Can Ertekin (Turkiye)
Prof. Dr. George Adir (Romania)
Prof. Dr. Alp Kağan Gürkan Gurdil (Turkiye)
Prof. Dr. Alp Kağan Gürkan Gurdil (Turkiye)
Prof. Dr. Halime Gübbük (Turkiye)
Prof. Dr. Hasan Hüseyin Öztürk (Turkiye)
Prof. Dr. Kürşat Çelik (Turkiye)
Prof. Dr. Hakan Ozkan (Turkiye)
Prof. Dr. İsmail Böğrekci (Turkiye)
Prof. Dr. İlker Hüseyin Çelen (Turkiye)
Assoc. Prof. Dr. Kürşat Celik (Turkiye)
Prof. Dr. Kamil Ekinci (Turkiye)
Prof. Dr. Kamil Ekinci (Turkiye)
Prof. Dr. Murat Kacira (Usa)
Assistant Prof. Dr. Murat Turgut (Turkiye)
Prof. Dr. Mehmet Topakcı (Turkiye)
Assoc. Prof. Dr. Elçin Yeşiloğlu Cevher (Turkiye)
Prof. Dr. Muharrem Keskin (Turkiye)
Prof. Dr. Fatih Özoğul (Turkiye)
Prof. Dr. Muharrem Karaaslan (Turkiye)
Prof. Dr. Mustafa Unlu (Turkiye)
Dr. Nazir Ahmad Khan (Pakistan)
Dr. Nazir Ahmad Khan (Pakistan)
Prof. Dr. Noorullah Soomro (Pakistan)
Assoc. Prof. Dr. Ömer Eren (Turikye)
Prof. Dr. Kamil Saçilik (Turkiye)
Prof. Dr. Sarp K. Sumer (Turkiye)
Prof. Dr. Sefa Altikat (Turkiye)
Prof. Dr. Sevil Karaaslan (Turkiye)
Prof. Dr. Serap Göncü (Türkiye)
Prof. Dr. Soner Kazaz (Turkiye)
Prof. Dr. Serkan Selli (Turkiye)
Assistant Profesor. Dr. Tevhide Kizildeniz (Turkiye)
Assoc. Prof. Dr. Ufuk Gültekin (Turkiye)
Assoc. Prof. Dr. Selçuk Ugurluay (Turkiye)
Prof. Dr. Ali Ünlükara (Turkiye)
Prof. Dr. Uğur Zülkadir (Turkiye)
Prof. Dr. Neslihan Yeşim Yalçin Mendi
Prof. Dr. Zeliha B. Barut (Turkiye)
Prof. Dr. Adel Zeggaf Tahiri (Morocco)
Prof. Dr. Lamis Chalak (Albania)
Prf. Dr. Athanasios Ragkos (Greek)
Dr. Recep Gök (Germany)
Prof. Dr. Tuba Esatbeyoğlu (Germany)
Prof. Dr. Susanne Neugert (Germany)
Prof. Dr. Esra Çapanoğlu (Turkiye)

ORGANIZING COMMITTEE

Prof. Dr. Hüseyin Kürşat Çelik
Assoc. Prof. Dr. Mohd Rafein Zakaria
Prof. Dr. Ebru Kafkas
Assoc. Prof. Dr. Lamiya Gulıyeva
Prof. Dr. Muhammet Şakiroğlu
Assoc. Prof. Dr. Tunahan Erdem (Chair)
Assoc. Prof. Dr. Çağdaş Civelek
Assoc. Prof. Dr. Elchin Nasırov
Assoc. Prof. Dr. Eser Çeliktopuz
Assoc. Prof. Dr. Mukhayyokhon Saidova (Vice Chair, Foreign Affairs)
Dr. Mahir Məmmədzadə
Prof. Dr. Nazan Koluman
Assoc.Professor Dilek Tekdal
Elcan Mammodov
Assoc. Prof. Dr. Aras Türkoğlu
Dr. Abdullah Çil
Dr. Seçil Karahüseyin
Dr. Nurten Yılmaz
Dr. Gamze Mazı

Prof. Dr. Elena Bartkiene
Prof. Dr. Fausto Gardini
Professor. Dr. Vida Sımat
Researcher Beyza Öztürk Erdem
Agr. Eng. Hilal Bölük
Dr. João M. Rocha
Dr. Phd Oscar Octavio Fernández Cutire
Assoc. Prof. Dr. Francısco Teodoro Condorı Tıntaya
Assitant Prof. Dr. Tevhide Kızıldeniz
Profesor. Dr. Luis Godoy Montiel
Prof. Dr. José De Sousa Câmara
Dr. Bruna Ramalho
Prof. Dr. Stanisław (Stan) Pluta
Phd. Ewelina Wojciechowska
Phd. Sneh Punia Bangar
Yenny Guiselli Torres Navarrete
Prof. Dr. Roman Galık
Prof. Dr. Antonıno Galatı
Prof. Dr. Bruno Mezzetti
Prof. Dr. Adrian Asanıca
Prof. Dr. David Herak
Assoc. Prof. Dr. Ali Berk
Dr. Abdul Chaudhry
Assoc. Prof. Dr. Cemal Kurt
Prof. Dr. Faheem Shadzad Baloch
Assoc. Prof. Phd. Djiyanov Ma'oruf
Assistant Prof. Dr. Harun Kutay
Assoc. Prof. Dr. Yakup Kenan Koca
Dr. Ayşe Nuran Çil
Research Asistant Kadriye Kurşun
Dr. İslim Polat
Assistant Researcher Burak Dalkılıç

5th International Conference on Research of Agricultural and Food Technologies (I-CRAFT'2025)

We wish to begin by expressing our sincerest gratitude for your invaluable contributions to the promotion of Turkiye, both domestically and globally, and for your unwavering support of public diplomacy and research within the vital **agricultural and food sectors**.

It is with great pleasure and pride, made possible by your support, that we announce the successful conclusion of the **5th International Conference on Research of Agricultural and Food Technologies (I-CRAFT'2025)**, held in **GANJA, AZERBAIJAN**, from **October 20-23, 2025**. This event was a fruitful joint organization between **Çukurova University** and the **Azerbaijan State Agricultural University (ADAU)**.

We were deeply honored by the participation of the Minister of Agriculture of Azerbaijan, which underscored the importance of this prestigious organization. The conference successfully brought together stakeholders from universities, producers, manufacturers, and affiliated organizations to foster critical dialogue on the future of our industry.

A total of **136 papers** were submitted to the system, and following a rigorous referee process, **126 scientific papers** were ultimately accepted. With **93 foreign papers** and **44 papers from Turkish participants**, the I-CRAFT'2025 achieved a remarkable **70% international participation rate**, firmly establishing itself as a truly international scientific platform.

To facilitate this significant global collaboration, the **Organizing Committee** covered the travel and accommodation expenses for 14 individuals. Furthermore, the substantial support provided by **TIKA (Turkish Cooperation and Coordination Agency)**, which covered the flight and accommodation costs for 22 academics, was instrumental in maximizing the international reach and impact of our event.

The richness of I-CRAFT'2025's scientific content, the high level of international engagement, and the resulting concrete collaboration outcomes demonstrate that we successfully fulfilled our mission to encourage **innovation in agricultural technologies** for the benefit of all participating nations, especially Turkiye and Azerbaijan.

We once again extend our thanks for your esteemed support that made this successful organization possible, and we respectfully submit this comprehensive report for your information.

Sincerely,

5th International Conference on Research of Agricultural and Food Technologies (I-CRAFT'2025)

PROCEEDINGS of the I-CRAFT

ISSN : 3062-3235

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Evaluation of honey quality using a temperature controlled sample (lab on a chip)

Eman Falna[1] [0009-0004-6729-7555] and Tahseen Owda[2] []

[1] Birzeit University, Palestinian bee council

efalna93@gmail.com

Abstract: Perhaps flooding the Palestinian and international markets with adulterated honey at the lowest possible price creates a major problem for beekeepers and in marketing their real and reliable honey, and affects people's health as well. In this work, a laboratory-on-achip (lab-on-a-chip) consisting of a transparent polymer based on cooling with liquid nitrogen stored in a tank made of a heat-insulating polymer will be invented to monitor the crystallization of natural honey and its appearance with the naked eye through a magnifying glass after relying on a database to differentiate between real honey and the adulterated one. This study evaluates honey quality using a temperature-controlled sample in a lab-on-a-chip system. Honey is a crucial natural product with extensive nutritional and medicinal benefits. Due to its widespread use, there is a significant issue with adulteration, particularly in Palestine. This research focuses on differentiating between natural and adulterated honey by analyzing sugar content, unique components, and crystallization temperatures. Various types of Palestinian honey will be subjected to chemical, physical, and microbiological analyses. Key techniques included high performance liquid chromatography (HPLC), spectrophotometer, and Nuclear Magnetic Resonance (NMR) spectroscopy. The findings aim to improve honey quality control and ensure consumer safety by providing a reliable method to identify adulterated honey. The study will demonstrated that natural and adulterated honey can be differentiated based on crystallization patterns and sugar content analysis. The lab-on-a-chip system should a reliable method for observing these differences. The use of high-performance liquid chromatography (HPLC), spectrophotometry, and Nuclear Magnetic Resonance (NMR) spectroscopy proved effective in identifying unique components and assessing the quality of honey. Crystallization patterns that should be observed after cooling with liquid nitrogen were significant in distinguishing between real and adulterated honey. The similarities in crystallization among natural honey samples and the differences with adulterated ones underline the potential of this method for quality control. Challenges such as the cost and selection of materials for the chip, as well as the time required for sample collection, may be noted. It is recommended to develop cost-effective polymers and to consider nanotechnology for future enhancements. This research highlights the importance of robust honey quality control mechanisms to protect consumers

from adulterated products, ensuring they receive the nutritional and medicinal benefits of genuine honey.

Keywords: Lab on a Chip, Beekeepers, Honey, Database, Adulterated honey.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Evaluation of local sugar bean (*phaseolus vulgaris* l.) Lines for yield in central anatolia

Ercan Ceyhan[1] [0000-0002-9154-9984], İrem Aylan Çolak[1] [0000-0002-8005-8231] and Serdar Karadaş[1] [0000-0001-8594-1288]

[1] Department of Field Crops, Faculty of Agriculture, Selçuk University, Konya, Turkiye

eceyhan@selcuk.edu.tr

Abstract: Sugar bean (*Phaseolus vulgaris L.*) is an important legume crop with high nutritional and economic value, particularly in semi-arid regions such as Central Anatolia. Local genetic resources represent a valuable pool for improving yield stability and adaptation under variable environmental conditions. The present study aimed to evaluate the agronomic performance of local sugar bean lines with a focus on yield potential under Central Anatolian conditions during the 2023 and 2024 growing seasons. Field experiments were conducted using a randomized block design with replications, involving one registered variety and nine local genotypes. Major yield-related traits, including plant height, number of pods per plant, seeds per pod, 100-seed weight, and grain yield, were recorded. Significant genetic variation was observed among the tested materials, indicating the presence of exploitable diversity for breeding. Several local lines exhibited superior yield performance and stable adaptation across years, suggesting their potential use as promising candidates in breeding programs for yield improvement. Overall, this study highlights the importance of utilizing local sugar bean germplasm, along with registered varieties, to enhance yield performance and strengthen sustainable production under Central Anatolian conditions.

Keywords: Sugar bean, Local genotypes, Yield, Agronomic traits.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Experimental studies on the improved pneumatic seeding apparatus

Mukhayyokhon Saidova [1] [0009-0007-0870-4802], Asomiddin Karaxanov[2] [0000-1111-2222-3333], Abdukarim Abduraxmonov[2][] and Hasanova Surayyo[1] [0009-0008-0964-3519]

[1] Tashkent State Technical University, Tashkent, 100095, Uzbekistan
[2] Scientific Research Institute of Agricultural Mechanization (SRIAM), Tashkent, Uzbekistan

muhayyosaidova1987@gmail.com

Abstract: This article defines the parameters of the seeding disk designed for clustered sowing in a pneumatic seeding apparatus. To ensure the seeds are densely packed in the cluster, the holes in the group must be positioned as closely as possible. However, seeds tend to adhere more to closely spaced holes than to individual holes. To remove excess seeds, a fork-shaped separator, which is the most effective and commonly used design, has been applied. In this design, the two prongs of the separator are positioned along a circular row of suction holes, "bordering" the seeds adhered to the holes and pushing away the excess ones. A constructive solution has been identified to remove excess seeds from the suction holes arranged in two or three rows for clustered sowing. This apparatus includes three separators that can be adjusted in two different ways. The separators are mounted on the cover of the seeding apparatus. A system of separators consisting of two radial and one central separator is used to remove excess seeds adhered to the holes of the seeding disk. To maintain the required vacuum density in the vacuum chamber of the seeding apparatus, a gasket made of fluoroplastic material is placed between the body of the apparatus and the disk. A centrifugal radial-type fan is recommended as an exhauster.

Keywords: Cotton, Sowing apparatus, Seeds.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

From green revolution to gene revolution: a pathway towards agricultural sustainability

Faheem Shehzad Baloch [1,2] [0000-0002-7470-0080], Thanh Tuan Thai[2] [0000-0003-2748-0529] and E. M. B. M. Karunathilake[2] [0009-0009-8841-1480]

[1]Department of Biotechnology, Faculty of Science, Mersin University, Türkiye
[2] *Department of Plant Resources and Environment, Jeju National University, Jeju, Korea*

balochfaheem13@gmail.com

Abstract: The Green Revolution of the 1950s and 1960s marked a major milestone in global agriculture, transforming food production through the use of chemical fertilizers, irrigation, and dwarfing genes in wheat. These innovations significantly boosted yields and contributed to global food security. However, with the world's population projected to surpass nine billion by 2050, challenges such as limited arable land, climate change, and environmental degradation are threatening future food supplies. To ensure long-term sustainability, a new transformation—the Gene Revolution—is emerging, driven by genomics, biotechnology, and digital agriculture. Biodiversity is the cornerstone of this Gene Revolution. Genetic resources provide novel alleles and adaptive traits that are vital for improving yield potential, stress tolerance, and nutritional value. Türkiye, located within the Fertile Crescent, is one of the world's richest centers of domestication and diversity for cereals and legumes. The vast genetic resources from this region hold unique alleles that can be harnessed for crop improvement and sustainable agricultural development. Over recent decades, advances in genomics have enabled the mapping of thousands of quantitative trait loci (QTLs) and DNA markers for important agronomic, physiological, and nutritional traits. Technologies such as marker-assisted selection (MAS), genotyping-by-sequencing (GBS), and whole-genome resequencing (WGRS) have revolutionized crop breeding, making it more precise and efficient. Our research group at Mersin University has assembled an extensive germplasm collection of wild and cultivated species, including bread and durum wheat, lentil, chickpea, common bean, sesame, maize, peanut, soybean, buckwheat, pearl millet, Cephalaria, and Laurus nobilis, along with medicinal and aromatic plants. Using GBS and WGRS, we have identified and validated QTLs associated with adaptive, physiological, and nutritional traits under both biotic and abiotic stress conditions. These QTLs are being integrated into breeding programs for yield stability and stress resilience. To address the impacts of climate change and ensure sustainable production, we have introduced finger millet and sorghum into the cropping systems of the Mediterranean region of Türkiye. Through ERANET and TÜBİTAK-funded projects, we performed whole-genome resequencing of sorghum and GBS of finger millet, identifying markers linked to nitrogen and

water use efficiency traits. Furthermore, within another TÜBİTAK project**,** we are developing Turkish melon cultivars resistant to aphids and Zucchini Yellow Mosaic Virus (ZYMV) using marker-assisted backcrossing. Selected examples from bean, wheat, Laurus, sesame, and maize will be presented to illustrate how molecular and genomic tools are effectively applied in identifying and utilizing QTLs for breeding superior cultivars. Collectively, these studies highlight how the integration of biodiversity, genomics, and biotechnology is reshaping agriculture from the Green Revolution to the Gene Revolution—laying the foundation for sustainable food production in the face of global climate and resource challenges.

Keywords: Buckwheat, Biodiversity, Genomic revolution, Molecular breeding.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Geometric modelling of complex shaped bodies using r-functions

Alisher Azimov [1] [0000-0002-7285-5396], Nafisa Tairova[1] [0000-0002-8280-5130], Dildora Sabirova[1] [0000-0001-9661-8160] and Anvar Rakhimov[1] [0000-0002-7599-6362]

[1] Tashkent State Technical University, Uzbekistan

nafistairova@gmail.com

Abstract: The accurate and efficient representation of complex geometric shapes is a critical challenge in various fields, including computer-aided design (CAD), computer graphics, simulation, and manufacturing. Traditional methods often struggle to handle intricate and organic shapes, necessitating the development of more versatile and robust modeling techniques. This paper explores the application of R-functions for geometric modeling of complex shaped bodies. R-functions, with their ability to define implicit surfaces, offer a powerful alternative to conventional explicit representations. This study delves into the theoretical foundations of R-functions, demonstrating their ability to combine multiple geometric primitives and perform complex Boolean operations seamlessly. We present several examples showcasing the effectiveness of R-functions in modeling a variety of intricate shapes, including both man-made and organic forms. Furthermore, we discuss the advantages and limitations of this approach, along with potential avenues for further research, such as optimization techniques and integration with other geometric modeling tools. The results demonstrate the promise of R-functions as a robust and efficient tool for geometric modeling of complex shapes, contributing to the advancement of shape representation and analysis techniques.

Keywords: R-functions, Geometric Modeling, Implicit Surfaces, Complex Shapes, CAD, CAGD (Computer-Aided Geometric Design), Solid Modeling, Shape Representation, Boolean Operations, Computer Graphics.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Insights from rna-seq data meta-analysis of soybean under abiotic stresses

Muhammad Amjad Nawaz[1] [0000-0001-9901-7555] and Mohammad Shafiq[1]

[1] Higher Engineering School of Agrobiotechnology, National Research Tomsk State University, Lenin Ave, 36, 634050, Tomsk, Tomsk Oblast, Russia.

amjad_ucauos@yahoo.com

Abstract: Increasing global warming is seriously threatening soybean crop production and yield. Particularly, the abiotic stresses such as heat, water, and drought, driven by climate change, can reduce soybean yield by up to 50%. Of modern strategies, development of abiotic-stress tolerant soybean varieties is the most feasible and appropriate strategy. However, engineering tolerance in soybeans depends on an understanding of the stress-associated molecular mechanisms. Although individual experiments on heath, water, and drought stresses have been carried out, the global response of soybeans to drought, heat, and water stress by examining RNA-seq meta-data, has not been attempted. To find genes that were differently expressed, 61 paired datasets were examined using the HN-ratio and HN-score. We performed functional annotation and motif analysis. In response to drought, heat, and water stress, the research found that 398, 332, and 322 genes were up-regulated, while 453, 301, and 455 genes were down-regulated. Of these, there were six genes that were down-regulated when heat and drought were present, six when heat and water, and four when drought and water stress was present. On the other hand, two genes were up-regulated between heat and water, ten between drought and heat stress, and fourteen between drought and water stress. The down-regulated genes were linked to photosynthesis and fructose metabolism (water), protein phosphate inhibitor activity (heat), and nicotianamine synthase activity and metal chelation (drought). Flavin mononucleotide binding, isoflavonoid biosynthesis (water), protein complex oligomerization, protein self-association, and reaction to hydrogen peroxide (heat) were all associated with up-regulated genes. Glutathione and nitrogen metabolism pathways were linked to common stress-responsive genes and their domains. A number of unidentified genes with possible functions in stress response were also found through meta-analysis. A useful tool for choosing potential genes for genome editing aimed at enhancing soybeans' resistance to abiotic stress is this meta-analysis.

Keywords: Abiotic stress, Climate change, Gene expression, Meta-analysis, Soybean, Transcriptomics.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Comparative phytochemical profiling and biological activity of two wild Azerbaijani hawthorns (*crataegus pentagyna* and *crataegus caucasica*)

Lamiya Guliyeva[1][0000-0002-3951-9083]], Turana Mammadova[2][0000-0002-9370-4351]]

[1]Department of Plant Protection, Azerbaijan State Agricultural University, Ganja, Azerbaijan
lamiya.quliyeva@adau.edu.az
[2]Department of Plant Protection, Azerbaijan State Agricultural University, Ganja, Azerbaijan

turana.mammadova@adau.edu.az

Abstract: The genus *Crataegus* (Rosaceae) is widely used in traditional medicine for the prevention and treatment of cardiovascular and metabolic disorders. This study investigated the chemical composition and biological activity of two hawthorn species growing in Azerbaijan—*Crataegus pentagyna* and *Crataegus caucasica*. Phytochemical analyses revealed a rich profile of flavonoids, phenolic acids, and triterpenoids, with notable concentrations of rutin, hyperoside, quercetin, chlorogenic acid, and ursolic acid. Gas chromatography–mass spectrometry (GC–MS) identified additional bioactive compounds, including terpenes, fatty acids, and sterols. Comparative evaluation demonstrated interspecific variation in secondary metabolites, suggesting ecological and genetic influences. In vitro assays confirmed pronounced antioxidant capacity, antimicrobial potential against gram-positive and gram-negative bacteria, and moderate cytotoxic effects. These findings support the ethnopharmacological use of Azerbaijani *Crataegus* species and highlight their potential as sources of natural antioxidants and cardioprotective agents. The results provide a scientific basis for further pharmacological evaluation and possible development of standardized herbal preparations.

Keywords: *Crataegus pentagyna*, *Crataegus caucasica*, phytochemistry, antioxidant activity

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Investigating price and cost dynamics in milk production in Turkiye using the ardl model

Tuğçe Kaya[1] [0000-0002-5376-6144] and Salih Çam[2] [0000-0002-3521-5728]

[1] Cukurova University, Faculty of Agriculture, Department of Agricultural Economics, Adana, Türkiye
[2]Cukurova University, Department of Econometrics, Adana, Türkiye

tkaya@cu.edu.tr

Abstract: Milk production is a critical sector for Türkiye in terms of both economic development and rural sustainability. Although Türkiye has high potential for milk production, rising production costs in recent years have created challenges for the sector. Inputs such as forage, energy, fertilizer, maintenance, and labor have increased significantly, especially since the pandemic in 2019. Additionally, fluctuations in exchange rates have raised the cost of imported forage components, putting further pressure on the country's production capacity. Therefore, empirically uncovering the factors determining milk supply will provide important information for addressing the challenges facing milk producers' farmers. Identifying the short-term and long-term factors affecting milk supply would help to take necessary actions in the event of a potential milk production shock in the country. This study examines the long-term and short-term factors influencing milk supply using the Autoregressive Distributed Lag method. Monthly data from 2020 to 2025 were used in the analysis. In the model, where total milk production is the dependent variable, cow milk price, buffalo milk price, producer price index (milk) representing milk production costs, and food consumer price index were used as explanatory variables. The results show that an increase in producer prices negatively affects milk production, while increases in buffalo milk prices and total food prices positively affect milk production. Finally, there is no statistically significant relationship between cow's milk prices and total milk production.

Keywords: Milk, Milk Production, ARDL, Türkiye.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Potential supportive role of matric aria recutita in chemotherapy: in vitro evaluation on cancer cell lines

Gülbahar Özge Alim Toraman[1] [0000-0002-7816-7551], Sezen Atasoy[2] [0000-0001-5063-5053], Fatma Göç[3] [0000-0003-2775-8033], Tuba Kuşman Sayğı[4] [0000-0002-1771-1453], Abdullah Dalar[5] [0000-0002-0080-2519], Gülaçtı Topçu[1,6] [0000-0002-7946-6545]

[1]Bezmialem Vakıf University Faculty of Pharmacy, Department of Pharmacognosy, İstanbul, 34093 Türkiye
[2]Bezmialem Vakıf University Faculty of Pharmacy, Department of Biochemistry, İstanbul, 34093 Türkiye
[3] Tokat Gaziosmanpaşa University Faculty of Pharmacy, Department of Pharmacognosy, Tokat, 60250 Türkiye
[4]Van Yüzüncü Yıl University Faculty of Pharmacy, Department of Pharmacognosy, Van, 65080 Türkiye
[5]Van Yüzüncü Yıl University Faculty of Pharmacy, Department of Pharmaceutical Botany, Van, 65080 Türkiye
[6]Bezmialem Vakıf University, Drug Application and Research Center, İstanbul, 34093 Türkiye

galim@benzialem.edu.tr

Abstract: *Matricaria recutita* L. (syn. *Matricaria chamomilla*), commonly known as "medicinal chamomile" or "German chamomile," is an aromatic plant belonging to the Asteraceae family. Widely distributed across Anatolia, it has been extensively used in traditional folk medicine and modern phytotherapy for centuries. Due to rich phytochemical composition, *M. recutita* (MR) exhibits various pharmacological effects including anti-inflammatory, antimicrobial, and sedative activities. Due to its active contents, MR is used as a supportive treatment particularly in alleviating side effects of chemotherapy in cancer patients. Studies have shown that chamomile provide symptomatic relief and offer a potential complementary treatment for improving patients' quality of life. In this context, the aerial parts of MR were macerated in ethanol to evaluate their proliferative effects. An MTT assay in A549 and SW480 cancer cell lines and as a control HEK293T cell line, was conducted to assess cell viabilities. The IC_{50} values were 186.28 µM for SW480, 531.63 µM for A549, and 369.68 µM for HEK293T cells, indicating low cytotoxicity in tested cell lines. Also, the EC_{50} values 14.75 µM (SW480), 1.43 µM (A549), and 2.86 µM (HEK293T) suggest that MR extract promotes cellular proliferation at lower concentrations. The ethanol extract was further fractionated using the Kupchan method into hexane, dichloromethane, ethyl acetate, and butanol sub-extracts. Except for the dichloromethane fraction, all promoted proliferation.

When the synergistic effects of the extracts and chemotherapeutic agent doxorubicin was examined, it was found that extracts significantly reduced

doxorubicin's cytotoxicity in vitro. Results from this study suggested a potential protective role of MR and highlighted its promise as a non-toxic, proliferation-supporting and protecting against doxorubicin-induced cellular damage, which may have implications for reducing chemotherapy-associated toxicity in cancer patients.

Keywords: Matricaria recutita, extraction, MTT assay, cell viability.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Internal and external quality characteristics of masai ostrich eggs

Fatma Yenilmez[1] [0000-0001-5470-7974]

[1]Çukurova University, Vocational School of Tufanbeyli, Department of Animal and Plant Science, 01640 Adana, Turkiye

fyenilmez@cu.edu.tr

Abstract: The internal and external characteristics of eggs are crucial for consumer preferences regarding table eggs, hatchability performance, chick quality, and the performance of breeding eggs. High-quality eggs have a larger share in the table egg market, while lower-quality eggs are often valued at lower prices in other markets. Therefore, the quality of an egg produced is vital for the profitability of the business. Among poultry eggs, ostrich eggs, which have high table value, although being an important protein source that could be utilized in situations such as an increasing population and drought caused by climate change, have not received the recognition they deserve. This study aims to draw attention to the ostrich eggs, and internal and external quality characteristics of Masai ostrich eggs (*Stuthio camelus massicus*) were investigated in Turkiye. In the study, a total of 18 Masai ostrich eggs were used. The study's findings revealed that the average egg weight was detected 1237.56 g, the ratio of albumen was 49.54%, yolk 31.16%, shell 18.14%, and shell thickness 2.02 mm. From the features of egg quality, the egg shape, yolk and albumen index, and Hough unit were calculated to be 87.71, 0.17, 18.08, and 124.77, respectively. The values for the egg yolk color of *L, a*,* and *b** were found to be 57.63, 7.26, and 57.20, respectively. Considering climate change, increased ostrich egg production and consumption in Türkiye should be encouraged.

Keywords: Ostrich Egg, Internal Quality, External Quality.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Investigation of the effects of climate change on the phenology of some shrub species (tamarix parviflora dc., haloxylon persicum bunge) in a desert ecosystem (Konya-Karapinar) - first detection

Kevser Karagöz Sezer [1] [0000-0002-1779-5861], Mehtap Öztekin[2] [] and Necati Şimşekli[3] []

[1]Republic of Türkiye, Ministry of Agriculture and Forestry, Field Crops Central Research Institute, Ankara
[2]Republic of Türkiye, Ministry of Agriculture and Forestry, National Botanical Garden Directorate, Ankara
[3]Republic of Türkiye, Ministry of Agriculture and Forestry, Soil, Water and Desertification Control Research Institute, Konya

kevser.karagoz.sezer@hotmail.com

Abstract: Climate change scenarios generally make evaluations based on biodiversity. These evaluations revealed that it is necessary to work meticulously on species that are important for human life. Natural species selected in this study; This study was carried out in Konya Karapınar protected area between 2018-2021 and the effects of climate change were investigated by determining the habitat requirements and phenological stages of Tamarix Parviflora DC., . Haloxylon persicum Bunge in the desert ecosystem. In the study, flowering, fruiting and seed times of the species in the Konya Karapınar protected area were determined and the climatic parameters that are the habitat requirements of these stages were determined. By recording the crown volumes of the plants in their phenological stages, their responses and changes to changing climatic conditions were recorded for the first time in this study. It was determined that the maturity stage began in the period when the air temperature dropped from 16 oC to 14 oC during the four years observed. It is thought that the fact that the Tamarix plant receives at least 30 mm of rainfall before the flowering stage and that it experiences drought throughout the period causes it to persist in the area for a long time and preserve its lush leafy appearance. In line with the data obtained throughout the study; Tree-like plants are thought to be able to tolerate wind speed and relative humidity for their phenology. For example, seed formation dates have been observed to be advanced or delayed in periods of low humidity and high winds, or conversely, in conditions of low wind and high humidity. They have been found to tolerate temperatures of up to +/- 5-7°C in air and soil root depths, a higher range than herbaceous plants.

Keywords: Tamarix Parviflora DC., . Haloxylon persicum Bunge, Phenology, Cimate change, Vegetation.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Estimation of reference crop evapotranspiration (eto) for Adiyaman province using artificial neural networks

Nurcan Menevşe[1] [0000-0002-4507-5140] and Osman Nuri Öcalan[2] [0000-0001-6242-4667]

[1] Department of Biosystem Engineering, Agriculture Faculty, Tokat Gaziosmanpasa University, Tokat, Türkiye
[2] Horticulture, Faculty of Agriculture, Tokat Gaziosmanpaşa University, Tokat, Türkiye

menevsenurcan@gmail.com

Abstract: Adıyaman province, located in Türkiye's Southeastern Anatolia Region, is an important center due to its geographical position and agricultural potential. Semi-arid climate conditions and limited water resources make irrigation planning and efficient water use essential. Reference crop evapotranspiration (ETO) is a key parameter in irrigation management. Accurate estimation of ETO not only improves crop productivity but also supports sustainable use of water resources. Traditionally, ETO is calculated with the FAO-56 Penman-Monteith method, but uncertainties in meteorological data and the need for many parameters make the process complex. Recently, artificial intelligence approaches, especially Artificial Neural Networks (ANNs), have shown promise in modeling nonlinear relationships for ETO estimation. In this study, 44 years of meteorological data from Adıyaman were used with ANN. The dataset was divided into training, validation, and testing. Results showed high accuracy in training and validation, with acceptable generalization in testing. NS values close to 1 confirmed strong agreement between predicted and observed values. Overall, ANN proved effective for ETO estimation and sustainable water management.

Keywords: Adıyaman, ANN, ETO, Drought.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Kefir as a living food: fermentation, function, and health

Yeşim ÖZOĞUL[1] [0000-0001-7769-9225] and Fatih ÖZOĞUL[2] [0000-0002-0655-0105]

[1] Çukurova University, Faculty of Fisheries, Department of Seafood Processing Technology, Adana, Turkiye
[2] Çukurova University, Biotechnology Research Centre, Adana, Turkiye

fozogul@cu.edu.tr

Abstract: Milk kefir and water kefir are the two main varieties of kefir, a fermented beverage recognized for its probiotic qualities and health advantages. People in the mountainous area between Europe and Asia have been consuming kefir milk for thousands of years. The process of making milk kefir involves fermenting milk (often from cows, goats, or sheep) with milk kefir grains, which are symbiotic cultures of yeasts and lactic acid bacteria. A tangy, creamy beverage full of vitamins, probiotics, and bioactive components is the end product. By fermenting sugar water or fruit juice with water kefir grains, which have a distinct microbial population suited to a non-dairy environment, water kefir, on the other hand, is a dairy-free substitute. In addition to providing probiotic advantages, this results in a mildly carbonated, sweet-tart beverage that is appropriate for vegetarians and others who are lactose intolerant. Both varieties of kefir support intestinal health. These grains are inhabited by a varied symbiotic ecosystem of yeasts, lactic acid bacteria, acetic acid bacteria, and other microorganisms. In kefir grains, the most prevalent bacteria are lactic acid bacterial taxa, such as Lactobacillus, Lactococcus, Leuconostoc, and Streptococcus. These grains also frequently contain yeast species such as Candida, Saccharomyces, Kluyveromyces, Kazachstania, and Pichia. Kefir drinks have been linked to several significant health benefits, including as improved lactose digestion, anti-carcinogenic, anti-hypertensive, and anti-diabetic properties, among others. In addition, kefir supports intestinal health by keeping the intestinal flora in balance. All of these health benefits are brought about by the kefir bacteria, their interactions, and the metabolic products they produce throughout the fermentation process. Thus, this review aims to provide information on fermentation, function, and health benefits of kefir.

Keywords: Kefir, Fermentation, Health benefits.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Frost and drought events in Cukurova's agricultural production: impacts and strategic recommendations for future resilience

Mustafa Yılmaz [1] [0009-0000-4353-4086], Şeyh Şamil Daban[2] [0009-0008-9314-2302], Eser Çeliktopuz[3] [0000-0002-5355-1717]

[1] İmamoğlu District Governorship, District Directorate of Agriculture and Forestry, 01700 İmamoğlu, Adana, Türkiye
[2] Cukurova Agricultural Enterprise Directorate, 01945 Ceyhan, Adana, Türkiye
[3] Cukurova University, Faculty of Agriculture, Department of Agricultural Structures and Irrigation, 01330 Sarıçam, Adana, Türkiye

mustafa_yilmaz@tarimorman.gov.tr

Abstract: All agricultural activities are highly dependent on climatic conditions. Various adverse consequences of climate change—such as shifts in precipitation regimes, rising temperatures, meteorological and hydrological droughts, and an increased frequency of natural disasters—can significantly affect agricultural productivity, growth rates, and food security. Frost and drought events, which are among the most critical risks to agricultural production, represent natural hazards with economic, social, and environmental implications. These events occur when temperatures fall below or rise above the tolerance thresholds of crops, increasingly as a result of climate change. In the 2025 growing season, farmers in Türkiye, as in many other parts of the world, were confronted with a range of extreme weather and climate phenomena. This paper presents recommendations for measures and practices that can be adopted to reduce the economic impacts of future frost and drought events during agricultural production periods.

Keywords: Cukurova, Drought, Agricultural Frost, Agriculture, Climate Change.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Importance of using digital technology in organizing audit activities

Elay Zeynalli[1] [0000-0002-6352-662X], Nargiz Hasanova[2] [0000-0001-9196-614X], Mirzeyev Qurban[3] [0000-1111-2222-3333], Firuza Mammadova[4] [0009-0003-1481-809X] and Hafiza Hajiyeva[5] [0000-0002-2062-6495]

[1,2,3,4,5] Azerbaijan State Agricultural University, Ataturk avenue 450, Ganja, (Azerbaijan)

e.zeynalli@adau.edu.az

Abstract: The article explores the inevitability of audit digitization in the rapidly evolving technological economy. It examines the integration of artificial intelligence and process automation into auditing activities, enabling the automation of repetitive tasks, enhancing data examination, and improving the accuracy of audit findings. The development of intelligent auditing with the application of machine learning and natural language processing is also discussed, significantly boosting the quality and efficiency of audit procedures. The adoption of modern technologies is reshaping the auditor's role, emphasizing the necessity of possessing not only traditional expertise but also knowledge of digital tools. Special focus is given to data protection requirements and compliance with global regulations. The impact of technological advancements on international auditing practices is also analyzed, where top accounting firms are actively adopting AI-driven solutions and blockchain technology. Additionally, the effect of digital transformation on auditing within the framework of International Auditing Standards is explored. Standard No. 520 encourages the application of advanced data analytics, Standard № 315 highlights concerns regarding risks, instability, and cybersecurity, while Standard № 500 outlines innovative methods for gathering audit evidence through artificial intelligence. In conclusion, the article emphasizes that the seamless integration of technology requires a holistic approach, including structural reforms, ongoing professional training, and adaptation to modern challenges, which will ultimately enhance the reliability and accuracy of audit processes while ensuring compliance with current best practices. The recommendations stress the importance of strengthening cybersecurity protocols, standardizing blockchain applications, and actively incorporating cutting-edge technologies. Future research may focus on developing innovative risk mitigation strategies and addressing emerging trends in digital auditing.

Keywords: digitization, auditing, AI, RPA, cognitive computing, predictive analytics, cybersecurity, regulations, top accounting firms, blockchain.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Immunity and nutrigenomic studies in livestock

Ercan Mevliyaoğulları[1] [0000-0003-3333-1490], Serap Göncü[2] [0000-0002-0360-2723] and Mustafa Güçlü Sucak[3] [0000-0001-6147-470X]

[1] Başkent University Kahramankazan Vocational School Ankara Türkiye
[2] Cukurova University, Agriculture Faculty, Department of Animal Science, Adana Türkiye
[3]Adıyaman University, Kahta Vocational School, Adıyaman, Türkiye

serapgoncu@gmail.com

Abstract: Nutrigenomics has emerged as a field of science that highlights the potential of dietary components to modulate gene expression and thereby shape immune responses, contributing to the overall effectiveness of the immune system. Studies have demonstrated that vitamins (A, D, E), trace minerals (zinc, selenium), omega-3 fatty acids, probiotics, and prebiotics enhance the activation of immunity-related genes, balance inflammatory responses, and support immune homeostasis (Musa et al., 2023; Ul Haq, 2022; Patil, 2021). Particularly in the neonatal period, immunoglobulins and bioactive peptides provided by colostrum promote the maturation of T and B lymphocytes, ensuring molecular-level programming of the immune system (Rosa et al., 2021; Loor, 2022). These findings suggest that nutrigenomics-based nutritional strategies may serve as a key tool in optimizing immune functions in animals, thereby improving both health and production performance. Nutrigenomic research clearly demonstrates that the immune system can be optimized at the molecular level in livestock production. Advances in high-throughput technologies have also enabled important investigations into disease resistance. The emergence of genotyping arrays has facilitated large-scale genome-wide association studies and global transcriptome analyses, giving rise to the field of "integrative genetics." Other omics technologies, such as proteomics and metabolomics, are expected to continue making significant contributions to the daily methodology of biological research.

Keywords: Livestock, Disease, Resistance, Immunity, Nutrigenomics.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Perspective rootstocks for stone fruit crops in intensive horticulture

İdrisov Huseyn Akbar[1] [0009-0009-8032-469X], Semanova Yegana Vahid[1] [0009-0008-6601-3142]
and Muradova Leyla Ramiz[1] [0009-0003-3300-7946]

[1] Azerbaijan State Agrarian University, Doctor of Philosophy in Agricultural Sciences

huseyn.idrisov@mail.ru

Abstract: One of the main factors underlying the efficient operation of orchards is healthy planting material - saplings. In other words, the successful development of fruit growing on an intensive basis and high crop production go through a network of progressive nursery farms organized on the basis of proper agrotechnological care. The planting material produced in the nursery lays the foundation for the phytosanitary condition of future productive orchards. In general, the production of healthy planting material is of great importance from both an economic and ecological perspective. We have research on the study of new rootstocks for stone fruit crops. The rootstocks VSL-2, Gisela-6 and Garnem were taken as research material. Biometric indicators of rootstocks were studied. It was determined that the height of the rootstocks in the first year after planting was 45-75 cm. The smallest height was VSL-2, the highest height was the Garnem, and the Gisela-6 was 56 cm tall. The diameter of the bole was 0.6 cm in the VSL-2 rootstock, 0.8 cm in the Gisela-6 rootstock, and 1.0 cm in the Garnem rootstock. The annual height increase is 25 cm in the VSL-2 rootstock, 39 cm in Gisela-6 rootstock, and 42 cm in the Garnem rootstock. As can be seen, the VSL-2 rootstock is distinguished from other rootstocks by its dwarf height. It should be noted that all three rootstocks are widely used in intensive gardening.

Keywords: in vitro, stone fruit crops, rootstosk, intensive gardening.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Utilization of rumen boluses in nutritional and health management of ruminants

Murat Durmuş[1] [0000-0002-4221-7449], Selahattin Erkek[1], Doğukan Onur Gürsoy[1], Merve Bulanıklı[1], Mert Yusuf Ateş[1], Mustafa Emir Erden[1] and Harun Kutay[1] [0000-0001-9163-4831]

[1]Department of Animal Science, Faculty of Agriculture, Cukurova University, 01330 Adana, Turkiye

durmusm@cu.edu.tr

Abstract: This review discusses the mechanisms of action, areas of application and effects on performance of rumen boluses used in different physiological periods of ruminants. Maximum productivity in farm animals, the protection of animal health and welfare and the sustainability of production are closely related to their adequate and balanced feeding in the different physiological periods as well as effective disease management. In recent years, the use of rumen boluses has become a practical method of supporting animal nutrition to achieve these goals. Rumen boluses are structures that are placed in the rumen and have a long-term release. They allow the controlled administration of mineral and vitamin supplements as well as pharmacological agents. Thanks to their sustained-release structures, they provide the necessary nutrients and medicines that animals need in a controlled manner during various physiological periods such as the transition period, pregnancy and lactation. Thus, they provide positive contribution to economic production by preventing metabolic diseases, improving reproductive performance, promoting immunity and the growth and development performance of the offspring. As a result, in light of the finding from the literature, it is suggested that rumen boluses can be used for both nutritional support and therapeutic purposes and can be evaluated as part of a total herd management strategy.

Keywords: Sheep, Goat, Rumen bolus, Prepartum, Postpartum.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Sustainable food governance: the growing role of local governments in Turkiye from a public policy perspective

Berat Akıncı[1] [10000-0002-5239-5417]

[1] Adana Alparslan Turkes University of Science and Technology
Faculty of Economics, Administrative and Social Sciences

bakinci@atu.edu.tr

Abstract: Sustainable food governance is not merely a framework regulating production–consumption relations but also a multi-actor governance process encompassing the formulation, implementation, and evaluation stages of public policy. The accelerating climate crisis, food insecurity, and agricultural vulnerabilities on a global scale reveal the limits of the state's traditional policy-making capacity. Accordingly, sustainable food policies increasingly rely on a multi-level governance model that goes beyond hierarchical administration and incorporates the active participation of local governments, civil society, the private sector, and citizens. This transformation brings a profound restructuring in both the content and the actor composition of public policy processes. Within this restructuring, the strategic position of local governments in sustainable food governance in Türkiye has become increasingly prominent. At the local level, municipalities are emerging not only as implementers but also as policy-makers and coordinators in areas such as food security, waste prevention, rural development, and climate-friendly production. This shift indicates a transition from a centralized model of policy-making toward a multi-level, participatory, and resilience-oriented public policy framework. The aim of this study is to explore the role of local governments in shaping sustainable food policies in Türkiye from the perspective of public policy and governance.

Keywords: Public Policy, Governance, Sustainable Food, Local Governments, Food Security.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

In vitro acetylcholinesterase inhibition and cytotoxic effects of selected phenolic compounds on sh-sy5y cells

Fatma GÖÇ[1] [0000-0003-2775-8033], Rabia Sare YANIKOĞLU [2] [0000-0003-4619-0957], Gülbahar Özge ALİM TORAMAN[3] [0000-0002-7816-7551], Aynur SARI [4] [0000-0001-8116-7053], Serdar MAKBUL[5] [0000-0001-8798-0926] and Kamil COŞKUNÇELEBİ[6] [0000-0001-5713-6628]

[1] Tokat Gaziosmanpaşa University, School of Pharmacy, Department of Pharmacognosy. 60100 Tokat, Türkiye
[2] Bezmialem Vakıf University, School of Pharmacy, Department of Biochemistry. 34093 İstanbul, Türkiye
[3] Bezmialem Vakıf University, School of Pharmacy, Department of Pharmacognosy. 34093 İstanbul, Türkiye
[4] İstanbul University, School of Pharmacy, Department of Pharmacognosy. 34452 İstanbul, Türkiye
[5] Recep Tayyip Erdoğan University, Faculty of Science, Department of Biology. 53100 Rize, Türkiye
[6] Karadeniz Technical University, Faculty of Science, Department of Biology. 61080 Trabzon, Türkiye

fatma.goc@gop.edu.tr

Abstract: This study investigated the *in vitro* acetylcholinesterase (AChE) inhibitory activities and cytotoxic effects of twelve naturally derived phenolic compounds isolated from *Scorzonera ketzkhowelii* Sosn. ex Grossh. AChE inhibition was assessed by the Ellman colorimetric method, using galantamine as a reference inhibitor, while cytotoxicity was evaluated by the MTT assay at six serial dilutions ranging from 100 µM. Among the tested compounds, 3,5-di-*O*-caffeoylquinic acid and quercetin 3-*O*-*α*-arabinopyranoside exhibited notable AChE inhibitory activities, with IC_{50} values of 0.56 µM and 0.89 µM, respectively, closely approaching the potency of galantamine (0.34 µM). Additionally, hydrangeic acid 4'-*O*-*β*-D-glucopyranoside, hydrangenol, and thunberginol F 7-*O*-*β*-D-glucopyranoside displayed moderate inhibitory activities, with IC_{50} values ranging between 1.69 and 2.57 µM. In the cytotoxicity assays, hydrangeic acid 4'-*O*-*β*-D-glucopyranoside demonstrated the strongest effect on SH-SY5Y cells, yielding an IC_{50} of 1.47 µM. This was followed by 3,5-di-*O*-caffeoylquinic acid, p-hydroxybenzaldehyde, and esculin, each showing IC_{50} values below 3 µM, indicating considerable cytotoxic potential. Overall, these findings highlight the dual pharmacological promise of phenolic compounds from *S. ketzkhowelii*, which not only act as effective AChE inhibitors relevant to neurodegenerative disorders but also exhibit significant cytotoxic effects against neuroblastoma cells. This study provides a valuable basis for future investigations aimed at elucidating the molecular mechanisms underlying

these activities and supports the continued exploration of phenolic structures from edible and medicinal plants as promising multitarget agents in both neurological and oncological therapeutic research.

Keywords: Phenolic compounds, Acetylcholinesterase inhibition, SH-SY5Y cytotoxicity.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Determination of aroma compounds in frozen and fresh of Arnavutköy strawberry samples using two different spme methods

İlbilge OĞUZ[1] [0000-0002-7198-4014], Tareq HAMIJO[1] [0000-0003-3247-6778], Karçiçeği GERGER[1] [0009-0000-3407-9907], Ebru KAFKAS[1] [0000-0003-3412-5971]

[1]University of Çukurova, Faculty of Agriculture, Department of Horticulture, Balcalı, Adana, Türkiye

ilbilge94@gmail.com

Abstract: The strawberry (*Fragaria* × *ananassa*) is classified among berry fruits, and its cultivation as a horticultural crop has a long historical background. Historical records indicate that a strawberry variety introduced from Istanbul to Ereğli many years ago was initially referred to as Arnavutköy and later became known as the Ottoman strawberry. Subsequently, this variety was hybridized with local landraces, particularly those referred to as Karaçilek, resulting in the development of new cultivars. The Arnavutköy strawberry is characterized by relatively small fruit size yet possesses a notably rich aromatic profile. Aroma is recognized as one of the most critical quality attributes of strawberries, with volatile compounds (VOCs) playing a pivotal role in determining consumer perception, acceptance, and overall preference. The identification of key volatile metabolites that confer the distinctive sensory attributes of the fruit is of considerable importance, as these compounds contribute to its fundamental sensory identity and uniqueness. In the present study, volatile composition analyses of fresh and frozen fruits of the Arnavutköy strawberry cultivar were conducted using gas chromatography–mass spectrometry (GC–MS) with using two distinct SPME fibers

Keywords: Arnavutköy, Strawberry, aroma, volatile compounds

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Determination of biochemical and volatile properties of papaya (carica papaya l.) Seeds

Yakup Polat [1] [0000-0002-5831-8199], Berken Çimen [1] [0000-0002-9376-1823], Sefa Sakar [1] [0009-0005-1480-0679], Salih Kafkas [1] [0000-0002-9037-4764], Ebru Kafkas [1] [0000-0003-3412-5971]

[1] University of Çukurova, Faculty of Agriculture, Department of Horticulture, Adana

yakupyyu@gmail.com

Abstract: Medicinal plants have long been utilized as natural prophylactic and therapeutic agents due to their abundance of bioactive compounds, easy accessibility, and relatively low toxicity. Currently, the demand for natural therapeutic agents is increasing as they are incorporated into both foods and pharmaceuticals as alternatives to synthetic compounds. Papaya (*Carica papaya* L.), belonging to the Caricaceae family, is an important plant cultivated in tropical and subtropical regions. While papaya fruit is widely consumed, its seeds are often discarded as waste, despite being rich in essential micronutrients and secondary metabolites with significant therapeutic potential. This study aimed to evaluate the biochemical composition, sensory characteristics, and volatile compounds of papaya seeds cultivated in Türkiye. The results revealed that total antioxidant (DPPH) activity was 50.75%, and total phenolic content was 81.96 mg GAE/100 g. Four sugars (sucrose, glucose, fructose, and xylose) were identified, with glucose (1860.92 mg/100 g) and fructose (1684.45 mg/100 g) being the most abundant. Volatile compound analysis identified 30 compounds (3 aldehydes, 4 alcohols, 8 esters, 6 acids, 8 terpenes, and 1 ketone), with acids, esters, and aldehydes as the predominant groups. The major volatiles were benzaldehyde (35.74%), hexanoic acid (5.79%), and hexanoic acid, hexyl ester (5.37%).

Keywords: Bioactive compounds, Papaya seed, sugars, volatile compounds profile

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Determination of fatty acid composition and olive oil quality parameters of the gemlik olive variety grown in Adiyaman

Halil İbrahim OĞUZ[1] [0000-0003-2213-7449] Fırat Ege KARAAT [1] [0000-0002-4676-0721], Mehmet İlhan ODABAŞIOĞLU [1] [0000-0001-8060-3407]

[1]Adıyaman University, Agriculture Faculty, Department of Horticulture, Adıyaman, Türkiye

hioguz64@gmail.com

Abstract: Adıyaman province has a climate and soil structure that is extremely favorable for olive cultivation due to its ecological characteristics. The climate of Adıyaman Province is generally characterized by dry and hot summers and mild and rainy winters in the south, and dry and cool summers and rainy and cold winters in the north. For this reason, Adıyaman Province serves as a bridge between the Eastern Anatolia and Mediterranean regions. The average annual rainfall is around 715.1 mm. According to 2024 TÜİK data, the area planted with table olive varieties in Adıyaman is 11,186 decares, while the area planted with oil olive varieties is 31,269 decares. The annual production of table olives in the province is 2,237 tons, while the production of oil olives is 5,101 tons. Adıyaman produces approximately 5% of Turkiye's table olive production and approximately 20% of Turkiye's oil olive production. The dominant olive variety grown for oil in Adıyaman is Gemlik. Olive oils produced in Adıyaman are distinguished from other olive oils by their unique aroma, color, and chemical properties. For this reason, the olive oils produced in the province are candidates for geographical indication as "Adıyaman Olive Oil." In this study, the sensory characteristics, fatty acid composition, and other quality parameters of oils obtained from the Gemlik olive variety grown in Adıyaman province were examined. It was determined that Adıyaman olive oil had a fruitiness score of 4.4±0.2, a bitterness score of 2.6±0.1, and a pungency score of 3.8±0.1, and that there were no sensory characteristics indicating low quality or deterioration in the oil. Additionally, the free fatty acid content of the examined olive oils was found to be 0.49±0.01%, the refractive index was 1.4683, peroxide content of 8.8±0.3 meq/kg, and UV-specific absorbance of K232=1.952, K270=0.1615, and ΔK=0.003. On the other hand, a total of 11 different fatty acids, including oleic acid, palmitic acid, and linoleic acid, were detected in the olive oils. In the olive oils examined, the oleic acid content was found to be 73.81 ± 0.19%, the palmitic acid content was 13.32 ± 0.52%, and the linoleic acid content was 6.41 ± 0.85%.

Keywords: Adıyaman, olive oil, sensory analysis, fatty acid composition, oleic acid

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Determination of genetic diversity based on scot (start codon targeted polymorphism) in *eremogone* fenzl (caryophyllaceae) taxa in Turkiye

Metin ARMAĞAN[1] [0000-0002-3913-954X], Aras TÜRKOĞLU[2] [0000-0003-2611-8034]

[1]Department of Field Crops, Faculty of Agriculture, Necmettin Erbakan University, Konya, Turkiye.

metin.armagan@erbakan.edu.tr

Abstract: Caryophyllaceae, one of the families with the most species in the Turkish flora, includes 100 genera and approximately 3000 species. The genus *Eremogone* was included in the newly defined tribe Eremogoneae and was expanded by the transfer of species classified as subgenera *Arenaria* and *Minuartia* in previous studies. Although revision studies on the genus continue with new species combinations in limited geographical areas, taxonomic problems have not been resolved. It is represented by approximately 100 species accepted worldwide, and a total of 20 taxa in Turkiye, 13 of which are endemic. This study focuses on evaluating the genetic diversity of 96 *Eremogon* genotypes collected from diffrent provinces across a wide geographic range. Start codon targeted (SCoT) markers were employed as a molecular tool to assess polymorphism. Genetic relationships among the genotypes were explored through clustering, principal component analysis (PCA), and population structure analysis. This research represents one of the first comprehensive efforts to investigate the genetic diversity and structure of *Eremogon* germplasm using the Start codon targeted (SCoT) marker system. The study provides essential insights for the conservation, characterization, and potential breeding applications of this underutilized yet valuable plant resource.

Keywords: *Eremogon*, genetic diversity, SCoT markers, population structure, molecular markers, biodiversity

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Determination of grain yield and yield-related characteristics of some faba bean (*vicia faba* l.) Cultivars in Cukurova ecological conditions.

Banu YÜKSEL[1,**] Aybegün TON[1*] [0000-0002-2064-1214]

[1] Çukurova University, Faculty of Agriculture, Department of Field Crops, Adana, Turkiye

aybeguntoncu@gmail.com

Abstract: Faba bean (*Vicia faba* L.) has high nutritional value and it can be use for food human and livestock and as green manure. The aim of this study was determine the grain yield and yield-related characteristics of some faba bean *(Vicia faba* L.) cultivars. This study was carried out in experiment area of the Field Crop Department, Faculty of Agriculture at Çukurova University during the 2021/2022 growing period. The study was established according to the randomized blocks experiment design with 3 replications and 12 faba bean cultivars were used as materials. As a result of the study, the maturity period was 154-160 days, the number of branches per plant was 2.3-3.4, the grain weight per plant was 13.8-26.2 g plant $^{-1}$ and 100 grain weight varied between 98.0-134.4 g. The lowest dry grain yield was found in the Luz de Otona cultivar with 1495 kg ha^{-1}, while the highest dry grain yield was obtained from Hara cultivar with 3286 kg ha^{-1}. It has been concluded that Hara, Filiz and Gölyaka cultivars are promising in the Çukurova region conditions in terms of dry grain production.

Keywords: Faba Bean, Cultivars, *Vicia faba* L., Grain Yield, Yield Components.
**This manuscript was produced from Master Thesis.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Development of a harvesting robot for use in soilless greenhouses

Bahadır Demirel[1*] [0000-0002-2650-1167], Osman Mert Yaz[1] [0009-0003-3367-6656], Gürkan Alp Kağan Gürdil[2] [0000-0001-7764-3977]

[1]Department of Biosystem Engineering, Faculty of Agriculture, Erciyes University, Kayseri, Turkiye
[2]Department of Agricultural Machinery and Technologies Engineering, Faculty of Agriculture, Ondokuz Mayis University, Samsun, Turkiye.

ggurdil@omu.edu.tr

Abstract: This study aims to achieve fully autonomous fruit harvesting in greenhouses utilizing soilless agriculture by integrating artificial intelligence (AI)-driven deep learning algorithms and robotic arm systems. Based on a comprehensive literature review, a conceptual model has been proposed featuring an articulated harvesting arm mounted on a mobile platform. The system employs depth-sensing vision sensors and advanced object recognition algorithms (e.g., YOLO, Faster R-CNN) to detect fruits and extract their three-dimensional positional data. Using inverse kinematics and robot control algorithms, the robotic arm is guided to the target location and performs harvesting according to the fruit's ripeness level and optimal detachment point. The mechanical design incorporates adaptable gripper-cutter mechanisms to prevent fruit damage during the harvesting process. According to data from related studies, fruit detection accuracy typically ranges from 88% to 95%, while harvesting success rates vary between 80% and 100%. The average picking time per fruit ranges from 3 to 15 seconds, depending on the crop type and system specifications. Deep learning-based approaches have demonstrated high accuracy in both fruit detection and ripeness classification, while developments in adaptive end-effectors have significantly improved harvesting efficiency in robotic arms. This technical study explores the feasibility, constraints, and performance metrics of autonomous harvesting technologies in hydroponic greenhouses. It highlights the synergy between AI-based perception and precise mechanical actuation, offering insights into the integration of computer vision, robotics, and agronomic parameters in modern agriculture. By addressing both algorithmic precision and mechanical adaptability, this research contributes to the development of intelligent and scalable solutions for high-throughput and labor-efficient harvesting in controlled-environment agriculture.

Keywords: Harvest, greenhouse, artificial intelligence, robotic

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Development of an energy-efficient electrotechnology for the inactivation of white grub (polyphylla olivieri) through electrophysical treatment

Urolboy Khaliknazarov [1,[0009-0003-8775-5333]]

[1]Tashkent State Agrarian University, Tashkent, 100140, Uzbekistan

u.xaliknazarov@mail.ru

Abstract: In primary silk cocoon processing facilities, only the hot air (convective) method is currently used for the inactivation and drying of silkworm pupae. However, most of the equipment operating with this method is physically and morally outdated, constructed from bulky and heavy metal materials, which leads to excessive fuel and energy consumption during processing. Experimental research has shown that the use of ultra-high frequency electromagnetic field treatment in the initial processing of cocoons ensures complete inactivation of the silkworm pupae while preserving the quality of the silk and significantly improving energy efficiency. This makes it one of the most optimal electrotechnological methods for cocoon processing.

Keywords: cocoon, cocoon processing, pupa, pupa inactivation, ultra-high frequency, energy-efficient technology

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Diversified crop rotation: an innovative approach to soil fertility preservation and sustainable crop production

Tamraz Tamrazov[1]

[1]Ministry of Agriculture, Scientific Research İnstitute of Crop Husbandry, Department of Sustainable Agriculture and Crop Diversification, Azerbaijan

tamraz.tamrazov@gmail.com

Abstract: Diversified crop rotation (DCR) is increasingly recognized as a cornerstone of sustainable agriculture, offering significant agronomic, environmental, and economic benefits. By incorporating a variety of crops in planned sequences, DCR enhances soil structure, increases organic matter, improves water infiltration and retention, and stimulates beneficial soil biota. These improvements contribute to greater resilience against drought, soil erosion, and nutrient depletion, while reducing the prevalence of weeds, pests, and diseases without heavy reliance on synthetic inputs.

Recent meta-analyses indicate that diversified rotations can increase crop yields by **10–20%** compared to monocultures, while simultaneously reducing nitrogen fertilizer requirements by up to **25%**. Long-term field experiments in both temperate and semi-arid regions demonstrate that DCR improves soil organic carbon stocks, leading to enhanced water-holding capacity and nutrient availability. Furthermore, rotations that include legumes significantly enhance biological nitrogen fixation, thereby reducing production costs and environmental pollution from excess fertilizer application.

From an economic perspective, DCR mitigates production risks and market uncertainties by diversifying farm outputs, thereby stabilizing farmers' income streams. Environmentally, it strengthens ecosystem services by improving nutrient cycling, enhancing biodiversity, and supporting long-term soil health. This is particularly relevant under the pressures of global climate change, population growth, and the demand for higher productivity from shrinking arable lands. Case studies from countries such as Canada, Australia, and Kazakhstan reveal that adopting DCR at a large scale requires supportive policies, farmer education programs, and market incentives for diverse crop products. Without these enabling factors, adoption rates may remain low despite clear agronomic benefits. This paper synthesizes current research findings on the role of DCR in sustainable crop production, outlines practical challenges to its wider adoption, and discusses context-specific strategies for successful implementation. The evidence suggests that DCR not only sustains productivity but also safeguards the natural resource base upon which future agricultural systems depend, making it a critical component of climate-smart agriculture strategies worldwide.

Keywords: diversified crop rotation, sustainable agriculture, soil health, ecosystem services, climate resilience, food security.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Effect of grafting on different rootstocks on flower and seed characteristics in kirkağaç melons (*cucumis melo* var. *Inodorus*)

Pınar ADIGÜZEL[1] [0000-0001-7971-2518]*, Şenay KARABIYIK[1] [0000-0001-8579-6228], İlknur SOLMAZ[1] [0000-0003-2996-0286]

[1]Horticulture Department, Faculty of Agriculture, Cukurova University, Adana, Türkiye

Abstract: This study was conducted at Adana Çukurova University in the 2021-2022 spring-summer growing season. In the research, purebred lines of the *Cucumis melo* var. *inodorus* group, a melon hybrid variety candidate developed by the dihaploidization technique within the scope of a completed TUBITAK project (TOVAG 1140230), were used. In the study, a hybridization program was applied with 5 applications, including 2 *C. maxima* × *C. moschata* hybrid rootstocks, 1 melon rootstock, 1 grafting onto itself as a rootstock, and 1 control (non-grafted), totalling 25 combinations. The study determined that the grafting showed higher viability values compared to the control. Even if Nun 9075 is the rootstock, the pollen quality and quantity were relatively lower compared to other grafting combinations. In terms of pollen parameters, the best results were obtained in grafting onto Maximus and its own rootstock. Although grafting affects pollen tube development and pollen quality, the main parent's grafting in seed data, especially on rootstocks other than melon, resulted in reduced effectiveness. According to the data, Sphinx increased the number of seeds by 21%, grafting on self-root by 19%, grafting on Maximus by 14%, and Nun9075 by 8%. In general, as a result of the study, it was found that if the male parent is grafted, there is no need to graft the female parent.

Key words: *Cucumis melo*, grafting, pollen quality, seed

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Yield and adaptation performance of newly developed pure lines of cowpea (*vigna unguiculata l.)*

Serdar KARADAŞ[1] [0000-0001-8594-1288], İrem AYRAN ÇOLAK[1] [0000-0002-8005-8231], Ercan CEYHAN[1] [0000-0002-9154-9984]

[1]Department of Field Crops, Faculty of Agriculture, Selçuk University, Konya, Turkiye

eceyhan@selcuk.edu.tr

Abstract: Cowpea (*Vigna unguiculata L.*) is an important legume crop with high nutritional and agronomic value, particularly in semi-arid regions where food security and sustainable agriculture are essential. The development of pure lines is a crucial step in breeding programs aimed at improving yield potential, adaptation, and stability. This study was conducted during the 2023 and 2024 growing seasons to evaluate the yield and adaptation performance of newly developed cowpea pure lines under field conditions in Central Anatolia. The experimental material consisted of one registered variety and ten genotypes, and the trials were arranged in a randomized block design with replications. Key agronomic and yield-related traits, including plant height, number of branches, pods per plant, seeds per pod, 100-seed weight, and grain yield, were measured. Significant genetic variability was observed among the pure lines, indicating a wide scope for selection and genetic improvement. Several lines demonstrated superior yield potential and stable adaptation across environments, suggesting their potential use as promising candidates in breeding programs. The results highlight the importance of exploiting newly developed cowpea pure lines, along with registered varieties, to enhance yield stability and strengthen breeding strategies for sustainable production under Central Anatolian conditions.

Keywords: Cowpea, pure lines, yield performance, agronomic traits

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Investigation of strategies to obtain pure lines

Dilek Tekdal[1]* [0000-0002-4545-9005]

[1] Department of Biotechnology, Faculty of Science, Mersin University, Mersin, Türkiye

dilektekdal@mersin.edu.tr

Abstract: Legumes constitute a significant portion of human nutrition and are also known for their soil-friendly nature. Legume breeding efforts to develop high-yield and resistant varieties have been insufficient due to the limited number of species introduced to the industry, low demand for local varieties used as genitors, and the lengthy breeding process. In traditional breeding practices, particularly those involving distant relatives, incompatibility necessitates using tissue culture techniques, known as embryo rescue. However, the difficulty of in vitro regeneration of legume species has led to the relegation of breeding and tissue culture studies with these species. For crossbreeding studies with the legume plant, which is endemic to Turkiye and notable for its multi-ovarian carpel structure within the legume family, obtaining pure lines of the species is crucial to shorten the breeding process. *Vuralia turcica*, a Turkish endemic in the literature, is a notable species within the Fabaceae family's Papilioideae (Faboideae) subfamily due to its multi-carpel ovary. It is the only species of the *Vuralia* genus found in Turkiye and worldwide. In addition to these critical characteristics, V. turcica is listed as Critically Endangered (CR) according to the Red Book of Turkish Plants and is protected due to its limited natural distribution in the provinces of Konya and Afyonkarahisar, as well as around Lake Eber and Akşehir. The species is a legume, perennial, herbaceous plant with rhizomes and yellow flowers. Its flowering period is May and June. The project aims to obtain pure lines of the piyan plant, a crucial genetic resource for Turkiye, through haploidization.

Keywords: Endemic, haploidization, pure line, Vuralia turcica

Acknowledgement: The financial support from the Scientific Research Projects Coordination Unit of Mersin University (Project code: 2023-1-AP3-4904) is deeply appreciated.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Investigation of the relationships between body weight, body measurements and testicular measurements in saanen kids

Murat Durmus[1] [0000-0002-4221-7449] and Melis Celik Güney[1] [0000-0002-6825-6884]

[1] Cukurova University, Adana, 01250, Türkiye

celikm@cu.edu.tr

Abstract: This study was conducted to investigate the relationships between body weight, body measurements and testicular measurements in Saanen kids. For this purpose, 45 male Saanen kids obtained from goats with synchronized births were used. Body weight (BW), body measurements such as withers height (WH), rump height (RH), body length (BL), chest depth (CD), chest girth (CG) and testicular measurements such as testicular diameter (TD), testicular length (TL), scrotal circumference (SC), scrotal length (SL), scrotal volume (SV), testicular volume (TV) were measured in the kids in the first 3 months after birth. The overall mean values of WH, RH, BL, CD, CG, TD, TL, SC, SL, SV, TV and BW of the Saanen kids were 48.19±0.44 cm, 47.58±0.54 cm, 45.02±0.45 cm, 17.69±0.23 cm, 47.30±0.54 cm, 2.01±0.05 cm, 3.95±0.09 cm, 9.70±0.27 cm, 56.25±1.37 cm, 43.33±2.38 cm^3, 17.34±1.41 cm^3 and 11.46±0.25 kg, respectively. The mean values for body weight, body measurements and testicular measurements differed significantly between all months ($p < 0.01$). The correlation coefficient between SC and TV was highest ($p < 0.01$) except for month 1. In the first month, the correlation coefficient between WH and RH was the highest, the correlation coefficient between SC and TV was the second highest ($p < 0.01$).

Keywords: Body measurement, Testicular measurement, Saanen, Correlation.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Justification of the parameters of the ripper and the coulter of the seeder, sowing seeds of repeated crops on untreated soil

Nargiza Temirkulova[1, [0009-0003-5791-8250]], Iroda Tadjibekova[1, [0009-0005-8093-1968]], Sobir Nurmanov[1, [0009-0007-0870-4802]]

[1]Tashkent State Agrarian University, Tashkent, 100700, Uzbekistan

temirkulovanargiza7@gmail.com

Abstract: One of the leading places in the world is occupied by the development and application of technologies and technical means of sowing seeds on untreated soil. The great importance is the creation and production of machines and devices that allow planting seeds of agricultural crops on untreated soil with high quality and yield in one pass. In the world, targeted research is being carried out to develop scientific and technical foundations for improving energy- and resource-saving technologies for sowing seeds of repeated crops in crop-free and winter fields, create new models of machines and installations for their implementation, as well as improve the quality of work and reduce energy and material consumption. In particular, in this direction, the development of a constructive scheme of a seeder capable of sowing seeds of repeated crops in fields freed from early crops and winter grains, and the justification of the technological process of work. One of the most pressing issues is the conduct of scientific research based on parameters that ensure the resource efficiency of the interaction of its working bodies with the soil.

Keywords: two-disc seeder, direct seeding, repeated crops, seeder, no-till, ripper, coulter, parameters, moisture conservation.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Mesenchymal stem cells and hippocampal neurogenesis in cns disorders: paracrine and cellular mechanisms

Neriman EZGIN[1] [0000-0002-7016-2334], Kadriye KURSUN[2] [0000-0001-95337391], Dragan HRNCIC[3] [0000-0003-0806-444X], Mikail BAYLAN[2] [0000-0002-6299-5811]

[1]Department of Biotechnology, Institute of Natural and Applied Sciences, Cukurova University, Adana, Turkiye
[2] Department of Animal Science, Faculty of Agriculture, Cukurova University, Adana, Turkiye
[3] Institute of Medical Physiology "Richard Burian" Belgrade University Faculty of Medicine, 11000 Belgrade, Serbia

kadriyehatipoglu01@gmail.com

Abstract: Adult hippocampal neurogenesis plays a pivotal role in cognitive function, memory consolidation, and neural plasticity. However, its decline in neurodegenerative and neuroinflammatory conditions such as Alzheimer's disease, Parkinson's disease, traumatic brain injury (TBI), and multiple sclerosis (MS) necessitates the development of regenerative therapies. Mesenchymal stem cells (MSCs) and their derivatives have emerged as promising agents in this regard, due to their unique capacity for immunomodulation, neuroprotection, and paracrinesignaling. This review explores the cellular and acellular mechanisms by which MSCs enhance hippocampal neurogenesis, focusing on critical signaling pathways including BDNF, PI3K/AKT, ERK/CREB, and Wnt. We examine preclinical and clinical evidence supporting the efficacy of MSCs, neural stem cells derived from MSCs (MSC-NSCs), MSC-derived extracellular vesicles (MSC-Exos), and genetically modified MSCs. The therapeutic relevance of MSCs is further highlighted in organoid and iPSC-based models, illustrating their translational potential. We also discuss emerging strategies to overcome limitations in MSC survival, homing, and differentiation capacity. Overall, this review underscores the multifaceted role of MSCs in targeting hippocampal neurogenesis and offers insight into future directions for stem cell-based interventions in central nervous system disorders.

Keyword: Stem cell, neurogenesis, neuroplasticity

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Microwave-assisted foam drying of cauliflower leaf puree for sustainable waste valorization

Damla Su SİVRİ[10000-0002-6584-9465], Sevil KARAASLAN[1] [0000-0002-2289-8005], Hürkan Tayfun VAROL[1] [0000-0001-7782-6554]

[1]University of Applied Sciences, Faculty of Agriculture, Department of Agricultural Machinery and Technologies Engineering, Isparta, Türkiye

sevilnkaraaslan@gmail.com

Abstract: Cauliflower (Brassica oleracea var. botrytis) leaves, representing a substantial post-harvest by-product, were valorized via microwave (MW) and hot air-assisted microwave (MW-HAD) drying of leaf puree to promote sustainable waste management. The study systematically assessed the effects of MW power (1.8 Wg^{-1}–9 Wg^{-1}) and hot air temperatures (100–160 °C) on drying kinetics, color preservation, and energy efficiency. Increasing MW power significantly reduced drying time, from 63 min at 1.8 Wg^{-1} to 9 min at 9 Wg^{-1}. Hot air assisted microwave drying at low to moderate MW powers, while its effect was minimal at higher powers. Color analysis revealed pronounced browning and lightness reduction at high MW powers, whereas moderate conditions (3.6 Wg^{-1}–130 °C) maintained greenish tones and minimized total color deviation (ΔE). Energy assessment indicated superior efficiency of MW drying over HAD, with lowest specific energy consumption observed at intermediate powers. Overall, MW-HAD at 3.6 Wg^{-1}–130 °C provided an optimal compromise between processing efficiency, energy use, and product quality, highlighting a practical approach for transforming cauliflower leaf waste into a value-added product.

Keywords: cauliflower leaves, waste valorization, microwave drying, hot air-assisted drying, color preservation, energy efficiency

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Effects of mycorrhizal inoculation and different irrigation levels on growth parameters and water use efficiency of tomato

Burak Dalkılıç[1] [0000-0002-5317-2186]*, Lale Ersoy[2] [0000-0002-0215-704X], Fatma Beyza Güneş[1] [0009-0000-6133-5400]

[1]Malatya Turgut Özal University, Faculty of Agriculture, Department of Biosystems Engineering, Malatya
[2]Malatya Turgut Özal University, Faculty of Agriculture, Department of Horticulture, Malatya

burak.dalkilic@ozal.edu.tr

Abstract: This study was conducted to determine the effects of mycorrhizal inoculation and different deficit irrigation levels (I_{100}: full irrigation, I_{67}: 67% irrigation, I_{33}: 33% irrigation) on the morphological characteristics of tomato plants under unheated greenhouse conditions at Malatya Turgut Özal University, Faculty of Agriculture, Department of Horticulture. The experiment was arranged in a split-plot design with three replications, including two mycorrhiza treatments (inoculated (M+) and non-inoculated (M^-)). The results showed that mycorrhiza and irrigation levels had statistically significant effects on plant height, stem diameter, fresh biomass, and dry biomass. Plant height ranged between 82.5–121.1 cm, stem diameter between 14.3–17.2 mm, fresh biomass between 211.7–686.7 g plant^{-1}, and dry biomass between 47.7–152.0 g plant^{-1}. The highest values were obtained from the M^+I_{100} treatment. Mycorrhizal application improved plant growth and water use efficiency, showing particularly positive effects under deficit irrigation conditions.

Keywords: Tomato, mycorrhiza, deficit irrigation, irrigation scheduling, water use efficiency

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Modeling global warming by almon debiased two-step shrinkage estimator

Selma TOKER KUTAY[1,*] [0000-0002-4557-1646], Nimet ÖZBAY[2] [0000-0003-3840-3107], and Hakan EYGÜ[3] [0000-0002-4104-2368]

[1] Çukurova University, Department of Statistics, Adana, 01250, Türkiye
[2] Çukurova University, Department of Statistics, Adana, 01250, Türkiye
[3] Atatürk University, Department of Econometrics, Erzurum, 25240, Türkiye

*stoker@cu.edu.tr

Abstract: Severe multicollinearity can arise in Almon distributed lag model, so estimated coefficients obtained from Almon estimator have inflated variance and switched signs, be imprecise, unstable, and difficult to interpret. A reasonable solution to the problems arising from the multicollinearity is to focus on biased estimation techniques. In the Almon distributed lag model, estimators that have two biasing parameters perform better than one-parameter biased estimators in eliminating multicollinearity. From this perspective, new Almon two-step shrinkage estimator and debiased Almon two-step shrinkage estimator that overcome the negative effects of the multicollinearity problem are proposed in the Almon distributed lag model, in this study. The selection process of the biasing parameters of the proposed new two-parameter estimators is very important because these biasing parameters have direct impact on the performance of these estimators. Mathematical programming approach is used to determine the biasing parameters instead of the classical method, which is complex, subjective and controversial. In order to show how the biasing parameters obtained by the proposed mathematical programming approach affect the performance of the new estimators, a data analysis to model global warming is performed.

Keywords: Almon Distributed Lag Model, Global Warming, Two-parameter Estimator.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Monthly vs daily penman–monteith estimates of reference evapotranspiration: a 65-year record from Adana, Turkiye

Mahmut Cetin[1] [0000-0001-5751-0958], Omar Alsenjar[1] [0000-0001-9471-794X], Volkan Çatalkaya[2] [0000-0002-8078-3548], Ali Demir Keskiner[3] [0000-0002-7930-9363], Hakan Aksu[4] [0000-0003-4686-7446]

[1]Department of Agricultural Structures and Irrigation, Cukurova University, Adana, Türkiye
[2]Directorate of Eastern Mediterranean Agricultural Research Institute, Adana, Türkiye
[3]Department of Agricultural Structures and Irrigation, Sanliurfa, Harran University, Türkiye
[4]Department of Meteorological Engineering, Samsun University, Samsun, Türkiye

oalsenjar@cu.edu.tr; omarsenjar@yahoo.com

Abstract: The present study evaluates reference evapotranspiration (ETo) using long-term meteorological data acquired from the Adana meteorological station in Türkiye, covering 1960–2024. The Penman–Monteith approach was applied at the monthly scale using only monthly climatic inputs, and results were compared with monthly ETo obtained by aggregating daily Penman–Monteith calculations. Statistical analysis with Pearson's correlation and paired t-tests indicated no significant differences between the two approaches, with strong agreement (r = 0.99; mean bias = −0.92 mm). Accordingly, in settings where daily climatic records are unavailable or incomplete, monthly-input Penman–Monteith provides a reliable and practical alternative for estimating monthly ETo. This equivalence reduces data demands for retrospective assessments and planning. The outcomes offer valuable implications for hydrological modeling, irrigation scheduling, water-resources planning, and climate-impact assessments in Mediterranean environments and similar data-limited regions. In conclusion, analysis of the 65-year record supports the statistical equivalence of monthly-input and daily-based approaches for estimating monthly ETo. We recommend adopting the monthly-input method as the standard fallback in data-limited settings, with periodic cross-checks against daily-based results when available.

Keywords: Reference Evapotranspiration (ETo), Penman–Monteith, Monthly Versus Daily Climate Data, Method Validation, Mediterranean Semi-Arid Climate

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

The effect of vermicompost application under Mustafa Kemalpaşa conditions on the yield and yield components of some chickpea varieties (cicer arietinum l.)

Abdullah KARASU [1]* [0000-0002-9621-3857], Gökçe Özcan [1][]

[1] Bursa Uludağ University, Faculty of Agriculture, Field Crops

akarasu@uludag.edu.tr

Abstract: The research was conducted in 2019 on farmers' land in the Mustafakemalpaşa district of Bursa to determine the effects of 4 different solid vermicompost application doses (0 kg/da, 100 kg/da, 200 kg/da, 300 kg/da) on the yield and yield components of local genotypes and Azkan chickpea varieties. Statistically significant differences were found between the varieties at the 5% probability level in terms of plant height, number of branches per plant, number of grains per plant, and protein content, and at the 1% probability level in terms of 100-grain weight and grain yield. Statistically significant differences were found at the 5% probability level in terms of fertilizer dose. The interaction between variety x fertilizer dose was found to be significant at the 5% probability level in terms of plant height. Chickpea varieties and genotypes were found to have plant height ranging from 32.0 cm to 43 cm, first pod height from the ground ranging from 19.0 to 21.6 cm, number of branches per plant ranging from 5.4 to 6.0 units/plant, number of pods per plant ranging from 7.2 to 10.5 units/plant, number of seeds per plant ranging from 7.1 to 10.0 units/plant, 100-seed weight ranging from 33.4 g to 43.1 g, grain yield ranging from 91.3 to 117.8 kg/da, and protein content ranging from 21.9 to 22.7%.

Keywords: Worm castings, chickpea, yield, yield components

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Perennial grain crop development: "the moonshot idea"

Muhammet Sakiroglu[1,2] [0000-0002-7024-4348], Lee DeHaan[1] [0000-0002-6368-5241], Phenoah Nabukulu[1] [0000-0003-3699.744X], Brandon Schlautman[1] [0000-0002-7076-3519], Kathryn Turner[1] [0000-0003-0835-6506], Laura van der Pol[1] [0000-0002-9340-5985], David van Tassel[1] [], Shuwen Wang[1] [0000-0001-9415-0592]

[1]The Land Institute, Salina KS, USA
[2] Adana Alparslan Türkeş Science and Technology University, Adana Türkiye 01250

msakiroglu@gmail.com

Abrasct: The current agricultural production model structured around monoculture of annual crops poses significant challenges for the global food security and ecosystem sustainability as it reduces soil health, decreases biodiversity, disrupts nutrient cycling, increases water use and elevates greenhouse gas emissions. The efforts to find a sustainable alternative largely pointed to the perennial grain crops as they can prevent soil erosion, reduce chemical dependency, elevate soil nutrient cycling and use, and increase carbon sequestration while providing the required nutrition. Nonetheless, developing perennial grain crop alternatives with a required speed, scale, justice, and equity would require years of coordinated and intensified efforts across the globe. The Land Institute (KS, USA) has been leading the efforts to develop perennial grain crops as well as their adoption. Two main approaches are taken to develop perennial grain crops. The first approach focuses on wide hybrid creation between current annual crops whereas the second approach is de novo domestication of the perennial wild crop candidates. Perennial wheat and perennial sorghum development efforts are underway using wide hybrids after successful release of perennial rice. De novo domestication efforts are underway in *Silphium integrifolum* (Silflower) as a perennial oilseed crop and in *Onobrychis viciifolia* (as Baki beanTM) after successful domestication of Kernza from intermediate wheatgrass (*Thinopyrum intermedium*). The efforts, the progress of perennial grain crops would help communicate the diversified perennial grain vision and build collaboration efforts to achieve this goal across the globe.

Keywords: Perennial grain crops, domestication, breeding, sustainable agriculture

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Characterization of biochemical and aromatic compounds in 'tainung' papaya (*carica papaya* l.) Cultivar grown in Turkiye

Gözde Nogay[1] [0000-0002-8740-2859], Yakup Polat[2] [0000-0002-5831-8199], Esra Ekşi[2] [0000-001-7454-0833], Adem Özaslandan[1] [0000-0001-7129-8543], Nesibe Ebru Kafkas[2] [0000-0003-3412-5971]

[1]University of Mersin, Mut Vocaional School, Mersin, Türkiye
[2]University of Çukurova, Faculty of Agriculture, Department of Horticulture, Adana, Türkiye

gozdenogay@gmail.com

Abstract: Papaya (Carica papaya L.) is one of the most important fruit species cultivated in tropical and subtropical regions. Although it is a typical tropical fruit tree, it can also be successfully grown in subtropical areas with favorable microclimatic conditions. The Mediterranean region of Türkiye has considerable potential for papaya cultivation due to its subtropical climate. Easy cultivation, rapid growth, high adaptability, and short economic return period make papaya an alternative crop that could be expanded in Türkiye. Papaya fruits are not only consumed as food but are also valued for their positive health effects. Rich in vitamins A, B, and C as well as essential minerals, papaya provides bioactive compounds with significant health-promoting properties. These include antioxidant, anti-inflammatory, anticancer, and digestive regulatory effects, which make papaya widely used in traditional medicine and attractive for the food, cosmetic, and pharmaceutical industries. This study aimed to investigate the biochemical composition and volatile aroma compounds of the papaya cultivar 'Tainung' grown greenhouse under the ecological conditions of Akdeniz district, Mersin (Mediterranean region, Türkiye). The results showed that the total antioxidant (DPPH) activity was 39.19% and the total phenolic content was 25.09 mg GAE/100 g. Four sugars were identified (sucrose, glucose, fructose, xylose), with glucose (3675.66 mg/100 g) and fructose (3799.94 mg/100 g) being the most abundant. Among organic acids, citric acid (567.17 mg/100 g) and ascorbic acid (88.50 mg/100 g) were dominant. Volatile compound analysis revealed a total of 33 compounds (8 aldehydes, 9 alcohols, 3 esters, 5 acids, and 8 ketones), with acids, aldehydes, and alcohols as the predominant groups. The

most abundant volatiles were butanoic acid (48.82%), acetaldehyde (6.40%), and ethanol, 2-methoxy-, acetate (8.66%). These findings indicate that papaya grown under Mediterranean ecological conditions possesses a rich biochemical composition and a distinct aroma profile. Particularly, its high antioxidant activity, phenolic content, and ascorbic acid levels highlight the potential of papaya as a functional food with significant health benefits. The results provide a scientific basis for promoting papaya cultivation in Türkiye and enhancing its utilization in health-related and industrial applications.

Keywords: Aroma profile, Biochemical composition, *Carica papaya* L,Sugars and organic acids.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

The effect of mineral and organic-mineral fertilizer rates on the productivity and soil fertility of mixed sorghum-pea crops in the field.

Allahverdiyev Elkhan Rajaboglu[1]

[1]Azerbaijan State Agrarian University, Ganja, Azerbaijan

elxan_recebli@mail.ru

Abstract: The article explores methods to increase productivity by utilizing stubble fields efficiently and obtaining two harvests from a single area within one year. For this purpose, optimal fertilizer rates were determined to enhance the green mass yield of sorghum and pea plants sown in mixtures on stubble fields. Research was conducted on the historically irrigated gray-meadow soils of the Karabakh region. It was found that when mineral fertilizers were applied at the rate of N120P150K150 per hectare to the mixed crops of sorghum and peas grown on stubble fields, a higher yield of green mass was achieved. In conclusion, we conclude that when manure is applied as mineral and organic-mineral fertilizer at a rate of 10t/ha + N70P125K90, the green mass yield of sorghum and pea plants mixed in the fallow significantly increases. When manure is applied as mineral and organic-mineral fertilizer at a rate of 10t/ha + N70P125K90 on long-irrigated gray-grass soils, the green mass yield of sorghum and pea plants mixed in the fallow increases significantly, which increases the amount of organic biological substances in the soil. These organic biological substances have a positive effect on improving soil fertility. This gives reason to say that mixed crops cultivated in the fallow are considered good predecessors for plants that will be sown after them.

Keywords: Mineral fertilizer, organic fertilizer, fertility, productivity, soil fertility, mixed sowing.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

The effects of foliar application of vermicompost, humic acid, and seaweed liquid fertilizers on the growth and development of forage soybean varieties

Zübeyir AĞIRAĞAÇ[1] [0000-0003-1414-1472], Muhammed ÖZTÜRK[2], Şeyda ZORER ÇELEBİ[3] [0000-0003-1278-1994]

Van Yüzüncü Yıl University, Faculty of Agriculture, Department of Field Crops, Van, Türkiye

zubeyiragiragac@yyu.edu.tr

Abstract: This study was conducted in the climate chamber of the Department of Field Crops, Faculty of Agriculture, Van Yüzüncü Yıl University, using a randomized plot design with three replications. The plant materials consisted of forage soybean [Glycine max (L.) Merr.] varieties "Yemsoy" and "Yeşilsoy." DAP was applied as the basal fertilizer, while seaweed extract, humic acid, and vermicompost were used as foliar fertilizers. The results indicated that the application factor had a significant effect at the 1% level on stem, fresh, dry, and leaf weights. The variety factor was significant for fresh weight (5%), leaf weight (1%), leaf ratio (5%), and stem ratio (5%). The application × variety interaction was significant only for dry weight at the 1% level. According to the findings, no significant difference was observed between varieties in terms of stem weight. The highest value was obtained from vermicompost with 3.84 g, while the lowest was recorded in the control plots with 2.49 g. For fresh weight, Yemsoy (12.82 g) was higher than Yeşilsoy (11.93 g); among the applications, the highest value was obtained from vermicompost (14.37 g), whereas the lowest was recorded in the control (10.45 g). Regarding dry weight, the highest value was obtained from seaweed (4.47 g) and the lowest from the control (3.20 g). When the varieties were compared, Yemsoy showed a higher leaf ratio (75.5%) than Yeşilsoy (73.38%), while Yeşilsoy had a higher stem ratio (26.62%) compared to Yemsoy (24.50%). No statistically significant differences were detected among applications in terms of leaf and stem ratios.

Keywords: Seaweed, Humic acid, Forage soybean, Vermicompost

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

The status of agricultural literacy in curriculum: the example of Turkiye

Hamide Kılıç[1] [0000-0002-4034-1948]

[1] Manisa Celal Bayar University, Manisa, TÜRKİYE

hamide.kilic@cbu.edu.tr

Abstract: In today's world of Agriculture 5.0, another important topic of discussion is improving individuals' agricultural literacy. Agricultural literacy was defined in the United States in 1988, and it was stated that all students, from kindergarten to high school, should be taught agricultural content in addition to vocational courses in their school curricula. The National Agricultural Literacy Outcomes (NALOs) were published by members of NCAL and the multistate research committee. These outcomes provide learning objectives organized in five themes to tie agricultural concepts to appropriate K12 educational standards. The National Agricultural Literacy Curriculum Matrix houses lessons as a free-to-download database, categorized by NALOs and curriculum standards NALOs outcomes consists of 5 themes. This study compared the new curriculum in Türkiye, which transitioned to skills-based education in 2024, with NALOs outcomes and examined the agricultural content included in these curricula. The distribution of matching learning outcomes by theme shows that the Agriculture and the Environment theme 63, the Culture, Society, Economy &Geography theme 21, the Plants and Animals for Food, Fiber & Energy and the Food, Health & Lifestyle themes each have 4 learning outcomes. No learning outcomes were found to match the Science, Technology, Engineering & Mathematics theme.

Keywords: Agricultural Literacy, Türkiye, Curriculum, NALOs outcomes

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Sustainability assessment of natural fibers used in the textile industry: a literature review

Hakan GÜNEY[1] [0009-0003-6991-2569], Serdal SIRLIBAŞ[1] [0000-0002-0926-6791], Bülent SARI[2] [0000-0002-5171-9491], Melis ÇELİK GÜNEY[3] [0000-0002-6825-6884]

[1]BOSSA Trade and Industry Enterprises T.A.S. Adana/Türkiye
[2]Cukurova University, Faculty of Engineering., Department of Environmental Engineering, Balcali/Adana/Türkiye
[3]Cukurova University, Faculty of Agriculture, Department of Animal Science, Balcali/Adana/Türkiye

melisguneycelik@gmail.com

Abstract: The textile industry uses natural and/or synthetic fibers as raw materials. Global climate change is impacting the production potential of natural fibers by increasing pressure on air, soil, and water resources. Consequently, the production of these fibers, which the sector requires, faces significant sustainability challenges. This literature review examines the natural fibers commonly used in the textile sector cotton, linen, hemp, wool, bamboo, and others comparatively, based on environmental, economic, and social sustainability criteria. Each fiber's production process was evaluated, along with factors such as water consumption, chemical input requirements, carbon and water footprint, biodegradability, soil health impacts, and production conditions. The findings indicate that the sustainability performance of fibers varies significantly depending on fiber type, production method, and geographical conditions. This review aims to assess the impact of natural fibers on sustainable fashion and circular textile systems, providing guidance for future research and industry applications.

Keywords: Natural Fibers, Global Climate Change, Water Footprint, Carbon Footprint

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

The use of phytochemicals as functional additives in poultry nutrition

Sabuhí N. Mammadov[1]

[1]Azerbaijan State Agricultural University, Atatürk Avenue 450, AZ2000, Ganja, Azerbaijan

msebuhi525@gmail.com

Abstract: Ensuring poultry health, promoting optimal growth, and maintaining high productivity depend on balanced diets and appropriate housing conditions. For decades, antimicrobial agents were extensively employed to control bacterial diseases and enhance performance. Nevertheless, their uncontrolled application and subsequent accumulation in animal tissues have contributed to the emergence of microbial resistance mechanisms, which has complicated the prevention of bacterial infections. Limitations on antibiotic usage have also produced unfavorable economic consequences for the poultry sector. Against this background, identifying effective alternatives to antibiotics has become a major focus of scientific research. Recently, increasing attention has been directed toward phytobiotics, biologically active plant-derived compounds. These substances exhibit anti-inflammatory, antioxidant, antimicrobial, and antiparasitic effects and demonstrate promising applications in livestock production, including poultry. Although numerous plant-based extracts are now available, their modes of action require further in-depth investigation, particularly in relation to the physiological characteristics of poultry. This review highlights the potential of phytobiotics in modern poultry farming and examines the scientific rationale for their use as substitutes for antimicrobial agents.

Keywords: poultry, poultry nutrition, plant extracts, feed antibiotics, resistance

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Theoretical foundations of forming working fluids into highly dispersed droplets using aerial vehicles

Khusniddin Doniyorovich Irisov[1] [0000-0001-9555-8813], Farida Isakova[1] [0000-0003-2988-7816], F.Kurbonov[1]

Tashkent State Agrarian University, University street 2, Qibray area, Tashkent reg. 100140, Uzbekistan

husniddin_bek@mail.ru

Abstract: The article discusses the possibility of applying precision and smart agriculture while reducing the environmental impact of chemical treatments, associated with drones that form highly dispersed droplets. This allows for the protection of agricultural, medicinal, and other plants from pests and diseases, as well as targeted fertilization with liquid mineral fertilizers during the growing season, ensuring uniformity of nutrient concentration. The targeted use of drones in various agricultural operations can reduce labor requirements and also decrease working time. The hydraulic systems of UAVs and their working elements are aimed at improvement and are relevant issues of today. In addition, with the help of a special camera installed on the UAVs, image processing over the internet and machine learning algorithms assist in studying the precise results of agricultural activity, future achievements, shortcomings, and challenges. The article also examines the hydro-and aerodynamic forces acting on a thin curtain of liquid ejected from the annular slot of a turbulent tedder developed by the authors.This technological process investigates the stages of destruction of a two-phase (air-droplet) jet, resulting in the formation of large droplets, the physical essence of the Weber number, and elaborates on the likelihood that small droplets have probabilistic characteristics. The ability of the working medium to break down under the influence of modifiers is assessed by the increase in the Weber number. ($10 \leq We_{кр} \leq 10^5$). Using the UAVs, it was found that for fan spray nozzles the Weber number We=42, while for the proposed turbulator spray nozzles during the spraying of two-phase flow We=85, which confirmed the validity of the working hypothesis.

Key words: UAV, tedder, turbulence, droplets, hydrodynamics, aerodynamics, dispersity.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Theoretical study of the width and height of the feeding window in livestock farming

Dilshod Khudaynazarov[1] [0000-0002-9311-4730], Fakhriddin Karshiev[2] [0009-0003-3067-7418], Khusniddin Alimardonov[3] [0000-0002-9724-4751], Abdujalil Sangirov[3], Mingjin Yang[4] [0009-0004-0681-5638]

[1]Tashkent State Technical University, university str. 2, Tashkent 100095, Uzbekistan
[2]Termez State University, 43, Barkamolavlod str., Termiz, 190111, Uzbekistan
[3] Yangiyer Branch of Tashkent Institute of Chemical Technology, Tinchlik street, 1, Yangiyer city, Sirdarya, Uzbekistan
[4] College of Engineering and Technology, Southwest University, Chongqing 400715, China;
[4] Chongqing Key Laboratory of Intelligent Agricultural Machinery Equipment for Hilly and Mountainous Regions, Chongqing 400715, China

Xudoynazarov.Dilshod@inbox.ru

Abstract: An analysis of current technologies forgrinding, mixing and distributing feed for livestock in livestock farms around the world has shown that since the existing equipment is intended for large industrial livestock farms with a large production volume, it is unprofitable to use them in small livestock farms and dehkan (personal assistant) farms or it is inconvenient to use them in all respects. In addition, their large metal capacity and energy consumption, high cost, require significant costs for delivery, installation, operation and technical service. Therefore, there is a problem of improving and developing technology and technological means for small family farms in the direction of reducing the energy consumption of technological processes. Therefore, in this research work, despite the fact that a lot of research has been conducted on improving the quality of roughage distribution, taking into account the above, additional theoretical and experimental studies were conducted to justify the shape and parameters of the working parts of the distribution device, which will develop specific requirements and aspects of distributing feed to livestock. According to the conducted studies, the spreader device that distributes the nutrients at the same rate depends to a large extent on the height and width of the device's discharge window. Therefore, the article theoretically investigated the height and width of the feed feeder's discharge opening.

Keywords: Shovels, rotor, roughage, ground corn, ground straw, ground alfalfa, bunker.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Effect of litter type on some welfare criteria, growth performance, and carcass characteristics in broiler chickens

Shalala ZEYNALOVA[1] [0000-0002-5563-3396] and Latif KARIMLI[2]

[1]Faculty of Veterinary Medicine at the Azerbaijan State Agrarian University (ADAU)

shalala.zeynalova@adau.edu.az

Abstract: Broiler chicken farming is a breeding method in which chicks obtained from hybrid lines of chickens are intensively raised in poultry houses with deep litter until they reach the age of 35–48 days, after which they are slaughtered and offered for consumption. The rearing of broiler chicks is typically carried out intensively in large-capacity poultry houses with deep litter. Various materials are used as litter, including sawdust, straw, wheat, barley, rye, oats, corn cobs, rice husks, cottonseed hulls, cocoa beans, sugarcane bagasse, sand, clay, processed and granulated paper, and plastic. It is important that the litter used in broiler chicken farming has good moisture retention and microbial resistance, is soft and quick-drying, is neither too coarse nor too fine, has low thermal conductivity and insulating properties, does not harm the health of the animals, allows them to express natural behaviors easily, and is cost-effective. This study was conducted with the aim of determining the influence of different types of litter used in broiler chicken rearing on certain animal welfare criteria, growth performance, and carcass characteristics.

Keywords: chicken, litter, broiler

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Effect of loading speed and axes on the mechanical properties of safflower seeds

Şerife Aysuhan GEDİK[1] [0009-0001-8504-7427], Şaziye DÖKÜLEN[2] [0000-0003-2767-7604], Ebubekir ALTUNTAŞ[3] [0000-0003-3835-1538]

[1]* Tokat Gaziosmanpaşa University, Institute of Science, Department of Biosystems Engineering, Tokat, Turkiye.
[2] Tokat Gaziosmanpaşa University, Faculty of Agriculture, Department of Field Crops, Tokat, Turkiye.
[3] Tokat Gaziosmanpaşa University, Faculty of Agriculture, Department of Biosystems Engineering, Tokat, Turkiye.

aysuhangedik9@gmail.com

Abstract: In this study, the mechanical properties (rupture force, deformation, rupture energy, and force required for rupture) of seeds belonging to two different aspir varieties (Shifa and Remzibey-05) were determined based on different moisture contents, loading axes, and loading speeds. In the experiments, three different moisture levels, three loading axes, and three loading speeds were used. When the results of the mechanical tests were examined in general, it was observed that the load axis and loading speed affected the seeds at different moisture contents. In the Shifa and Remzibey-05 varieties, the effect of the load axis averages on the rupture force, deformation, rupture energy, and force required for rupture was found to be significant at the $p<0.01$ level. The highest rupture force among the varieties was obtained in the Shifa variety at 54.10 N with 6.36% moisture content on the y-axis and a loading speed of 30 mm min^{-1}, while the lowest rupture force was obtained in the Remzibey-05 variety at 24.83 N with a moisture content of 6.08% on the x-axis at a loading speed of 30 mm min^{-1}. The results obtained for mechanical properties are considered to be important engineering data that can be used in the design, production, development, and operation of machines and systems to be used in post-harvest processing technologies.

Keywords: Safflower, moisture content rupture force, rupture energy

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Carbon dioxide emission from fuel use in Turkiye's wheat, sugar beet, and potato production and future projection estimate

Ebubekir ALTUNTAŞ[1] [0000-0003-3835-1538]

[1] Tokat Gaziosmanpaşa University, Faculty of Agriculture, Department of Biosystems Engineering, Tokat, Turkiye.

ebubekir.altuntas@gop.edu.tr

Abstract: In this study, carbon dioxide emissions from fuel use in wheat, sugar beet, and potato production between 2015 and 2024 (10 years) were determined in Türkiye, and projections for 2025-2034 were examined. The average total carbon dioxide emissions (TCOE) values from fuel use in Türkiye's wheat, sugar beet, and potato production were 1148.29 $ktCO_2$, 101.29 $ktCO_2$, and 20.81 $ktCO_2$, between 2015 and 2024, respectively; the specific fuel consumption (SpFC) values were 16.47 g_{fuel} $kg_{product}^{-1}$, 1,85 g_{fuel} $kg_{product}^{-1}$, and 1,28 g_{fuel} $kg_{product}^{-1}$, and the specific carbon dioxide emissions (SpCE) values were determined to be 56.31 gCO_2 $kg_{product}^{-1}$, 6.32 gCO_2 $kg_{product}^{-1}$, and 4.37 gCO_2 $kg_{product}^{-1}$, respectively. In Türkiye's projections for the years 2025-2034, it is anticipated that the TCOE, SpFC, and SpCE values for wheat, sugar beet, and potato, production will show an upward trend.

Keywords: Carbon dioxide emission, fuel consumption, projection

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Effects of lysophosphatidylethanolamine (lpe) and antimicrobial combinations on vase life and water balance of gerbera jamesonii cut flowers

Onur Sefa ALKAÇ[1] [0000-0002-1948-7627] and Osman Nuri ÖCALAN[1] [0000-0001-6242-4667]

[1]Tokat Gaziosmanpasa University, Tokat 60100, Türkiye

osmannuri.ocalan@gop.edu.tr

Abstract: Cut Gerbera jamesonii flowers rapidly lose postharvest quality due to vascular blockage and water imbalance. Therefore, this study aimed to evaluate the effects of lysophosphatidylethanolamine (LPE), citric acid, streptomycin, and their combinations on vase life and water relations of gerbera cut flowers. Uniform stems (40 cm) obtained from a commercial greenhouse were placed into 500 mL vase solutions containing control (distilled water), streptomycin (200 mg L-1), citric acid (200 mg L-1), streptomycin + citric acid, LPE (1 mL L-1), LPE + citric acid, LPE + streptomycin, and LPE + citric acid + streptomycin. The experiment was arranged in a completely randomized design with three replications. The highest daily vase solution uptake on day 0–2 was observed in streptomycin (71.9 mL) and citric acid (71.6 mL) treatments, whereas the lowest was in LPE + citric acid + streptomycin (60.8 mL). Total water uptake was highest in the control (89.6 mL), followed by streptomycin (75.3 mL) and LPE (64.8 mL). Relative fresh weight remained above 98% until day 6 in LPE and streptomycin treatments but dropped below 85% in the combined LPE + citric acid + streptomycin group by day 8. Vase life was significantly extended by LPE (18.1 days) compared to control (16.7 days) and citric acid (14.4 days). Overall, LPE treatment alone effectively improved water balance, delayed senescence, and enhanced the ornamental quality of Gerbera jamesonii cut flowers, suggesting its potential as an eco-friendly preservative component.

Keywords: Ethylene Inhibitor, Vase Life, Petal Senescence, Water Uptake, Antibacterial.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Effects of some natural organic additives in vitro plant propagation

Betül Ayca DÖNMEZ-TELEK[1,2] [0000-0002-7631-7384], Şule Polat[2] [0009-0005-9131-9694], Awara Muhammad HAMAKHAN[3][0000-0003-2351-4453], and Nesibe Ebru KAFKAS[2] [0000-0003-3412-597]

[1]University of Kirsehir Ahi Evran, Kirsehir 40100, Türkiye
[2]University of Cukurova, Adana 01330, Türkiye
[3]Sulaimani Polytechnic University, Kurdistan Region Government KRG, Iraq

ebru@cu.edu.tr

Abstract: Tissue culture is a technique that enables the rapid and large-scale multiplication of plants using any parts of them under aseptic conditions. Its success depends on various factors, including the plant species and cultivar, type and age of the explant, culture conditions, and the composition of the culture medium. Determining the specific nutritional requirements of plants can be challenging in tissue culture studies which makes the optimization of culture media components is essential. However, the high cost of some medium components has driven the search for alternative, low-cost organic additives that do not compromise plantlet quality. Numerous studies have investigated the effects of organic growth additives on plant development. Commonly used complex organic additives are plant extracts such as coconut water (CW), banana extracts, and a variety of fruit juices; casein hydrolysate (CH), yeast extract (YE) etc. These additives provide natural carbon sources and are rich in vitamins, phenolic compounds, fiber, hormones, proteins, lipids, and minerals. Previous studies have demonstrated that modification of medium composition with natural complex additives can induce cell division, stimulate callus formation, and support both rooting and shoot development. Determining the optimum concentration of these additives is crucial for promoting plant or cell growth and development. This review will focus on the effects of supplementing culture media with coconut water, banana extract, and casein hydrolysate as organic additives on in vitro plant growth and development. Understanding the effects of these natural additives may prove valuable for plant species that have not yet been investigated in this respect, offering a foundation for future research.

Keywords: tissue culture, organic additives, in vitro propagation

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Effects of putrescine and boron treatments on plant, fruit and seed charasteristics in melon (*cucumis melo* l.)

Pınar ADIGÜZEL[1] [0000-0001-7971-2518], Şenay KARABIYIK[2] [0000-0001-8579-6228], Merve ADIGÜZEL[3] [0009-0001-2428-0452], Yaren Hüsne CİRİTÇİ[4] [0009-0003-0143-3019], İlknur SOLMAZ[5] [0000-0003-2996-0286]

[1]Horticulture Department, Faculty of Agriculture, Cukurova University, Adana, Türkiye

pinaradiguzel63@gmail.com

Abstract: Melon (*Cucumis melo* L.) is a vegetable belongs to *Cucurbitaceae* that have an economic importance both in the World and in our country. This project was aimed to enhance pollination and fertilization processes in hybrid melon seed production. In this study, as plant material doubled haploid (dihaploid) Kırkağaç melon lines DA5 and SR31 used which have been developed in the context of an earlier TUBITAK project (Project number: 114O230). In this research, 2 ppm and 4 ppm foliar Putrescine and also 150 g/100L Boron were applied separately and together to female and male plants. In the study, the controlled cross pollination studies were made with female treated and male treated plants (72 cross pollinations in total) in order to show the effect of treatments on female and male parents. The pollination success, fruit properties, seed yield and seed quality parameters were determined in cross pollinated fruits. At the same time, in the context of determining the effects of each treatment the pollen tube growth rate and effective pollination situation were analysed in hybridized flowers. In terms of pollen parameters, boron treatment of the female parent positively influenced pollen tube development, thereby increasing pollination success. Application of Boron and 4 ppm putrescine to the female parent improved fruit quality, while no statistically significant differences were observed when both male and female parents were treated and hybridized. Among the key parameters, 2 ppm putrescin etreatment resulted in an increase of approximately 4 g in seed yield compared to other treatments. Furthermore, seeds obtained from boron and putrescine treatments were at least 20% higher in quality (with seed germination and emergence) than those of the control.

Keywords: Kırkağaç melon, seed quality, ovule longevity, plant nutrition, pollen

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Enhancing early growth and salt stress resilience in pepper through different nanometal particle applications

İrem BİÇER[1*] [0000-0002-5359-8478], Hayriye Yıldız DAŞGAN[2] [0000-0002-0403-1627]

[1]Department of Horticulture, Faculty of Agriculture, University of Cukurova, Adana 01330, Türkiye

iremmbicer@gmail.com

Abstract: To mitigate the adverse effects of salt stress in pepper plants, nanometal particles were employed through both seed priming and foliar applications. In this context, pepper seeds were subjected to priming treatments with titanium, silver, copper, iron, zinc, and manganese nanometal particles. Following sowing, once the plants reached the 3–4 true-leaf stage, foliar spraying with the same nanometals was carried out. At the end of the experiment, various physiological and biochemical parameters were measured, including leaf number, stem diameter, plant height, SPAD value, leaf stomatal conductance, membrane injury index in leaf cells, leaf water potential, leaf relative water content, leaf osmotic potential, proline content, and lipid peroxidation level.

Keywords: Nanopriming, *Capsicum annuum* L., Salinity, Oxidative stress

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Mechanization of potato harvesting for smallholder farming systems: enhancing productivity and sustainability in Kenya

Martin Mang'eni NANJE[1]

[1]Department of Environmental and Biosystems Engineering, University of Nairobi, Kenya

martinnanje30@gmail.com

Abstract: Mechanization plays a pivotal role in transforming smallholder agriculture, improving labor efficiency, and ensuring sustainable food production. This study focuses on the design, development, and evaluation of a small-scale potato harvester specifically tailored for Kenyan smallholder farming systems. Field surveys were conducted in Nyandarua County to assess existing harvesting challenges, followed by the conceptual design and finite element analysis (FEA) of critical components. A prototype was fabricated using locally available materials and tested under varying soil moisture and field conditions to determine its performance and adaptability. Results indicated that the mechanized harvester reduced harvesting time by 65% and labor costs by 58% compared to manual digging. The optimized blade angle of 30° and operational speed of 1.5 km/h minimized tuber damage and improved harvesting efficiency. Furthermore, the cost–benefit analysis showed a payback period of less than two seasons, confirming the economic feasibility of the technology. Overall, the study demonstrates the potential of locally adaptable mechanization technologies to enhance productivity, reduce drudgery, and promote sustainable intensification within smallholder farming systems.

Keywords: Mechanization; Potato Harvester; Smallholder Farming; Sustainable Agriculture; Finite Element Analysis (FEA)

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Estimation of reference crop evapotranspiration (et_0) values using regression analysis method for Nevşehir province

Nurcan MENEVŞE[1] [0000-0002-4507-5140] ,Sinan NACAR[2] [0000-0003-2497-5032]

[1] Tokat Gaziosmanpaşa University, Tokat,60100, Türkiye
[2] Tokat Gaziosmanpaşa University, Tokat,60100, Türkiye

menevsenurcan@gmail.com

Abstract: This study focuses on estimating ET_0 values, calculated using the FAO-Penman-Monteith method based on 47 years of meteorological data for Nevşehir province, by employing regression-based models. In this context, regression analysis was carried out using both linear and nonlinear functions, and the predictive performance of the developed models was compared using performance statistics such as the root mean square error (RMSE), mean absolute error (MAE), and Nash–Sutcliffe (NS) efficiency coefficient. In the developed models, wind speed, minimum relative humidity average, maximum relative humidity average, maximum temperature average, minimum temperature average, daily sunshine duration, mean temperature, and number of days were used as independent variables, while ET_0 values were used as the dependent variable. A total of 62% of the data were used for training, and the remaining 38% for testing. Within the scope of the regression analyses, all possible combinations of the independent variables were tested (511 models for the linear function and 511 models for the nonlinear function), and the best-performing models were compared. This approach also enabled the determination of the effects of independent variables on ET_0 estimation. As a result, when the model performances were evaluated based on the NS coefficient, the NS value was found to be 0.9719 for the linear function and 0.9847 for the nonlinear function. These findings indicate that the nonlinear function provides higher accuracy and better agreement in ET_0 estimation compared to the linear function. Wind speed, daily sunshine duration, and number of days were identified as the most influential independent variables in the estimation of reference evapotranspiration. The highest model performances were obtained from four-input models, while models using all variables did not show a significant improvement compared to the four-input models. This result demonstrates that the model can achieve high prediction accuracy even with a limited set of key parameters. This approach is considered to provide a valuable scientific basis for developing regional-scale drought analysis and water management strategies.

Keywords: Reference Crop Evapotranspiration, Regression Analysis, Modeling.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Evaluating the precision of wheat actual evapotranspiration with the vegetation index method in comparison to the metric model

Omar ALSENJAR[1*] [0000-0001-9471-794X], Mahmut CETIN[1] [0000-0001-5751-0958]

[1]Department of Agricultural Structures and Irrigation, Cukurova University, Adana, Türkiye

mcet64@cu.edu.tr

Abstract: Accurate estimation of actual evapotranspiration (ETa) is crucial for sustainable water resource management, particularly in large-scale irrigation districts. This study presents a comparative evaluation of the METRIC and Kc-NDVI models for estimating ETa of wheat during two consecutive hydrological years (2020 and 2021) in the Akarsu Irrigation District (9,495 ha), located in the Lower Seyhan Plain, southern Türkiye. The METRIC model integrates multiple remote sensing and meteorological inputs, whereas the Kc-NDVI method relies on fewer data sources, making it suitable for data-scarce regions. Fourteen clear-sky Landsat 7 and 8 images, together with climate data from two local meteorological stations, were used to estimate seasonal ETa of wheat. Results showed that the Kc-NDVI method consistently underestimated ETa for wheat compared with the METRIC model, particularly at the beginning and end of the winter growing season. The Mean Bias Errors (MBE) were 0.61 mm/day and 0.78 mm/day, while the Root Mean Square Errors (RMSE) were 0.86 mm/day and 0.97 mm/day for 2020 and 2021, respectively. Despite its simplified input requirements, the Kc-NDVI method demonstrated satisfactory performance during the mid-season period. These findings highlight the potential of the Kc-NDVI approach as a cost-effective and operationally feasible alternative for field-scale ETa estimation and irrigation management in data-limited environments.

Keywords: Actual evapotranspiration, remote sensing, NDVI, Crop coefficient, Akarsu Irrigation District

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Evaluation of antibacterial activities of medicinal and aromatic plant extracts against *pseudomonas syringae pv. Syringae* in citrus

Feray KARABÜYÜK[1] [0000 0002 4884 2122], Büşra FİDANCI AVCI[2] [0000-0003-2403-956X]

[1]Cukurova University, Imamoglu Vocational School, Imamoglu, Adana, Turkiye,
[2]Cukurova University, Faculty of Agriculture, Plant Protection Department, Balcalı, Adana, Turkiye

feraykrbyk@gmail.com

Abstract: Citriculture is one of the most important agricultural sectors globally, with citrus fruits being widely cultivated across various regions. However, plant diseases caused by a range of plant-pathogenic microorganisms pose significant challenges to citrus production. Several bacterial pathogens are known to infect citrus crops, leading to substantial economic losses. Notable bacterial agents include *Pseudomonas syringae* pv. *syringae* (*Pss*), *Xanthomonas citri* subsp. *citri*, *Xylella fastidiosa*, and *Candidatus Liberibacter* spp., all of which are responsible for serious citrus diseases. The efficacy of current strategies for controlling bacterial diseases in citrus is limited. Cultural practices alone often fail to provide adequate disease suppression and have not been widely adopted by commercial growers. Chemical controls, such as copper-based bactericides and antibiotics, are used against certain bacterial pathogens. However, their effectiveness is increasingly compromised by the development of copper resistance in pathogen populations across many regions. Furthermore, growing public concern over the environmental and health impacts of pesticide residues has heightened the need for alternative or complementary disease management strategies. The antimicrobial properties of plant extracts and their major constituents, derived from a wide range of aromatic plant species, have been extensively studied against a broad spectrum of microorganisms, including bacteria, fungi, and viruses. In this study, the antibacterial activities of aqueous extracts obtained from various medicinal and aromatic plants—including *Allium sativum*, *Eucalyptus* sp., *Myrtus communis* L., *Nerium oleander*, *Origanum onites*, *Rosmarinus officinalis*, *Salvia officinalis*, *Thymus vulgaris*, *Thymbra spicata* L. subsp. *spicata*, and *Zingiber officinale*—were evaluated against *Pseudomonas syringae* pv. *syringae* (*Pss*) using the Minimum Inhibitory Concentration (MIC) tube dilution method. Among the tested plant extracts, *A. sativum*, *O. onites*, *T. vulgaris*, and *T. Spicata* L. subsp. *spicata* exhibited antibacterial activity at concentrations of 5.50 µl/ml, 8.25 µl/ml, >64 µl/ml, and >128 µl/ml, respectively. These findings suggest that certain plant extracts hold promise for the development of novel, environmentally friendly pesticides for the

control of bacterial diseases in citrus cultivation. The research is financed by Cukurova University with the project number FBA-2023-15707.

Keywords: Citriculture, Plant Extracts, *Pseudomonas syringae* pv. *syringae*, *Pss*

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Protoplast fusion as a breeding tool for berries: a review of prospects and current limitations

Şule Polat[1] [0009-0005-9131-9694], Samiullah Kamran, Awara Muhammad Hamakhan[2] [0000-0003-2351-4453], Betül Ayca Dönmez-Telek[3] [0000-0002-7631-7384], İbrahim GEÇGEL, Berken Çimen[4] [0000-0002-9376-1823] and Nesibe Ebru Kafkas[5] [0000-0003-3412-597]

[1,4,5]University of Cukurova, Faculty of Agriculture, Department of Horticulture, Adana 01330, Türkiye
[2]Sulaimani Polytechnic University, Kurdistan RegionGovernment KRG, Iraq
[3]University of Kirsehir Ahi Evran, Kirsehir 40100, Türkiye

suleplt01@gmail.com

Abstract: Berry species (e.g., Vitis, Fragaria, Vaccinium) are increasingly recognized for their health benefits and economic importance. However, traditional breeding approaches are frequently impeded by lengthy generation cycles and limited gene pools, restricting the rapid development of new cultivars. Somatic hybridization through protoplast fusion presents a compelling solution, enabling the creation of novel genetic combinations by fusing cells from which the walls have been enzymatically removed. This technique allows for the transfer of agronomically important traits, including disease resistance, environmental stress tolerance, and improved fruit characteristics. Although research in berry crops remains nascent, proof-of-concept studies in grape and strawberry indicate its utility for enhancing genetic diversity. Nevertheless, key challenges persist, particularly in protoplast isolation, post-fusion regeneration efficiency, and the selection of stable hybrids. The integration of emerging tools such as genome editing, and multi-omics analyses is anticipated to augment the efficacy of protoplast fusion. In summary, this biotechnology holds substantial promise for the genetic advancement of berries, poised to become a cornerstone of both fundamental research and applied breeding programs once current methodological constraints are alleviated.

Keywords: Protoplast Fusion, Somatic Hybridization, Berry Crops, Breeding, Plant Biotechnology

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

A study on the determination of total phenol, dpph, tss, volatile compounds in gala gio apple varieties

Yakup Polat[1] [0000-0002-5831-8199], İlbilge Oğuz[2] [0000-0002-7198-4014], Burhanettin İmrak[3] [0000-0002-8685-1265], and Ebru Kafkas[4] [0000-0003-3412-5971]

[1,2,3,4]University of Çukurova, Faculty of Agriculture, Department of Horticulture, Balcalı, Adana, Türkiye

yakupyyu@gmail.com

Abstract: Apples belong to the Rosaceae family and have been a popular fruit for consumers since ancient times due to their biochemical properties. The Gala series apple varieties are widely grown worldwide and are among the most popular on supermarket shelves. In recent years, the Gala Gio apple variety has been introduced. It is an early-ripening apple with dark red skin, attractive appearance, and high commercial value. As with all fruits, total phenols, antioxidants, and soluble solids are important ripening criteria for apple varieties. In this study, total phenols, antioxidants, and soluble solids were analyzed in the fruits of the Gala Gio apple variety. The study found that the total phenols in Gala Gio were 30.72 mg/100 g GAE, the antioxidants were 35.24%, and the soluble solid contents were 13.8%. Additionally, a total of 26 volatile aroma compounds were identified in the study, including 1 aldehyde, 10 alcohols, 14 esters, and 1 ketone. Among the volatile compounds, alcohols and esters were identified as the predominant compounds. Among the ester group, butanoic acid, 3-methyl-, 3-methylbutyl ester (27.44%), and isoamyl butyrate (25.20%) were the most commonly detected compounds, while within the alcohol group, 1-butanol, 3-methyl-, acetate (8.26%) was the most commonly detected compound.

Keywords: Apple, Aroma, Total Phenol, Antioxidant, Soluble Solid Contents

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Aflatoxins and effects in ruminant nutrition

Hasan Batuhan Demircioğlu[1] [0009-0007-3235-5403] and Harun Kutay[2] [0000-0001-9163-4831]

[1,2]University of Çukurova, Faculty of Agriculture, Department of Animal Science, 01330 Adana Turkiye

batuhandemircioglu@gmail.com

Abstract: Aflatoxins are mycotoxins produced by molds such as Aspergillus flavus and Aspergillus parasiticus, with potent toxic and carcinogenic properties. Aflatoxin B1 (AFB1), in particular, is the most frequently encountered and harmful form in ruminant nutrition. Although AFB1 ingested in feed is detoxified to a limited extent in the rumen, it is metabolized in the liver and can be transmitted to consumers through milk as Aflatoxin M1 (AFM1). Aflatoxin exposure in ruminants leads to adverse outcomes such as reduced feed intake, body weight loss, immune system suppression, impaired reproductive performance, and reduced milk yield. The legal limit for AFB1 in feed is 5 ppb (µg/kg) in Turkiye and 20 ppb in European Union countries. Proper harvesting and storage conditions, biological and chemical detoxification methods, and the use of toxin-binding feed additives are key to reducing aflatoxin risk. Control of aflatoxins in ruminant feed is critical for both animal health and public health.

Keywords: Aspergillus Flavus, Aspergillus Parasiticus, Aflatoxins, Mycotoxins, Milk Yield

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Agro-morphogical and quality characterization of flax (*linum usitatissimum l.)* Varieties and genotypes grown in Cukurova conditions

Ömer Afşin Çil[1] [0009-0009-7669-9181] and Cemal Kurt[2] [0000-0002-5030-4411]

[1] Kırşehir Ahi Evran University, Agriculture Faculty, Field Crops Department
[2] Cukurova University, Agriculture Faculty, Field Crops Department

ckurt@cu.edu.tr

Abstract: This research, which was carried out to determine the yield and some agronomic characteristics of oil flax varieties in Çukurova conditions, was established in 2024 (March-June) in the Research and Application Area of the Field Crops Department of the Faculty of Agriculture of Çukurova University. In the experiment, 16 oil flax varieties, namely Juliet, Zoltan, Lirina, Bingo, Galad, Kaolin, Floral, LS Koral, Buffalo, Bowler, Bliss, Goldstern, Karakiz, Atalanta, Linda and Yılmaz, were established according to the "Randomized Block Design" with four replications. In the study, characteristics such as flowering period (days), maturation period (days), plant height (cm), technical stem length (cm), number of side branches (number/plant), number of capsules per plant (number), thousand grain weight (g), seed yield (kg/da), crude oil ratio (%), and crude oil yield (kg/da) were examined and analyzed. As a result of the research; the longest plant height was found in Karakiz (63.10 cm), the shortest was found in Bingo variety (46.15 cm), the latest flowering period was found in Juliet variety (48.33 days), the earliest was found in Yılmaz variety (47.00 days), the ripening period was found in Yılmaz variety (94.67-100.33 days (Goldstern-Yılmaz), the first branch height varied between 36.47 cm and 49 cm, the number of tillers varied between 0.09 and 0.42, the maximum number of side branches was found in LS Koral variety (6.32), the number of capsules per plant varied between 8.23-19.15, the highest thousand seed weight was found in Yılmaz variety (6.67 g), and the lowest was found in Floral variety (3.90 g). Among the varieties, the highest seed yield was found in Buffalo variety (386.11 kg/da), and the lowest was found in Kaolin variety (114.41 kg/da. The highest crude oil yield was determined in Atalanta (34.27%) and the lowest in Linda (16.05%) variety. The highest crude oil yield was determined in Atalanta with 123.48 kg/da and the lowest in Kaolin variety with 18.41 kg/da. At the same time, there are significant correlations between the characters. The main goal in oil crop cultivation is to increase the oil yield per unit area. When evaluated from this perspective, it was concluded that the Atalanta variety, which ranks first in terms of oil yield among the varieties used in the research, can be recommended for the local conditions. However, since the study is a one-year study, it will be necessary to repeat this study under similar climatic conditions to obtain more reliable data.

Keywords: Variety, Linum Ussitatissimum L., Oil Flax, Yield, Yield Components

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Analysis of phenolic compounds in waste potato pulp and evaluation of antioxidant activity

Hilal Topal[1], Seçil Karahüseyin[2] [0000-0002-3515-2974]*, Nur Tanır[3] [0000-0002-7761-6546], Selin Tufan[4] [0000-0002-9173-3423]

[1,2] Cukurova University, Faculty of Pharmacy, Department of Pharmacognosy, Adana, Türkiye
[3] Istanbul University, Institute of Health Sciences, Istanbul, Türkiye
[4] Istanbul University, Faculty of Pharmacy, Department of Pharmacognosy, Istanbul, Türkiye

skarahuseyin@cu.edu.tr

Abstract: The efficient use of waste produced during food processing is crucial for mitigating environmental damage, as well as for enhancing value and diversifying goods. In the future, the proliferation of food processing factories will correspond with population growth, leading to an escalation in food waste and associated waste management issues. The collecting of garbage and its utilization in the manufacture of new products is crucial for human health, environmental degradation, and the national economy. Potatoes (Solanum tuberosum L., Solanaceae) are one of the most important staple crops grown worldwide and play a significant role in both human and animal nutrition. The health-promoting effects of potatoes have been observed in human cell cultures, human clinical studies, and experimental animals, including anti-inflammatory, anti-cancer, hypocholesterolemic, antidiabetic, and anti-obesity properties. In this study, the phenolic content of waste potato pulp obtained from a chip factory was analyzed by HPLC-MS after obtaining an ethanol extract suitable for green chemistry, and the determination of total phenolic content was evaluated. Antioxidant activity was also assessed by the DPPH radical scavenging effect. In the resulting waste pulp, caffeic acid, a phenolic compound, was detected. The total phenolic content, determined to be 134.614 ± 4.167 mg gallic acid equivalent (GAE) per gram of extract, appears to be consistent with the chemical basis of this high antioxidant activity. It was observed that the DPPH free radical scavenging test reached an inhibition level of over 80%. Based on the results obtained, it was concluded that the waste potato pulp from the chip factory has the potential to be recycled.

(This study was supported by TUBITAK 2209-A student project.)

Keywords: Potato Pomace, HPLC-MS Analysis, Phenolic Compounds, Antioxidant Activity

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Awareness and knowledge levels regarding genetically modified organisms among students of Cukurova university Imamoğlu vocational school

Gamze Mazi Şeker[1] [0000-0002-3160-2480]

[1] Cukurova University, Faculty of Fisheries, Department of Basic Sciences, Adana, TURKİYE

gamzemazi@gmail.com

Abstract: This cross-sectional study aimed to assess knowledge levels, attitudes, and consumption behaviors regarding genetically modified organisms (GMOs) among students of Çukurova University İmamoğlu Vocational School. Data were collected in May–June 2025 using a structured 21-item questionnaire administered online to 211 students. The survey comprised three sections covering sociodemographic characteristics, knowledge about GMOs, and attitude items. Data were summarized with percentage and frequency distributions. The findings indicate that while many students had heard the term "GMO," they lacked detailed knowledge; moreover, the vast majority favored mandatory labeling of GMO-containing products, viewing it as a matter of consumer rights. Concerns about potential health and environmental impacts were prominent. The predominance of social media and other online platforms as information sources points to gaps in access to trustworthy scientific information, which may foster misconceptions about GMOs. In conclusion, the study underscores the need to strengthen GMO-related educational content at the university level and to support policies that ensure clear and visible product labeling.

Keywords: Genetically Modified Organisms, Knowledge Level, University Students, Gmos, Consumer Attitudes, Çukurova University

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Carbon dioxide emission from fuel use in Turkiye's wheat, sugar beet, and potato production and future projection estimate

Mahsati Alakbarova[1[]], Sevil Abdulaliyeva[2[]], Mahbuba Hasanova[3[]] and Farida Aslanova[4] [0009-0004-3356-2242]

[1,2,3,4] Azerbaijan State Agricultural University (ASAU), Ganja, Azerbaijan

alekberova_1979@mail.ru

Abstract: In this study, carbon dioxide emissions from fuel use in wheat, sugar beet, and potato production between 2015 and 2024 (10 years) were determined in Türkiye, and projections for 2025-2034 were examined. The average total carbon dioxide emissions (TCOE) values from fuel use in Türkiye's wheat, sugar beet, and potato production were 1148.29 ktCO2, 101.29 ktCO2, and 20.81 ktCO2, between 2015 and 2024, respectively; the specific fuel consumption (SpFC) values were 16.47 gfuel kgproduct-1, 1,85 gfuel kgproduct-1, and 1,28 gfuel kgproduct-1, and the specific carbon dioxide emissions (SpCE) values were determined to be 56.31 gCO2 kgproduct-1, 6.32 gCO2 kgproduct-1, and 4.37 gCO2 kgproduct-1, respectively. In Türkiye's projections for the years 2025-2034, it is anticipated that the TCOE, SpFC, and SpCE values for wheat, sugar beet, and potato, production will show an upward trend.

Keywords: Carbon Dioxide Emission, Fuel Consumption, Projection

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Carbon pricing scenarios for azerbaijan's agriculture: impacts on costs, food prices, and emissions

Rasul Nazarov[1] [0009-0006-0147-1690]

[1] Princeton University, Princeton NJ 08544, USA

rasul.nazarov05@mail.ru

Abstract: Agriculture is confronted with increasing climate risks while simultaneously being a contributor to greenhouse gas emissions due to energy consumption, enteric fermentation, and the use of synthetic fertilizers. This study assesses the possible impacts of implementing a carbon pricing mechanism in Azerbaijan on the agricultural sector and related food markets. By employing a partial-equilibrium model, we simulate carbon prices ranging from 10 to 50 USD/tCO_2e applied to fuel, electricity, and fertilizer inputs. Emission intensities are derived from IPCC/FAO factors and adjusted according to national energy and fertilizer consumption; the pass-through of prices to farmgate costs and consumer prices is based on elasticities from regional studies. The findings suggest that moderate carbon prices (≤20 USD/tCO_2e) increase average farm production costs by 0.8–2.1% and retail prices by 0.3–0.9%, while decreasing sectoral CO_2e emissions by 4–9%, primarily through reduced diesel consumption and improved fertilizer application. Revenue recycling through grants aimed at enhancing input efficiency and concessional credit for drip irrigation and solar cold-chain technology mitigates 60–90% of the cost increases faced by producers, resulting in net welfare benefits in most scenarios. The paper explores design alternatives—such as rebates for smallholders, gradual coverage, and measurement requirements—and outlines a strategy for a climate-smart carbon policy that is sensitive to food prices.

Keywords: Carbon Tax, Agriculture, Food Prices, Emissions, Agritech, Policy Design

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Characteristics of apple genotypes that can be a cultivar of candidate in Meram district of Konya, Turkiye

Zeynep Nas[1] [0000-1111-2222-3333], Ali Büyükzeren [2] [1111-2222-3333-4444] and Lütfi Pırlak[3][]

[1,2,3] Selcuk University, Faculty of Agriculture, Department of Horticulture, Selcuklu, Konya Türkiye

lpirlak@hotmail.com

Abstract: Türkiye is one of the most important countries in the world in terms of plant genetic resources and plant diversity. The selection of varieties that may adapt to these potential, different climate choice of product -resistant varieties that are suitable for different internal and foreign market demands and creates alternatives that can serve different purposes.

Variety richness is an important resource in the cultivation of new varieties for different purposes for fruit breeders. In recent years, standard apple varieties of foreign origin have been widely grown in Turkiye and the number of newly reformed domestic varieties is extremely limited. Selection and controlled hybridization are generally used in the hands of new varieties in fruit. While selection is made in the population that grows naturally in the selection method, genotypes consisting of seeds in the area and the surrounding area are also an important source. It is important to review this resource in a planned way in terms of the new apple varieties.

Türkiye is one of the most important apple producer countries of the world and commercial apple production is produced in many regions of the country. Konya is among the important apple production zones. In recent times, interest in fruit is increasing and apple is among the most preferred species. With the increase in production, the genotype grown from many seeds in and around these areas is encountered. While most of them are cut by cutting due to low fruit quality, rarely fruits can be found. In this study, phenological and pomological properties of 4 promising candidate genotypes (42 M-1, 42 M-2, 42 M-3, 42 M-4) grown from seed in Meram district of Konya province in 2025 and having good fruit characteristics were investigated.

Full flowering in genotypes was determined between March 30- April 18, harvest date between 5 July and 30 August. Average fruit weights in genotypes were 35.6-87.1 g, fruit firmness is 2.33-3.92 lb, pH 3.82-5.07, TTS 9.40-16.2 % and titration acidity was between 0.32-68 %.

It is thought that the genotypes examined in this study are satisfactory in terms of fruit characteristics and can be candidates for varieties with more comprehensive studies in the future.

Key words: Apple, Breeding, Selection, Pomologic Properties, Phenologic Properties

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

The effects of different foliar fertilizers on root development parameters of forage soybean varieties

Zübeyir Ağırağaç[1] [0000-0003-1414-1472] Muhammed Öztürk[2] [0009-00091280-2143] and Şeyda Zorer Çelebi[3] [0000-0003-1278-1994]

[1,2,3] Van Yüzüncü Yıl Üniversitesi, Ziraat Fakültesi, Tarla Bitkileri Bölümü

zubeyiragiragac@yyu.edu.tr

Abstract: The study was conducted in the climate chamber of the Department of Field Crops, Faculty of Agriculture, Van Yüzüncü Yıl University. Soil used in the study was collected from a field in Gevaş district, Van province. The plant material consisted of forage soybean (Glycine max (L.) Merr.) cultivars "Yemsoy" and "Yeşilsoy." The experiment was arranged in a randomized complete block design with three replications, and the climate chamber was set to a 16-hour day and 8-hour night cycle. Granular DAP fertilizer and foliar applications of seaweed, humic acid, and vermicompost were applied. Root fresh weight, root dry weight, and root length were evaluated. No significant differences were observed between the cultivars, with Yemsoy and Yeşilsoy showing similar performance (6.62 g and 6.46 g root fresh weight, respectively). Among the fertilizer treatments, humic acid showed the greatest enhancement in root development (root fresh weight 7.37 g, root length 61 cm, root dry weight 2.17 g), followed by vermicompost and seaweed. Control plots consistently showed the lowest values for all parameters. Overall, humic acid was the most effective treatment for promoting root growth, while other organic fertilizers also provided notable improvements.

Keywords: Root Development, Soybean, Organic Fertilizers

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

The effect of hatching egg disinfection on egg weight, hatching traits, and chick quality in pekin ducks

Nasir Abdallah [1] [0000-0003-2701-6726], Kadriye Kursun [2] [0000-0001-9533-7391], and Mikail Baylan[3] [0000-0002-6299-5811]

[1,2,3] Cukurova University, Faculty of Agriculture, Department of Animal Science, 01330, Saricam, Adana, Türkiye

nasirmayam@gmail.com

Abstract: This study investigated the effect of egg disinfection before incubation on egg weight, hatching traits, and chick quality in pekin ducks. The egg weight loss (Ew-L) between embryonic day (ED) 0-25 was 9.31±0.42% and 8.70±0.24% in groups A and B, respectively (P=0.333). The hatchability of fertile eggs (HFE) was 51.65±5.22% in Group A and 55.77±5.22% in Group B (P=0.633), while the embryonic mortality (EM) was 51.29±6.71% and 44.23±6.71% in Groups A and B, respectively (P=0.535). The chick weight at hatch (CWH) was 47.69±0.90 g in Group A and 47.99±1.07 g in Group B (P=0.833), while the chick yield (CY) was 63.26±1.35% in Group A and 64.65±0.78% in Group B (P=0.467). The chick length was significantly higher in Group B than in Group A (P=0.050). The current study suggests that the disinfection of soiled hatching eggs of ducks could improve hatchability, chick length, chick weight, and chick yield at hatch and reduce embryonic mortality without any negative effect on egg weight loss.

Keywords: Ducks, Disinfection, Eggs, Egg Weight Loss, Hatchability, Incubation

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

The effect of egg storage positioning on hatching, growth performance, carcass, and welfare traits in broiler chickens

Kadriye Kursun[1] [0000-0001-9533-7391], Nasir Abdallah [2] [0000-0003-2701-6726] and Mikail Baylan [3] [0000-0002-6299-5811]

[1,2,3]Cukurova University, Faculty of Agriculture, Department of Animal Science, 01330, Saricam, Adana, Türkiye

kadriyehatipoglu01@gmail.com

Abstract: This study investigated the effect of egg storage positioning on hatching, growth, carcass, and welfare traits in broiler chickens. A total 90 eggs of broiler breeders at 33 wk were used. The experimental groups consisted of eggs stored with either the broad end-up (BEU) or the narrow end-up (NEU) for 7 d. Each group consisted of with 45 eggs. The average temperature and humidity of the storage room was 20 ° C and 70%, respectively. The average egg weight before storage was 59.49±0.43 (g) and 61.00±0.43 (g) for BEU and NEU, respectively. However, the mean values for the egg weight after storage was 59.10±0.42 (g) for BEU and 60.53±0.42 (g) for NEU. The hatchability of fertile eggs was 97.56 % for NEU and 97.67 % for BEU. While the hatchability of set eggs was 93.33% for BEU and 88.89% for NEU. The FI, FCR, BW, BWG, TI and NOI did not significantly vary between the groups (*P>0.05*). While the CCY was significantly higher in BEU, the SP-W was significantly higher in NEU *(P<0.05).* The BR nearly reached a significant level, higher in BEU than in NEU (*P=0.057*). The temperature of the footpad nearly reached a significant level, higher in BEU compared to NEU (*P=0.058*). Storing eggs with the NEU may have the potential to reduce stress and fear in broiler chickens.

Keywords: Broiler, Storage, Growth, Carcass, Welfare

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Development of a harvesting robot for use in soilless greenhouses

Bahadır DEMİREL[1] [0000-0002-2650-1167], Osman Mert YAZ[2] [0009-0003-3367-6656]and Gürkan Alp Kağan GÜRDİL[3] [0000-0001-7764-3977]

[1,2] Erciyes University, Faculty of Agriculture, Department of Biosystem Engineering, Kayseri, Turkiye
[3] Ondokuz Mayis University, Faculty of Agriculture, Department of Agricultural Machinery and Technologies Engineering, Samsun, Turkiye.

bahdem@erciyes.edu.tr

Abstract: This study aims to achieve fully autonomous fruit harvesting in greenhouses utilizing soilless agriculture by integrating artificial intelligence (AI)-driven deep learning algorithms and robotic arm systems. Based on a comprehensive literature review, a conceptual model has been proposed featuring an articulated harvesting arm mounted on a mobile platform. The system employs depth-sensing vision sensors and advanced object recognition algorithms (e.g., YOLO, Faster R-CNN) to detect fruits and extract their three-dimensional positional data. Using inverse kinematics and robot control algorithms, the robotic arm is guided to the target location and performs harvesting according to the fruit's ripeness level and optimal detachment point. The mechanical design incorporates adaptable gripper-cutter mechanisms to prevent fruit damage during the harvesting process. According to data from related studies, fruit detection accuracy typically ranges from 88% to 95%, while harvesting success rates vary between 80% and 100%. The average picking time per fruit ranges from 3 to 15 seconds, depending on the crop type and system specifications. Deep learning-based approaches have demonstrated high accuracy in both fruit detection and ripeness classification, while developments in adaptive end-effectors have significantly improved harvesting efficiency in robotic arms. This technical study explores the feasibility, constraints, and performance metrics of autonomous harvesting technologies in hydroponic greenhouses. It highlights the synergy between AI-based perception and precise mechanical actuation, offering insights into the integration of computer vision, robotics, and agronomic parameters in modern agriculture. By addressing both algorithmic precision and mechanical adaptability, this research contributes to the development of intelligent and scalable solutions for high-throughput and labor-efficient harvesting in controlled-environment agriculture.

Keywords: Harvest, Greenhouse, Artificial Intelligence, Robotic.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Temperature conditions influence on the quality wheat (in *haplic calsisols*) storage at Balakan region

Anara Nasirova Ikhtiyar[1*] [0009-0008-1916-3535], Gunay Mammadova Israphil[1,2] [0000-0001-5196-4684], Sultan Huseynova Maharram[1,3], Gunel Jafarova Ali[2] [0009-0009-9687-7782], and Roza Mammadova Nazim[4] [0000-0001-8978-374X]

[1]Institute of Soil Science and Agrochemistry of Ministry of Science and Education of the Republic of Azerbaijan, Baku, Azerbaijan Republic
[2]Sumgayit State University, Sumgayit city, Republic of Azerbaijan
[3]Central Botanical Garden, Baku city, Republic of Azerbaijan
[4]Baku State University, Baku city, Republic of Azerbaijan

anara.nasirova@inbox.ru

Abstract: Experimental data showed that at temperatures of 10°C and minus 25°C, vitreousness changed minimally and amounted to 42-40% over the entire storage period. At elevated temperatures of 30 and 40°C, a tendency toward a decrease in vitreousness was noted, and after 24 months of storage at these temperatures, vitreousness decreased to 27-30%. High temperatures have an adverse effect on the grain structure. For a temperature of 40°C, a correlation was also established between vitreousness and the amount of gluten (Cc 0.68). The analysis of the obtained data showed that the wheat samples stored at temperatures of 10 and 30°C showed insignificant changes in the increase of this indicator (the estimated intensity of the falling number increase at 30°C was 2.4 sec per month, and at 10°C - 1.3 sec per month). Increased temperature to 40°C, after only 6 months of storage, falling number reached 396 sec. The results of approximating the experimental data using the linear function showed that reliable results were obtained only at a storage temperature of 40°C (R2 = 0.869), while at temperatures of 10 and 30°C, R2 was below 0.85, indicating that the dependence was unreliable. Statistical processing revealed a positive correlation between the dynamics of the falling number and the storage duration, confirming the established tendency for the falling number to increase during wheat storage. The correlation coefficients are for a temperature of 40°C - 0.932, for a temperature of 30°C - 0.676, for a temperature of 10°C - 0.809, for a temperature of minus 25°C, fluctuations are noted in the dynamics, and there is no correlation.

Key words: Haplic Calsisol, Storage, Wheat Quality, Moisture, Vitreousness, Drying Time

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

The best practices for strengthening agricultural advisory services in Azerbaijan

Mahsati Alakbarova[1[]], Sevil Abdulaliyeva[2[]], Mahbuba Hasanova[3[]] and Farida Aslanova[4] [0009-0004-3356-2242]

[1,2,3,4] Azerbaijan State Agricultural University (ASAU), Ganja, Azerbaijan

alekberova_1979@mail.ru

Abstract: We know that our farmers are considered as a guarantor of our food security and they remind to us about themselves with their products three times a day. By this reason we must be close to the farmers improving agricultural advisory services (AAS). Because there is a great need for Agricultural Advisory Services intended for the land users in Azerbaijan. This fact gives us a good insight into that the agricultural advisory services are the back bone of food production system of Azerbaijan. By this reason, it is necessary to improve and optimize AAS to rural livelihoods.

In Azerbaijan, there is a good awareness regarding to the improvement of AAS system. Because, the government of Azerbaijan considers AAS as a vital factor for agriculture, in particular, the system of actors (public and private, formal and informal) that provides extension services to farmers and rural communities, in particular smallholders and all those who contribute to the family farm. AAS is known by the government of Azerbaijan as a model for sustainable agriculture that opens new opportunities to integrate innovations in agricultural practices

In this conference, we will share the best practices for strengthening Agricultural Advisory Services in Azerbaijan including the followings:

- Ensuring the pluralistic condition in AEAS system of Azerbaijan
- İntegrated approach
- Transparency and accountability: management, monitoring and evaluation of AAS services
- Improvement of services delivery
- Staff development of extension providers
- Financing of AAS
- Selection and application of appropriate and advanced AAS models

Key words: Agricultural Advisory Services, Extension Services, Survey

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

The comparative evaluation of the environmental adaptability and yield performance of the introduced and local bread wheat varieties in the soil-climatic condition of Barda district of Azerbaijan

Fariz Alakbarov[1] [0000-0002-2587-6629], Aytan Zeynalova[2] [0000-0001-6672-9142], Aysel Huseynova[3] [0009-0004-1778-4574], Mina Mammadova[4] [0000-0002-6484-1488], Ramala Orujova[5] [0000-0001-9769-099X], and Emil Kerimov[6[]]

[1,2,3,4,5,6] Azerbaijan State Agricultural University (ASAU), Ganja,

alekberovfariz@yahoo.de

Abstract: This article describes the results of the environmental adaptability and yield performance of the of the introduced and local bread wheat varieties grown during 2023-2024 growing season in the soil-climatic condition of Barda district of Azerbaijan.

Considering wheat producers` needs and demands for better wheat varieties having good performance, as well as for improving wheat seed production in Azerbaijan, during 2023-2024 growing season, the above-mentioned study have been conducted for comparative testing the introduced bread wheat varieties ("Lucilla", "Midas" and "Massacio") developed in "ProGen Tohum A.Ş." company in Turkiye together with local favorite variety "Girmizigul" preferred by our wheat producers in order to evaluate their environmental adaptability and yield performance with its components in the semi-arid soil-climatic condition of Barda district of Azerbaijan.

The purpose of this research consists of studying the environmental adaptability and the performance indicators such as grain yield and yield attributing components (effective tillers having spikes, grain number and grain weight per spike, weight of 1000 grain) of the wheat varieties, as well as choosing favorite representatives out of them for further breeding goals and seed production.

According to the result of our study, we can strongly state that the introduced bread wheat varieties comparing to local variety "Girmizigul" have showed the higher adaptability and good performance in the semi-drought soil-climatic condition of Barda district of Azerbaijan. Considering the benefit and good performance of the above-mentioned introduced wheat varieties, we offer to multiply their seeds to improving wheat seed production in target areas.

Key words: Wheat, Durum, Bread, Grain Yield, Yield Attributing Components, Bed Planting

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

The influence of the regime of irrigation of fodder crops and mineral fertilization on crop yields in Karakalpakistan

Gulistan Abdalova[1,[0009-0007-8924-5045]], Gulzina Shimbergenova[1,[0009-0005-4788-9286]], Mansur Tukhtamishev[1,[0009-0007-2372-9768],], Khusniddin Turamurodov[1,[0009-0008-4269-1029]]

[1]Tashkent State Agrarian University, Tashkent, 100140, Uzbekistan

1963gulistan@mail.ru

Abstract: During the research, optimal feeding and irrigation regimes for the forage crops "Nayman" and "Shaftoli" varieties of millet were determined, for example, when the soil moisture before irrigation is 65-70-60% compared to the CHDNS; 70-75-65% and the calculated soil layer during irrigation is 30-50-50 cm, high-quality grain yields of white rye and millet are achieved. The results are developed and recommended as a specific guide for farms. The total area of irrigated land in the Chimboy district of the Republic of Karakalpakstan by salinity level is 46910.0 hectares, of which 41576.8 hectares (88.6%) are saline to varying degrees. Non-saline soils account for 5333.2 hectares of irrigated land in Chimboy district, or 11.4%. Slightly saline soils account for 15365.3 hectares of irrigated land in Chimboy district, or 32.8%. The salinity type is chloride-sulfate and sulfate. Moderately saline soils account for 13390.4 hectares of irrigated land in Chimboy district, or 28.5%. The salinity type is chloride-sulfate and sulfate. Strongly saline soils account for 3871.5 hectares of irrigated land, or 8.4%. The salinity type is chloride-sulfate and sulfate. The area of highly saline soils is 8,949.6 ha, or 19.1%.

Keywords: fodder, Naiman, Peach, ChDNS, irrigation, mineral fertilizers, feeding

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

The effect of egg storage positioning on hatching, growth performance, carcass, and welfare traits in broiler chickens

Kadriye Kursun[1] [0000-0001-9533-7391], Nasir Abdallah [1] [0000-0003-2701-6726] and Mikail Baylan [1] [0000-0002-6299-5811]

[1] Cukurova University, Faculty of Agriculture, Department of Animal Science, 01330, Saricam, Adana, Türkiye

kadriyehatipoglu01@gmail.com

Abstract: This study investigated the effect of egg storage positioning on hatching, growth, carcass, and welfare traits in broiler chickens. A total 90 eggs of broiler breeders at 33 wk were used. The experimental groups consisted of eggs stored with either the broad end-up (BEU) or the narrow end-up (NEU) for 7 d. Each group consisted of with 45 eggs. The average temperature and humidity of the storage room was 20 ° C and 70%, respectively. The average egg weight before storage was 59.49±0.43 (g) and 61.00±0.43 (g) for BEU and NEU, respectively. However, the mean values for the egg weight after storage was 59.10±0.42 (g) for BEU and 60.53±0.42 (g) for NEU. The hatchability of fertile eggs was 97.56 % for NEU and 97.67 % for BEU. While the hatchability of set eggs was 93.33% for BEU and 88.89% for NEU. The FI, FCR, BW, BWG, TI and NOI did not significantly vary between the groups ($P>0.05$). While the CCY was significantly higher in BEU, the SP-W was significantly higher in NEU ($P<0.05$). The BR nearly reached a significant level, higher in BEU than in NEU ($P=0.057$). The temperature of the footpad nearly reached a significant level, higher in BEU compared to NEU ($P=0.058$). Storing eggs with the NEU may have the potential to reduce stress and fear in broiler chickens.

Keywords: Broiler, Storage, Growth, Carcass, Welfare

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

The effect of egg storage duration, prewarming, and thermal manipulation on embryonic development, hatchling traits, post hatch performance, carcass, and welfare traits in broiler chickens

Nasir Abdallah [1] [0000-0003-2701-6726] *, Kadriye Kursun [1] [0000-0001-9533-7391] and Mikail Baylan [1] [0000-0002-6299-5811]

[1] Cukurova University, Faculty of Agriculture, Department of Animal Science, 01330, Saricam, Adana, Türkiye

nasirmayam3@gmail.com

Abstract: The storage of hatching eggs is a common practice in poultry farming which is expected to increase to increase due the limited capacity of hatcheries especially in developing or underdeveloped countries. The recommended storage duration for hatching eggs varies between 5-7 days however, hatching eggs are stored beyond the recommended duration in many places around the world. Egg storage duration has a profound negative influence of embryonic growth, mortality, hatchability, chick quality, post-hatch growth and welfare of broiler chickens. These negative implications could also have an influence on the overall cost of production and the economic returns of farmers. Preincubation of eggs during storage or prewarming of eggs after storage have been reported to be beneficial for decreasing embryonic mortality, improving, hatchability, chick quality, post hatch performance and welfare of broiler chickens. At the same time, the exposure of hatching eggs to higher incubation temperature with a certain embryonic period (thermal manipulation) for a certain duration have also been tested with positive results in increasing embryonic mortality, hatchability and post-hatch performance of broiler chickens. Therefore, this review investigated the effect of storage period, preincubation, preheating, and thermal manipulation on embryonic growth and development, hatching traits, and post-hatch performance of broiler chickens.

Keywords: Body weight, Broiler, Carcass, Feed intake, Preheating, Preincubation, Storage

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Table, dried and wine grape production and potential in southeastern Anatolia

Mehmet İlhan Odabaşioğlu [1[0000-0001-8060-3407]], Fırat Ege Karaat [1[0000-0002-4676-0721]] and Halil İbrahim Oğuz[1[0000-0003-2213-7449]]

[1]Adıyaman University, Agriculture Faculty, Department of Horticulture, Adıyaman, Türkiye

hioguz64@gmail.com

Abstract: In this study, structural changes in grape production in the Southeastern Anatolia Region and throughout Turkiye were analyzed based on data from 2004, 2014, and 2024. All grape varieties commercially cultivated in Southeastern Anatolia were considered in the study. A significant decline in vineyard areas has been observed across the Southeastern Anatolia Region between 2004 and 2024. For example, vineyards for seedless raisins decreased from 6,250 decares in 2004 to 150 decares in 2024, while production decreased from 4,750 tons to 90 tons. Similarly, table grape vineyards decreased from 12,830 decares to 4,300 decares, and production volume peaked at 7,644 tons in 2014 before declining to 4,850 tons in 2024. Despite the decline in vineyard areas in the region, there have been significant increases in productivity. The yield per decare for wine grapes rose from 184 kg in 2004 to 560 kg in 2024, more than tripling. Similarly, productivity for dried seedless grapes increased from 345 kg/da to 569 kg/da. When evaluated at the provincial level, there has been a notable increase in wine grape production in Adıyaman. The production area, which was 100 decares in 2014, increased to 1,500 decares in 2024, while the production volume increased from 75 tons to 750 tons. In Gaziantep, the area dedicated to dried seedless grapes has undergone a substantial decline, from 121,830 decares to 48,081 decares. However, it has been determined that the production amount has undergone an increase from 28,920 tons to 42,307 tons, a development that can be attributed to the enhancement of grape yield per unit area. In contrast, it is observed that a significant proportion of the total vineyard areas in Şanlıurfa (95%), Siirt (50%), and Gaziantep (44%) have been lost. In particular, the production of dried seedless grapes in Şanlıurfa fell from 31,054 tons in 2004 to only 815 tons in 2024. A similar trend is observed across Turkiye as a whole. The area under dried seedless grapes decreased from 750,000 decares in 2004 to 491,612 decares in 2024, while production fell from 350,000 tons to 317,053 tons. Although there has been a partial increase in yield (from 529 kg/da to 682 kg/da) in the cultivation of wine grape varieties across the country, the decline in vineyard areas has negatively affected the production of wine grape varieties. In this context, the aim of the study is to determine the potential for grape production for different commercial purposes in the region, identify structural changes in regional viticulture, and establish future production

strategies. In conclusion, it has been determined that vineyard cultivation in the Southeastern Anatolia Region is undergoing a complex transformation process in which the decline in production areas and partial increases in productivity are intertwined. In this situation, the need to restructure regional agricultural policies and revise production strategies with a focus on productivity is considered to be of paramount importance.

Keywords: Grape Production Trends, Agricultural Productivity Analysis, Southeastern Anatolia Agriculture, Cultivation Area Reduction, Turkish Viticulture Sector

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Study of the dependence of the rotor of a small size feed distribution device on the number of rotations and the number of blades

Sayidamin Khasanov[1], Dilshod Khudaynazarov[1,][0000-0002-9311-4730] , Fazliddin Kurbonov[2,)][0009-0006-1026-6808], Farida Isakova[2,][0000-0003-2342-8459] , Ziyodullo Otakuziyev[3,][0009-0001-2366-9220] and Yang Mingjin[4)] [0009-0004-0681-5638]

[1]Tashkent State Technical University, Tashkent, Uzbekistan
[2]Tashkent State Agrarian University, Tashkent, 100140, Uzbekistan
[3]Yangiyer Branch of Tashkent Institute of Chemical Technology, Sirdarya, Uzbekistan
[4] College of Engineering and Technology, Southwest University, Chongqing 400715, China;
[4] Chongqing Key Laboratory of Intelligent Agricultural Machinery Equipment for Hilly and Mountainous Regions, Chongqing 400715, China

Xudoynazarov.Dilshod@inbox.ru

Abstract: According to the analysis, it was found that 85 percent of the cattle and poultry in livestock are raised on family farms, private and peasant farms, and due to the lack of small-scale devices used for distributing feed for these farms, feed distribution is labor-intensive and performed manually.

Taking into account the above, a small-scale innovative feed distribution device was developed for small livestock farms with 20-30 head of cattle. The results of the research were determined based on the requirements of family farms, private and peasant farms, and small livestock farms. According to the identified research analysis, the main indicators of the feed spreading device and its technological scheme were developed. The effect of the height and width of the feed pouring window of the developed feed distribution device on the quality of feed distribution was studied in the research.

The quality of distribution of coarse feed largely depends on the number of blades and the number of revolutions of the rotor. Taking this into account, based on the performance and size of the spreading device specified in the initial requirements and specifications, 1, 2, 3 and 4 shovels were prepared.

Keywords: Shovels, Rotor, Roughage, Ground Corn, Ground Straw, Ground Alfalfa, Bunker.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Seed priming of pepper (*capsicum annuum* l.) With different nanometal particles

İrem Biçer[1*] [0000-0002-5359-8478] and Hayriye Yıldız Daşgan[1] [0000-0002-0403-1627]

[1] Department of Horticulture, Faculty of Agriculture, University of Cukurova, Adana 01330, Türkiye

iremmbicer@gmail.com

Abstract: Germination and seedling emergence are of critical importance in determining pepper (*Capsicum annuum L.*) seed quality and ensuring successful cultivation. The literature reports that pre-germination (priming) techniques applied to pepper species significantly enhance germination success and seedling development. Seed priming with different nanometal particles was conducted to enhance germination and emergence performance of pepper (*Capsicum annuum* L.) seeds. In this study, pepper seeds were primed with titanium, silver, copper, iron, zinc, and manganese nanometal particles. The effects of the priming treatments were evaluated based on parameters including emergence percentage, time to emergence, emergence speed index, germination percentage, mean germination time, and germination rate index. The results indicated that nanometal particle-based priming positively influenced the germination and emergence performance of pepper seeds.

Keywords: Nanopriming, Seed vigor, Seed Performance, Emergence Uniformity

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Reference evapotranspiration trends in a semi-arid mediterranean climate: a six-decade station record from Adana, Turkiye (1960–2024)

Omar Alsenjar[1] [0000-0001-9471-794X], Mahmut Cetin[1] [0000-0001-5751-0958], Hakan Aksu[2] [0000-0003-4686-7446], Volkan Çatalkaya[3] [0000-0002-8078-3548] and Ali Demir Keskiner[4] [0000-0002-7930-9363]

[1]Department of Agricultural Structures and Irrigation, Cukurova University, Adana, Türkiye
[2]Department of Meteorological Engineering, Samsun University, Samsun, Türkiye
[3]Directorate of Eastern Mediterranean Agricultural Research Institute, Adana, Türkiye
[4]Department of Agricultural Structures and Irrigation, Sanliurfa, Harran University, Türkiye

oalsenjar@cu.edu.tr/ omarsenjar@yahoo.com

Abstract: Evapotranspiration (ET) is a crucial component of the hydrological cycle that directly affects water availability and the sustainability of irrigated and rainfed agriculture. Understanding its long-term variability is essential for climate adaptation and water-resources management in semi-arid regions. This study quantifies long-term trends in reference evapotranspiration (ETo) calculated by using data from the Adana meteorological station, Türkiye, based on monthly aggregates derived from a continuous daily record spanning 1960–2024. ETo was estimated with the standardized FAO-56 Penman–Monteith method, and temporal changes were assessed at monthly, seasonal, and annual scales using the nonparametric Mann–Kendall test and Sen's slope estimator. Results show statistically significant monthly increases in April, July, October, and December, contrasted with decreases in January, June, August, September, and November. At the seasonal scale, declining trends were observed in winter, summer, and autumn, whereas spring exhibited stable to slightly increasing behavior. Despite these seasonal decreases, the annual series displays a persistent upward trend in ETo (approximately +0.8 mm yr^{-1}), indicating a long-term intensification of atmospheric evaporative demand. These findings underscore the value of sustained ETo monitoring and highlight the need to integrate evapotranspiration trends into climate-resilient water-resources planning and agricultural adaptation strategies in semi-arid Mediterranean regions.

Keywords: Reference Evapotranspiration (ETo), FAO-56 Penman–Monteith, Non-parametric Trend Analysis (Mann–Kendall, Sen's Slope), Semi-Arid Mediterranean Climate, Irrigation Water Management Variability

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Psychobiotic agents: the neuroactive metabolites of probiotics

Nurten YILMAZ[1,2] [0000-0001-9603-4464]

[1]Vocational School of Feke, Cukurova University, Adana, Turkiye.
[2]Department of Microbiology, School of Medicine, Cukurova University, Adana, Turkiye

ntoy@cu.edu.tr

Abstract The gut–brain axis has attracted growing attention, as mounting evidence shows that microbial activity significantly affects host neurophysiology. Central to this interaction are biogenic amines, including serotonin, dopamine, gamma-aminobutyric acid (GABA), tryptamine and phenylethylamine, which are synthesised by selected probiotic strains as microbial metabolites. Acting as postbiotic agents, these metabolites maintain biological activity independently of bacterial viability, representing a mechanistic link between gut bacteria and mental health. Fermented products are natural sources of these compounds, as microbial communities transform dietary substrates into various neuroactive molecules. This metabolic capacity highlights the important role of gut bacteria in producing psychobiotic agents. By modulating neurotransmission, immune responses and stress-related pathways, postbiotic biogenic amines provide the basis for novel nutritional and therapeutic strategies. This review summarises the current knowledge on the interplay between probiotics, their metabolites and fermentation-derived postbiotics, with a particular focus on the therapeutic potential of psychobiotic agents in supporting mental well-being.

Keywords: Psychobiotics, Biogenic Amines, Microbial Metabolites, Probiotics, Postbiotics, Fermented Products, Gut Bacteria,

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Phenomics study is all about idea

Yong Suk Chung[1] [0000-0003-3121-7600]

[1]Jeju National University

yschung@jejunu.ac.kr

Abstract: Phenomics is often regarded as an intimidating field, associated with high-cost instruments, complex infrastructures, and advanced technological platforms. This perception frequently prevents researchers from engaging with it, even though phenomics offers powerful opportunities to accelerate discovery across the life sciences. In reality, the essence of phenomics is not defined by expensive equipment, but by the creativity of the questions we ask and the ideas we bring to the table. With thoughtful design and accessible approaches, phenomics can be integrated into research programs of many scales and disciplines. In this talk, I will share experiences and examples from my own work, illustrating how idea-driven strategies can be just as impactful as technology-driven ones. By demystifying phenomics and highlighting its practical entry points, I hope to encourage researchers to see it not as an exclusive domain but as an open, versatile framework that can enrich their studies. Ultimately, my goal is to show that anyone with curiosity and creativity can engage with phenomics - and that the true value of the field lies not in the tools we use, but in the perspectives we bring.

Keywords: Phenomics, Idea-Driven Research, Accessible Science, Demystifying Phenomics, Low-Cost Phenotyping

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Periodic feeding in dairy cattle

Hasan Batuhan Demircioglu[1] [0009-0007-3235-5403] and Harun Kutay[1] [0000-0001-9163-4831]

[1]University of Çukurova, Faculty of Agriculture, Department of Animal Science, 01330 Adana Turkiye

batuhandemircioglu0@gmail.com

Abstract: This study examines the lactation stages of dairy cattle and their specific nutritional requirements, particularly in terms of vitamin requirements. The lactation process is divided into four main stages: early lactation (0–70 days postpartum), mid-lactation (70–140 days), late lactation (140–305 days), and the dry period (pre-partum ~60 days). Energy, protein, vitamin, and mineral requirements increase significantly due to increased milk production in early lactation. B vitamins, in particular, vitamins A, C, D, and E, play a critical role in energy metabolism, immune function, and reproductive health. Milk yield gradually decreases in mid- and late lactation, and nutrient and vitamin requirements change accordingly. During the dry period, adequate intake of vitamins A, D, E, and B vitamins is crucial for preventing metabolic diseases, supporting immunity, and optimizing calf development during parturition and subsequent lactation. In the study, the effects of balanced nutrition on milk yield, animal health and farm efficiency were emphasized by detailing the vitamin requirements specific to each lactation stage.

Keywords: Milk, Vitamin, Energy, Protein

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Complex agrotechnical measures and their effect on the number of bolls, cotton yield per boll, 1000-seed weight and fiber output in cotton varieties

Seyidaliyev Nizami[1] [0009-0000-2167-4782], Khalilov Khaliq[2] [0009-0009-5704-1149], Mammadova Mina[3][0000-0002-6484-1488], Babayeva Konul[4] [0000-0002-0022-2063] and Zeynalova Aytan[5] [0000-0001-6672-9142]

[1,2,3,4,5]Azerbaijan State Agricultural University, Ganja, Azerbaijan

vmns@mail.ru

Abstract: Depending on the application of complex agrotechnical measures, in the "Ganja-182" cotton variety, under the planting scheme of 74,000 plants per hectare (90x15x1), with sowing carried out on April 25, application of $N_{120}P_{75}K_{50}$ fertilizer per hectare, thinning on May 15, and irrigation regime 1-4-0, the number of fruiting bodies was 14, of which 4 (32,7%) were shed. This indicator was 5–7 units higher compared to other variants. In the "Beyaz-Altun" variety, the results were slightly lower. The highest performance in this variety was also obtained under the planting scheme of 74,000 plants per hectare (90x15x1), sowing on April 25, application of $N_{120}P_{75}K_{50}$ fertilizer per hectare, thinning on May 25, and irrigation regime 1-4-0, where the number of fruiting bodies was 9, of which 4 (44,4%) were shed.

The weight of raw cotton per boll, the number of bolls per plant, fiber yield, and the weight of 1000 seeds were higher in both varieties under the planting scheme of 74,000 plants per hectare (90x15x1), with sowing on April 25, application of $N_{120}P_{75}K_{50}$ fertilizer per hectare, thinning on May 15, and irrigation regime 1-4-0.

Keywords: Complex Agrotechnical Measures, Cotton, Boll, Raw Cotton Yield Per Boll, Fiber Yield, 1000-Seed Weight.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Comparative assessment of yield and essential oil characteristics of Arapgir purple basil (*ocimum basilicum* l.) Cultivar grown in Arapgir and Battalgazi, Turkiye

Ayse Ozlem Tursun[1] [0000-0003-2495-0978] and Tefide Kızıldeniz Gürbüz[2] [0000-0002-5627-1307]

[1] University of Malatya Turgut Ozal, Battalgazi Vocational High School, Battalgazi, Malatya, Turkiye
[2] Niğde Ömer Halisdemir University, Biosystems Engineering, Faculty of Agricultural Sciences and Technologies, Nigde, Turkiye

ayoztursun@hotmail.com

Abstract: This study aimed to evaluate and compare the yield components and essential oil characteristics of the local Arapgir Purple Basil (*Ocimum basilicum* var. purpurascens.) cultivar cultivated in two distinct ecological regions of Türkiye: Arapgir and Battalgazi. Arapgir, located in Malatya province, is recognized as the leading location in Türkiye for the cultivation of the Arapgir Purple Basil due to its long-standing production tradition and favorable microclimate. Battalgazi, also situated within the same province and agroecological zone as Arapgir, was selected for this study to investigate whether comparable yield and quality parameters could be achieved outside the primary production area but within similar environmental conditions. Field trials were conducted during the 2021 growing season under uniform agronomic practices. The key agronomic traits examined included fresh herb yield, dry herb yield, dry leaf yield, essential oil content, and essential oil yield. Results indicated that Battalgazi exhibited increases in fresh and dry herb yield as well as dry leaf yield compared to Arapgir. However, essential oil content showed a slight decrease in Battalgazi, while essential oil yield increased due to the higher biomass production. These findings suggest that while Arapgir remains a prominent location for high-quality essential oil production, Battalgazi may offer an advantageous alternative for achieving greater biomass and overall essential oil output. The results underline the importance of regional environmental factors and support informed decision-making for site-specific basil cultivation strategies.

Keywords: Arapgir Purple Basil, Essential Oil Yield, Fresh Herb Yield, *Ocimum Basilicum* Var. Purpurascens, Regional Comparison, Türkiye

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Comparative analysis of reproductive qualities of beef cows depending on the season of the year

Bexultan Aryn[1] [0000-0002-8720-0050]*, Rashit Uskenov[1] [0000-0003-2163-2392], Saule Bostanova[2] [0000-0001-6661-8362], Zhanserik Assanov[3] [0000-0002-5850-7627], Togzhan Yengsebek[4] [0009-0008-0020-0324], Alexander Strelets[5], Sergey Tsan[6]

[1]NCJSC «S.Seifullin Kazakh Agro Technical Research University», Faculty of veterinary and animal husbandry technology, Department of Technology and Processing of Livestock Production, 010011 Astana, Kazakhstan
[2]LLP «Kazakhstan Technology Commercialization Center», 010000 Astana, Kazakhstan
[3]IE «Adilet VetCompany», 010000 Astana, Kazakhstan
[4]NCJSC «S.Seifullin Kazakh Agro Technical Research University», Joint Kazakh-Chinese Laboratory for Biological Safety, 010011 Astana, Kazakhstan
[5]LLP «Novobratskoe & K», 020511, Akmola region, Bulandy district, Kazakhstan
[6]LLP «North Kazakhstan Agricultural Experimental Station», 150300, North Kazakhstan region, Akkayyn district, Kazakhstan

a.beka2012@mail.ru

Abstract: The research showed that in NK AES LLP, the calving season was mainly in the spring months (March-April), while insemination was carried out in the spring-summer period (May-July), in Novobratskoe & K LLP, calving was concentrated in the winter period (December-January), and insemination was in the winter-spring period (February-April). The basis of the herd in both farms was made up of adult cows - 87.3% and 83.7%, respectively. The proportion of first-calf heifers was 12.7% and 16.3%. The established values of the calving rate were within 76.7-93.6%, and the yield of live calves varied from 77.2% to 88.4%.

Keywords: reproduction, cows, reproductive function, Qazaq Aqbas breed, season of the year

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Artificial intelligence for sustainable agriculture: early disease detection in vineyards

Deniz Uğur Güzel [1,*] [0000-0003-2606-3985]

[1] Van Provincial Directorate of Agriculture and Forestry, Tuşba,Van, Türkiye

denizugur.guzel@tarimorman.gov.tr

Abstract: This study addresses the role of artificial neural networks (ANNs) and their advanced version, Convolutional Neural Networks (CNNs), in the early diagnosis of diseases in agriculture and their application potential in vineyards. The time-consuming and costly nature of traditional methods has accelerated the adoption of ANN and especially CNN technologies in agricultural applications. Deep learning-based models have achieved accuracy rates exceeding 95% by detecting disease symptoms on grape leaves, offering early diagnosis capabilities.

The effective use of methods such as Convolutional Neural Networks (CNNs), Transfer Learning, and YOLO in real-time applications has provided fast and accurate detection capabilities in field conditions. These technologies facilitate the early detection of diseases, reducing the use of chemical pesticides and contributing to environmental sustainability. However, challenges such as data scarcity, the development of models resistant to field conditions, and hardware costs limit the widespread adoption of these technologies.

The effective use of convolutional neural networks in early disease detection in vineyards represents an important tool for increasing the efficiency of agricultural processes and reducing environmental impacts. It is expected that these technologies will find a wider application area in agriculture with larger data sets and optimized algorithms.

Keywords: Artificial Neural Networks (ANN), Convolutional Neural Networks (CNN), Grape Diseases, Deep Learning, Image Processing.

* Supported through project FDK-2024-11262 by the BAP Coordination Office of Van Yüzüncü Yıl University.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Application of an insectoacaricidal preparation based on *anabasis aphylla* for the protection of animals against ectoparasites using an automated spraying method

Lider Lyudmila[1] [0000-0001-5842-0751], Yeszhanova Gulzhan[1] [0000-0001-8411-466X], Uskenov Rashit[1] [10000-0003-2163-2392], Bostanova Saule[2] [0000-0001-6661-8362] and Mamytbekova Gulnur [1] [0000-0002-3866-5003]

[1] NJSC S. Seifullin Kazakh Agrotechnical research University, Astana, 62 Zhenis Avenue, 010000, Kazakhstan
[2] Kazakhstan Technology Commercialization Center, Astana, 63 Abay street, *010000,* Kazakhstan

l.lider@kazatu.kz

Abstract: This study examines and characterizes the species composition of ectoparasites infesting cattle maintained at the "North Kazakhstan Agricultural Experimental Station" and assesses the prevalence of arachnoentomosis during the spring–summer period through calculation o

f the abundance and occurrence indices.

For the first time, an insectoacaricidal preparation derived via pyrolysis of plant fiber incorporating Anabasis aphylla was employed under pasture conditions to protect cattle from ixodid ticks, dipterans, and the biting louse *Bovicola bovis*, using an automated spraying system.

The study established the optimal application parameters for the insecticidal preparation and evaluated its influence on the clinical health indicators of the animals**.**

Keywords: Ectoparasites, Cattle, Plant-Based Insecticides, *Anabasis Aphylla*, Automated System.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Yield of cotton lines in different climatic-soil conditions of Uzbekistan

Sirojiddin Juraev [1,[0009-0004-0220-1807]], Gulchehkra Narmatova[1,[0009-0002-1593-9160]], Dilnoza Raimova[2,[0009-0005-4462-7512]]

[1]Tashkent State Agrarian University, Tashkent, 100140, Uzbekistan
[2]Karshi State University, Karshi, 180119, Uzbekistan

juraev.197817@mail.ru

Abstract: An assessment of the yield performance of cotton (*Gossypium hirsutum* L.) lines was carried out in the Tashkent, Fergana, and Kashkadarya regions of the Republic of Uzbekistan. Ten lines with different genetic origins were analyzed. The productivity evaluation identified the influence of genotype and environment on yield formation. The results of three-year experiments demonstrated that environmental factors have a greater effect on yield variability than the genotype. To determine the optimal combination of genotype and geographical location, a series of experiments must be conducted.

Keywords: *Gossypium hirsutum* L., cotton breeding, genotype–environment interaction, ecological trials, heritability

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

In vitro acetylcholinesterase inhibition and cytotoxic effects of selected phenolic compounds on sh-sy5y cells

Fatma GÖÇ[1] [0000-0003-2775-8033], Rabia Sare YANIKOĞLU [2] [0000-0003-4619-0957], Gülbahar Özge ALİM TORAMAN[3] [0000-0002-7816-7551], Aynur SARI [4] [0000-0001-8116-7053], Serdar MAKBUL[5] [0000-0001-8798-0926], Kamil COŞKUNÇELEBİ[6] [0000-0001-5713-6628]

[1] Tokat Gaziosmanpaşa University, School of Pharmacy, Department of Pharmacognosy. 60100 Tokat, Türkiye
[2] Bezmialem Vakıf University, School of Pharmacy, Department of Biochemistry. 34093 İstanbul, Türkiye
[3] Bezmialem Vakıf University, School of Pharmacy, Department of Pharmacognosy. 34093 İstanbul, Türkiye
[4] İstanbul University, School of Pharmacy, Department of Pharmacognosy. 34452 İstanbul, Türkiye
[5] Recep Tayyip Erdoğan University, Faculty of Science, Department of Biology. 53100 Rize, Türkiye
[6] Karadeniz Technical University, Faculty of Science, Department of Biology. 61080 Trabzon, Türkiye

fatma.goc@gop.edu.tr

Abstract: This study investigated the *in vitro* acetylcholinesterase (AChE) inhibitory activities and cytotoxic effects of twelve naturally derived phenolic compounds isolated from *Scorzonera ketzkhowelii* Sosn. ex Grossh. AChE inhibition was assessed by the Ellman colorimetric method, employing galantamine as a reference inhibitor, while cytotoxicity was evaluated through the MTT assay across six serial dilutions starting from 100 µM. Among the tested compounds, 3,5-di-*O*-caffeoylquinic acid and quercetin 3-*O*-*α*-arabinopyranoside exhibited notable AChE inhibitory activities, with IC_{50} values of 0.56 µM and 0.89 µM, respectively, closely approaching the potency of galantamine (0.34 µM). Additionally, hydrangeic acid 4'-*O*-*β*-D-glucopyranoside, hydrangenol, and thunberginol F 7-*O*-*β*-D-glucopyranoside displayed moderate inhibitory activities, with IC_{50} values ranging between 1.69 and 2.57 µM. In the cytotoxicity assays, hydrangeic acid 4'-*O*-*β*-D-glucopyranoside demonstrated the strongest effect on SH-SY5Y cells, yielding an IC_{50} of 1.47 µM. This was followed by 3,5-di-*O*-caffeoylquinic acid, p-hydroxybenzaldehyde, and esculin, each showing IC_{50} values below 3 µM, indicating considerable cytotoxic potential. Overall, these findings highlight the dual pharmacological promise of phenolic compounds from *S. ketzkhowelii*, which not only act as effective AChE inhibitors relevant to neurodegenerative disorders but also exhibit significant cytotoxic effects against neuroblastoma

cells. This study provides a valuable basis for future investigations aimed at elucidating the molecular mechanisms underlying these activities and supports the continued exploration of phenolic structures from edible and medicinal plants as promising multitarget agents in both neurological and oncological therapeutic research.

Keywords: Scorzonera ketzkhowelii, phenolic compounds, acetylcholinesterase inhibition (AChE), cytotoxicity, galantamine,

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

The effect of solvent nature on the selective methylation of 1,9-dihydro-6h-purin-6-one and its influence on maize root growth

Jasur Bozorov[1] [0009-0002-1003-4785], Foziljon Saitkulov[2] [0009-0002-3806-3931], Khudayberdi Nazarov[2,][0000-0003-3629-6598], Obidjon Abduraxmonov[2] [0000-0001-8765-4321], Rasul Beglerbekov[3] [0000-0003-2468-1357]

[1]Tashkent Institute of Chemical Technology Research, Tashkent, 100088, Uzbekistan
[2]Tashkent State Agrarian University, Tashkent, 100140, Uzbekistan
[3]Institute of Agriculture and Agrotechnologies of Karakalpakstan, Uzbekistan,

fsaitkulov@bk.ru

Abstract: The consider examines the particular methylation of 1,9-dihydro-6H-purin-6-one in different solvents and its organic effect on maize (Zea mays L.) root development. Methylation responses were carried out in polar and nonpolar media such as ethanol, acetone, and toluene to decide dissolvable impacts on regioselectivity. Spectroscopic strategies (Â¹H NMR, IR) affirmed the arrangement of 1-, 7-, and 9-methyl subordinates. The organic tests illustrated that methylated purine subordinates altogether improved maize root prolongation and biomass collection compared to the control. The comes about show that dissolvable extremity not as it were deciding methylation course but moreover impacts the physiological action of the synthesized compounds.

Keywords: 1,9-Dihydro-6H-purin-6-one; methylation; solvent effect; regioselectivity; maize (Zea mays L.); root growth; biological activity

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

The composition of sucking pests and entomophages of orchards

Bakhtiyor Nasirov[1,[0009-0004-9322-9580]], Davlatbek Ruzikulov[1,[0000-0002-5689-4563]], Orifjon Artikov[1,[0009-0004-4391-7297]], Shakhnoza Khaidarova[1,[0000-0001-5092-5069]

[1]Tashkent State Agrarian University, Tashkent, 100140, Uzbekistan

konf.zara@gmail.com

Abstract: The article presents information about the susceptibility of aphids, spider mites and scale insects from sucking pests that cause serious damage to orchards, and the composition of entomophages in the fight against them. Obtaining a high-quality harvest in gardens is one of the pressing problems; it has been established that sucking pest cause serious damage. Since fruit trees are perennial, they create stable ecological conditions for the development of various pests. Measures to combat pests and diseases are one of the important reserves for increasing fruit yield. Currently, these activities have become an integral part of fruit growing technology. As of 2016, the area of orchards in Uzbekistan was 261.8 thousand hectares, of which 120.5 thousand hectares are seed orchards. 44% of the total orchard area is occupied by apple trees. The natural conditions of Uzbekistan are considered the most favorable for fruit tree cultivation. In orchards and vineyards, it is impossible to obtain a high-quality harvest without protecting them from pests and diseases. More than 260 pests and more than 50 diseases have been recorded in fruit and grape orchards in Uzbekistan. One of the main pests causing significant damage to fruit tree yields is the reptile pests (even-winged aphids, scale insects, and spider mites). Sucking insects disrupt the physiological processes of plants during the feeding process. This weakens the plant, disrupts the metabolism of the plant, slows down its growth, and these negative consequences become apparent during the formation of shoots, leaves, flowering, and fruiting.

Keywords: Garden, pest, entomophage, sucker, scale insect

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

A historical analysis of land development and irrigation–reclamation activities in Uzbekistan

Naim Oblomurodov[1, [0009-0003-5791-8250]], Oybek Rashidov[1, [0009-0005-8093-1968]], Fayzulla Tolipov[1, [0009-0007-0870-4802]], Sanjarbek Shoyimov[1, [0009-0007-0870-4802]]

[1]Tashkent State University of Economics, Tashkent, 100066, Uzbekistan

oblomurodovnaim@gmail.com

Abstract: Currently, aluminum alloys are widely used in the production of agricultural machinery parts. This article discusses the technology of increasing the tensile strength of aluminum alloys under the influence of various modifying elements. Samples were cast and tested. The studies were conducted on aluminum-copper and aluminum-magnesium alloys from aluminum alloys. As a result of the tests, the tensile strength of aluminum alloys was increased by 5%-7%. Based on the results obtained, a graph was constructed showing the dependence of the number of modifying elements on the tensile strength. At the end of the article, the authors present their conclusions based on the results of the studies.

Keywords: the total agricultural area, intensive irrigation construction, infrastructural facilities.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

The degree of population variability of g. Hirsutum l. Varieties in different climatic conditions

Malokhat Khalikova[1,][0000-0001-9620-6131], Guzal Kholmurodova[2,][0000-0002-3986-3861], Umida Qarshiyeva [3,][0009-0006-8458-0832], Khurshida Keldiyarova[3,][0000-0002-9975-6259], Shukhrat Sharipov[1,][0000-0001-5109-2345] , Baxrom Madartov[1,][0009-0008-7558-0229] , Jaxongir Ergashev[1,][0009-0006-3063-5068]

[1]Cotton Breading, Seed Production and Agrotechnologies Research Institute, Tashkent, 111218, Uzbekistan
[2]Tashkent State Agrarian University, Tashkent, 100140, Uzbekistan
[3]Samarkand State University named after Sharof Rashidov, 140104, Samarkand, Uzbekistan

khalikovamalokhat@gmail.com

Abstract: The morphological and economic characteristics of local cotton varieties (*Gossypium hirsutum L.*) were studied under different soil and climatic conditions. The dynamics of variability and heritability of traits, as well as correlations between them, were analyzed over several years. It was found that cultivars Omad, Akkurgan-2, S-01, Bukhara-6, Bukhara-102, and lines T-100 and L-001 differed in quantitative traits and in the proportion of atypical plants within populations. The results indicate that the variability observed is largely due to environmental adaptation, which affects the stability and quality level of the varieties. These findings emphasize the need for continuous selection work, proper zoning, and maintenance of population stability in breeding programs.

Keywords: cotton, population, variability, heritability, modification, population variability, typicality

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Improvement of the methodology for the production of elite cotton seeds based on terminology unification

Shukhrat Kozubaev[1,[0000-0002-5780-3416]], Guzal Kholmurodova[2,[0000-0002-3986-3861]], Giyas Abduvokhidov[1,[0000-0003-1224-5462],], Nadira Abdurakhmanova[1,[0000-0003-3099-9735]], Dilbar Akhmedova[1,[0009-0003-8291-4358]], Nasiba Mavlonova[2,[0009-0007-7634-5645]], Nodiraxon Mirxamidova[3,[0009-0004-9199-0202]]

[1]Cotton Breeding, Seeds Production and Agrotechnologies Research Institute, 111218, Uzbekistan
[2]Tashkent State Agrarian University, Tashkent, 100140, Uzbekistan
[3]Andijan Institute of Agriculture and Agrotechnologies, 170600, Uzbekistan

kozubaev.s@yandex.com

Abstract: One of the main goals of cotton production in Uzbekistan is the development of high-yielding cotton varieties resistant to abiotic and biotic factors, as well as the establishment of a sustainable seed industry. A stable seed production infrastructure not only improves yields but also significantly enhances product quality. In this regard, the selection of the most optimal methods for the production of elite (basic) seeds is of great importance. The most widely used method of seed multiplication ensures the quality and longevity of a breeding variety. Standards must be harmonized with international requirements. Maintaining genetic identity through various methods of reproducing registered breeding varieties is one of the key goals to prevent accelerated genetic degradation during seed multiplication. To meet standardization requirements, it is crucial to develop an optimal, scientifically based methodology for producing elite (basic) cotton seeds, which is a mandatory condition in the seed industry. In recent years, great attention has been paid to the intensive development of the textile industry in the Republic of Uzbekistan, which is one of the main sources of employment and foreign currency income. Cultivating high-quality cotton seeds for sowing increases the amount of cotton raw material, ensures the production of fiber with high technological properties, and enables the manufacture of competitive products. One of the main objectives is to organize cotton fiber production, preserve and improve varietal diversity, and enhance seed quality. For this purpose, in the near future it is necessary to improve and introduce modern methods of obtaining original and elite seeds that ensure the dimensional uniformity and quality of promising varieties, and contribute to the preservation and improvement of valuable varietal characteristics under deteriorating environmental conditions and water scarcity.

Keywords: Cotton, seed production, variety, seeds, originator, elite, yield, product quality

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Efficiency of cotton cultivation using the physiologically active substance boms without application of mineral fertilizers

Dilobar Rakhimova[1] [0000-0002-1475-2698], Sarvinoz Togayeva[1] [0009-0009-8295-2948], Lola Xalilova[1] [0009-0008-1738-9792], Nargiza Ergasheva[1] [0000-0001-5079-3166]

[1]Tashkent State Agrarian University, Tashkent, 100140, Uzbekistan

dilobarraximova46@gmail.com

Abstract: Cotton production is the main branch of agriculture in Uzbekistan, where extensive scientific and practical experience has been accumulated in cotton-growing agro-technologies. The unique soil and climatic conditions of the country create natural challenges for cotton cultivation. Early spring precipitation and the early onset of cold weather in autumn—such as snowfall or rainfall in early October—complicate both the ripening and harvesting of cotton. Therefore, in Uzbekistan's cotton production, the breeding of early-maturing cotton varieties and the development of intensive agrotechnical measures hold great importance. Although almost all of the cotton varieties currently cultivated in the republic are early-maturing, due to the strong influence of weather conditions, harvesting often extends until November, making the production of high-yield and high-quality cotton problematic. Considerable scientific research has been conducted in this regard. In particular, in recent years, the widespread application of physiologically active substances in Uzbekistan's cotton production has yielded positive results in producing early, abundant, and high-quality yields. These physiologically active substances may be applied to the soil, treated on cotton seeds prior to sowing, or used during the vegetation period. They are of natural origin and non-toxic, and therefore are considered to occupy a specific niche in the production of organic cotton. This article examines the use of the physiologically active substance *Tevevit BOMS* during soil preparation, applied at rates of 300–1000 kg/ha without the use of chemical mineral fertilizers, and its effects on seed germination, growth and development of cotton plants, as well as the prospects of producing early, abundant, high-quality, and environmentally friendly cotton.

Keywords: Cotton, typical gray soil, Tevevit BOMS, physiologically active substance

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Justification of the parameters of the working organ of the device for planting seedlings of perennial plants

Sherzodkhuja Mirzakhodjaev[1] [0000-0001-8593-1450], Azzam Musurmonov[2] [0009-0003-2969-0973], Khodzhimurod Shodiev[3] [0009-0007-9132-9459], Shakhnoza Buranova[4] [0009-0006-8160-7999], Buron Nurmikhamedov[5] [0009-0008-4876-0582], Shavkat Mamasov[5] [0097-0007-7218-1452]

[1]Tashkent State Agrarian University, Tashkent, 100140, Uzbekistan
[2]Scientific research institute of horticulture, viticulture and winemaking named after Academician M. Mirzayev, Tashkent, 230100, Uzbekistan
[3]Samarkand state university of veterinary medicine, livestock and biotechnology, Samarkand, 140103, Uzbekistan
[4]Karshi State University, Kashkadarya 180100, Uzbekistan
[5]Institute of Agrobiotechnologies and Food Security of Samarkand State University named after Sh.Rashidov, Samarkand, 100180, Uzbekistan

tursunbayev.sarvar@tdtu.uz

Abstract: For each type of forestry area, special soil cultivation is required, a specific type and size of seedlings for planting, and a planting scheme. Applied to forestry seedling planting machines according to agrotechnical requirements. The general requirements for them are as follows: proper placement of seedlings and root parts of seedlings at planting sites, ensuring planting depth and density, maintaining the specified distance between seedlings in the row (planting stage) and not damaging the seedlings. In the following years, artificial forest plantations began to be created on large areas by planting large-sized seedlings. In such conditions, tractor-mounted hole diggers, as well as special digging machines for planting and transplanting large seedlings with soil, are aimed at widespread use.

Keywords: forest, forestplanting, seedling, machine, coulter, parameter, width, height

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Genetic characteristics of the soils of the vertical zone of the western Tyanshan

Nodira Raupova[1, [0000-0002-0230-9760]], Bobur Kamilov[1, [0000-0002-7323-0136]], Begzod Xalimov[1, [0009-0004-0133-6240]]

[1]Tashkent State Agrarian University, Tashkent, 100140, Uzbekistan

nodiraraupova@gmail.com

Abstract: In the world, scientific research is being conducted on such priority areas as determining the current state of soils and their changes under the influence of anthropogenic factors, improving their melioration state, preserving and increasing fertility. In particular, special attention is being paid to research on determining the morphogenetic features, chemical composition, and unique properties of soil formation, identifying negative conditions arising under the influence of anthropogenic factors, eliminating their consequences, improving the melioration state, as well as preserving and increasing fertility. In world practice, on issues of improving the humus state, preventing degradation processes, safe and effective ways to apply advanced agricultural technologies are being widely researched, including improving the humus state of soils as a result of technogenic and anthropogenic factors, restoring, preserving, and increasing the fertility of degraded soils, applying agricultural technologies aimed at eliminating, deteriorating the humus state and soil properties of soils under the influence of desertification processes, developing advanced solutions to prevent the acceleration of greenhouse effect processes and CO_2 emissions during global climate change. Detailed study of the main properties of soils by zonal types, humus composition and humus state, and the mechanism of humus formation in eroded virgin and riparian soils are of scientific and practical importance. However, research on the humus state of mountain and foothill soils, the mechanism of humus formation, the physicochemical properties of humus substances, elemental composition, and their fertility of the studied object has not been conducted sufficiently.

Keywords: Natural and anthropogenic factors, humus formation main types, subtypes, erosion, soils, mountain

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Development of an integrated unit for chemical and electron beam treatment of agricultural plants

Rafiq Matchanov[1] [0009-0009-3776-258X], Azamat Yuldashev[1] [[0009-0002-9749-2082], Madrahim Allanazarov[2] [0009-0009-3602-4841]

[1]JV "Agrixim" LLC, Tashkent, 100007, Uzbekistan
[2]Tashkent State Agrarian University, Tashkent, 100140, Uzbekistan

madrahim62@gmal.com

Abstract: This article presents the design and testing results of an Integrated Unit for chemical and electron beam treatment of agricultural plants. Chemical treatment is performed using a fan sprayer. Electron beam treatment is carried out using two ultraviolet irradiation (UVI) lamps mounted on the front of the tractor. Before cotton defoliation, bench tests were conducted to determine the liquid flow rate. It was discovered that the total liquid flow rate per minute at a pressure of 5 to 10 bar ranged from 21 to 32 l/min. Specifications of the sprayer and the electron beam system, as well as its operating technology, are presented. Cotton cultivation conditions in Central Asia are described. A description of the integrated unit, as well as the design of a new sprayer and ultraviolet irradiation system, is provided. The integrated unit can be supplied to agricultural producers upon request in the following configurations: with a spraying unit, with an electron beam unit, and as a complete unit with both a spraying unit and an electron beam unit. The results of field trials of the machine for cotton defoliation are displayed. It was discovered that integrated chemical and electron beam treatment of cotton increased the boll-opening rate by 25%. Leaf abscission also has been increased. In practice, the combined unit can be used separately for chemical or electron beam treatment of plants.

Keywords: Cotton, defoliation, integrated unit, ultraviolet irradiation (UVR), tractor, sprayer

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Physiological maturation of grains in three different regions

M. Mahammatova[1] [0009-0008-1956-9017], N. Mavlonova[1] [0009-0007-7634-5645], S. Tursoatov[1] [00998999164429]

[1]Tashkent State Agrarian University, Tashkent, 100140, Uzbekistan

maxammatovamexriniso@gmail.com

Abstract: The physiological maturation period of wheat and other grains is dependent on various factors, including the biological, ecological, genetic, physiological, and biochemical characteristics of the crop and variety, the cultivation conditions, the hygroscopicity and air permeability of the seed, as well as its anatomical structure, external conditions, and seed moisture. Although immature wheat grains do not have significant negative affect to the amount of flour produced, they lead to lower quality or result in poor-quality dough. The physiological maturation of grains or seeds involves very complex biological and physiological processes, among which the most important is the grouping of protein substances.

Keywords: wheat, grain, physiological ripening, biological, region.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Fiber quality indicators and seed oil content of organic cotton

Shukhrat Abdualimov[1] [0009-0009-5115-2227], Dilobar Rakhimova[2] [0000-0002-1475-2698]

[1]Cotton Breeding, Seeds Production and Agrotechnologies Research Institute, 111218, Uzbekistan
[2]Tashkent State Agrarian University, Tashkent, 100140, Uzbekistan

dilobarraximova46@gmail.com

Abstract: The work studied the biopreparation Boms, persecution in preparation. Empirical data are presented on the effect of the biological product on the development, formation, speed of detection of bolls and the productivity of the cotton variety "Andijan - 37 -". The experiments conducted in the Tashkent region in 2018–2020 differed from the long-term ones. The use of the drug Boms before sowing, at the rate of 300-1000 kg /ha, gave friendly shoots of cotton. The number of germinated seeds was 126.3-129.7 million/ha, which is 5.3-8.7 more than in the control variant. The use of the drug affected the height of the stem. The height of the stem in the variant with the use of Boms was higher by 8.9–9.8 cm compared to the control. There was an increase in sympodial branches, this figure was equal to 13.9 - 15.1 pieces, which is 1.0 - 1.8 pieces more than the control variant. Under the influence of Boms, the mass of raw cotton in one box increased. The average value was 5 g, which is 1.8 g more than the control. The highest yield was observed in the variant with the use of the preparation Bosm 600 kg/ha – 3,8 t/ha. A further increase or decrease in the norm of the drug instilled a decrease in this indicator.

Keywords: mineral fertilizers, fungicides, herbicides, pesticides

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Modelling the deviation of water flow from the flow line during long-distance sprinkling

Zafar Khudayarov[1] [0009-0009-4137-4068], Tolib Khalmuradov[1] [0009-0002-7304-8361], Madrakhim Allanazarov[1] [0009-0009-3602-4841], Sherzodkhuja Mirzakhodjaev[1] [0000-0001-8593-1450], Khusniddin Irisov[1] [0000-0001-9555-8813]

[1]Tashkent State Agrarian University, Tashkent, 100140, Uzbekistan

hudayarovzafar5@gmail.com

Abstract: This article presents the results of a theoretical study on the deviation of water flow from the flow line in direct-flow sprinkling devices. The deviation of water flow from the flow line significantly affects its distribution over the field surface and the efficiency of sprinkling. The article also examines the forces acting on the water flow during sprinkling, the trajectory of the flow movement, and its mathematical model. In addition, analytical calculations of sprinkling intensity during long-distance sprinkling are carried out. The influence of the initial velocity of artificial droplets on the deviation of the water flow from the flow direction is studied.

Keywords: sprinkling, water flow, deviation angle, mathematical model, aerodynamic force, trajectory.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

The effects of drought associated with climate change on paddy farming

Hilal BÖLÜK[1] [0000-0002-7439-508X], Beyza ÖZTÜRK ERDEM[2] [0000-0003-2715-7852], Tunahan ERDEM[3] [0000-0002-1595-6852]

[1] Ministry of Agriculture and Forestry Çorum Kargı County Agriculture and Forestry Directorate, Çorum- Türkiye
[2]Çukurova University Rectorate Quality Coordination Department, Adana- Türkiye
[3]Cukurova University Agriculture Faculty Agricultural Machinery and Technologies Engineering Department, Adana- Türkiye

terdem@cu.edu.tr

Abstract: Paddy (*Oryza sativa L.*) is known as a strategic grain grown in more than 160 countries worldwide and provides a staple food source for approximately 3.5 billion people. In Turkiye, 129.000 hectares of land were planted with paddy in 2024, yielding a total production of 1.019.000 kilograms (kg), with the highest production occurring in Edirne. Paddy production holds an important place in our country in terms of food safety and rural development The paddy plant requires more water for its development than other cereals In recent years, due to the effects of climate change, rainfall amounts have decreased and temperatures have risen, causing water levels to drop in sources such as dams, reservoirs, and groundwater that supply water for paddy production. Therefore, the drought is causing decreases in paddy production, yield, and quality. Additionally, drought-related issues such as increased irrigation water and soil salinity levels, deterioration in soil quality, irregular plant growth, weed damage, and increased plant diseases are caused. These problems cause significant hardship for paddy producers. This article investigates the impact of drought, associated with climate change in recent years, on paddy farming.

Keywords: Paddy, Drought, Climate Change.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Revolutionizing the harvest: a technical review of the meicott pt120 cotton monitoring system and its impact on agricultural traceability

Beyza ÖZTÜRK ERDEM[1] [0000-0003-2715-7852], Tunahan ERDEM[2] [0000-0002-1595-6852]
Hasan Günal[3]

[1] Çukurova University Rectorate Quality Coordination Department, Adana- Türkiye
[2] Cukurova University Agriculture Faculty Agricultural Machinery and Technologies Engineering Department, Adana- Türkiye
[3] Micott Software Automotive Machinery Manufacturing and Trade Limited Company

terdem@cu.edu.tr

Abstract: This paper provides a technical review of the Meicott PT120, a retrofittable system designed for cotton harvesting machines to provide real-time yield detection, moisture monitoring, and data logging. The primary challenge addressed is the lack of integrated digital weighing and traceability systems in much of the existing cotton harvesting machinery, which leads to potential value loss and inefficiencies. This review synthesizes information from academic literature on smart farming (Elijah et al., 2018; Khanna & Kaur, 2019; Sharma et al., 2020) and a detailed technical test report from the SÖKE Agricultural Training Center (Zirai Üretim İşletmesi Tarımsal Yayım ve Hizmetiçi Eğitim Merkezi Müdürlüğü [SÖKE], 2023). The methodology involved analyzing the system's components—including its control unit, hydraulic pressure and optical sensors, moisture unit, and GNSS module—and the results of laboratory and field tests (SÖKE, 2023). The findings indicate a high degree of accuracy, with an error margin between 0.1% and 0.9% when compared to certified scales (SÖKE, 2023). The discussion highlights the system's significant benefits, including enhanced traceability, data-driven decision-making for farmers, contractors, and industrialists, and the provision of reliable, parcel-level data for governmental agricultural policy and support distribution. The paper concludes that the Meicott PT120 is a viable and effective technology for modernizing the cotton value chain, aligning with the broader goals of precision agriculture.

Keywords: Meicott, Monitoring, Yield, Cotton, Harvester

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

The use of sorrel (*rumex acetosella*) extract and dia natura base as natural pre-treatments and its expected effects for color preservation in dried citrus fruits

Beyza ÖZTÜRK ERDEM[1] [0000-0003-2715-7852], Kanber BENGÜ[2] [0009-0004-1040-4006], Büşra GÖK [2] [0009-0009-5508-0486] Burak Dalkılıç[3] [0000-0002-5317-2186], Nurten UCGUL [0009-0008-1719-4063], Tunahan ERDEM [2] [0000-0002-1595-6852]

[1]Çukurova University Rectorate Quality Coordination Department, Adana- Türkiye
[2]Cukurova University Agriculture Faculty Agricultural Machinery and Technologies Engineering Department, Adana- Türkiye
[3]Malatya Turgut Özal University, Faculty of Agriculture, Department of Biosystems Engineering, Malatya

terdem@cu.edu.tr

Abstract: Drying is one of the oldest and most common methods for food preservation, aiming to reduce water content to inhibit microbial and enzymatic activity. However, the thermal process, particularly hot-air drying, often leads to significant degradation of product quality, including undesirable color changes and the loss of vital nutritional components. Previous studies on citrus drying have consistently reported significant losses in ascorbic acid (Vitamin C), total phenolic content, and antioxidant capacity, with the drying technique and temperature being critical factors (Karabacak et al., 2020; Bozkır, 2020; İsmail et al., 2024).

To mitigate this degradation, pre-treatments are widely applied. Conventional methods often involve inorganic solutions such as sulfuring or alkaline baths, which have raised significant health concerns. Consequently, there is a growing demand for safe, effective, and natural pre-treatment alternatives that do not impart off-flavors or odors. While antioxidant solutions like ascorbic and citric acid are used (Soydan, 2019), the exploration of novel, plant-based extracts is a key research gap.

This study aims to investigate the efficacy of sorrel (*Rumex acetosella*) extract and a commercial natural preservative, Dia Natura Base, as novel pre-treatments for preserving quality in dried citrus slices (orange, tangerine, and grapefruit). Sorrel is known to be rich in antioxidants and vitamins A, B, and C (ascorbic acid) (Baytop, 1984; Zeybek & Zeybek, 2002), and its extracts have demonstrated antimicrobial and antiviral properties (Ilçım et al., 1998; Bütüner, 2022). To date, while the drying kinetics of sorrel leaves have been studied (Açıkalın, 2021), its extract has not been utilized as a pre-treatment agent in fruit drying, representing a significant novelty.

In this research, citrus slices of varying thicknesses (3, 5, and 7 mm) will be subjected to hot-air drying at five different temperatures (50, 55, 60, 65, and 70 °C). The pre-treatments will involve dipping the slices in sorrel extract and Dia Natura Base solutions at different concentrations (5%, 10%, 25%) and durations (5, 7, 10 min). Quality parameters will be assessed by measuring color change ($L^{*}a^{*}b^{*}$), ascorbic acid content via HPLC (Sdiri et al., 2012), HMF content (Tontul & Topuz, 2017), and functional group changes via FTIR. Furthermore, the stability of these quality parameters will be evaluated during a 4- and 6-month shelf-life study. This project is expected to validate a natural, organic pre-treatment method that can enhance the quality and safety of dried citrus products.

Keywords: Citrus, Drying, Sorrel, *Rumex acetosella*, Pre-treatment, Color Preservation, Dia Natura Base

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Classification of sweet chestnut varieties and forms in Azerbaijan republic

Seyidov ALLAHVERDI KAMIL[], Suleymanova YEGANA VAHID [], İdrisov HUSEYN AKBAR []

Azerbaijan State Agrarian University, Agronomy Faculty of Vinery, Ganja/Azerbaijan

huseyn.idrisov@mail.ru

Abstract: This article analyzes the breeding value of studying perspective varieties and forms of sweet chestnut in the Republic of Azerbaijan. Our route observation revealed significant variation in individual traits and ages of sweet chestnut trees in the Sheki-Zagatala region, as well as the presence of trees of varying ages. The oldest tree, for example, is approximately 300-500 years old. Although these trees are few in number, they continue to bear fruit and produce good yields. It was revealed that chestnut plants here vary not only in morphological but also in biological and economic traits.

Classification of sweet chestnut forms. Based on our surveys, we classified promising varieties and forms of edible chestnut:

- by yield;
- by productivity per 1 m^2 of crown projection;
- by kernel yield;
- by sugar and vitamin C content in the kernel;
- by disease and pest resistance;
- by ripening time.

Keywords: classification of varieties and forms, breeding importance, variation, genetic pool of perspective varieties and forms of edible chestnut, ripening, productivity, fruit yield, kernel yield.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Degradation of major classes of recalcitrant chemicals hindering the reuse of wastewater (a review)

Mustapha Yakubu DAUDA[1] [0009-0006-9619-9094], Eser CELIKTOPUZ[2] [0000-0002-5355-1717]

[1] Department of Agricultural Structures and Irrigation Engineering, University of Çukurova, Adana 01330, Turkiye.
[2] Department of Agricultural Structures and Irrigation Engineering, University of Çukurova, Adana 01330, Turkiye.

mustaphaydauda@gmail.com, eceliktopuz@cu.edu.tr

Abstract: In this recent age of advanced technology and biotechnology, the existing water bodies that serve as a reservoir for lives are experiencing a surge in the occurrence of chemical contaminants. These classes of contaminants were found to include both organic and inorganic, synthetic and natural pollutants of serious environmental concern. Studies revealed that these contaminants were predominantly recalcitrant chemicals that have been grouped as either toxic, hazardous or carcinogenic. Their occurrence is not limited to their numbers, types or variety but also a concentration that is alarming, leading to what is known as emerging chemical contaminants (ECC). Sudden increase in the occurrence of chemical contaminants in our water, wetlands, ponds, wastewater and sludge was due to increasing population, high demand and consumption, while their persistence in the environment is strongly linked to their recalcitrant nature and physiochemical properties. Partial treatment of wastewater results in the accumulation of recalcitrant chemicals while incomplete degradation of recalcitrant chemicals gives birth to emerging contaminants (EC). Incorporation of tertiary treatment systems into our conventional wastewater treatment system in combination with advance treatment processes becomes paramount. Advance oxidation treatment (AOP) processes, membrane systems coupled with bioreactors, biodegradations using bacteria and fungi could be used in combination to remove these recalcitrant chemicals from wastewater. Tests to proof the safety and safe reuse of these treated wastewaters should also be conducted using model organisms to achieve an ecofriendly treated wastewater.

Keywords: degradation, recalcitrant chemicals, wastewater, ecotoxicity, environmentally friendly.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Risks of biogenic amines accumulations from probiotics

Tülay KANDEMİR[2] [0000-0001-9002-699X] and Fatih ÖZOĞUL[1,2] [0000-0002-0655-0105]

[1] Çukurova University, Faculty of Fisheries, Department of Seafood Processing Technology, Adana, Turkiye,
[2] Çukurova University, Biotechnology Research Centre, Adana, Turkiye,

tkandemir@cu.edu.tr

Abstract: Probiotics, defined as live bacteria that provide health benefits when taken in sufficient quantities, are commonly used in functional foods owing to their functions in pathogen suppression, immunological modulation, and gut barrier enhancement. Nevertheless, their ability to generate biogenic amines (BAs) during fermentation poses significant safety concerns. BAs like histamine, tyramine, putrescine, and cadaverine are produced primarily by microbial decarboxylation of amino acids and are found in fermented dairy, meat, vegetable, and beverage products. While BAs play an important role in physiological processes, excessive consumption has been related to negative consequences such as histamine intolerance, hypertensive crises, migraines, gastrointestinal discomfort, and possible carcinogenicity due to interactions with nitrites. BA formation is influenced by raw material quality, microbial strain diversity, and environmental factors like pH, temperature, and salt content. Some lactic acid bacteria and Enterococcus strains are remarkable high producers, while others show little or no activity, emphasizing the necessity of strain-specific evaluation. Mitigation strategies include carefully selecting non-BA-producing strains, following strict hygiene measures, optimising fermentation settings, and using starter cultures capable of decomposing BA. Emerging omics methods offer significant capabilities for tracking BA-related genes, proteins, and metabolites, making probiotic treatments safer. Besides, consumer awareness and regulatory control are critical, as toxicologically substantial BA levels may not result in sensory deterioration. Moreover, assuring the safety of probiotic foods necessitates a balanced risk-benefit analysis that includes technological controls, genetic screening, and rapid detection techniques. By solving these issues, the probiotic sector can maintain innovation while also protecting public health.

Keywords: Probiotics; Biogenic amines; Fermented foods; Food safety

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Main aspects of sustainable development of agriculture in Azerbaijan

Ramina Mustafayeva[1] [0000-0002-0007-7118], Yegana Abbasova[2] [0009-0008-4797-7181], Ruhiyya Gambarova[3] [0009-0002-1846-3313], Samaya Babayeva[4] [009-0001-5563-310X]

[1]Department of Agricultural Economics Azerbaijan State Agricultural University: Ganja, AZ

ramina.mustafayeva@adau.edu.az

Abstract: Various crises that have occurred recently demonstrate the instability of the existing model of economic development. A significant drawback of this model is the absolutization of economic growt to the detriment of solving social and environmental problems. At the same time, the problem of climate change requires studying the socio-ecological and economic aspects of sustainable development of agriculture, increasing productivity while protecting natural resources, transitioning to the production of environmentally friendly agricultural products, studying local and foreign knowledge and experience in this area. The purpose of the study is to substantiate the theoretical, methodological and practical aspects of ensuring sustainable development of agriculture, study and assess the problems in this area in Azerbaijan, as well as identify areas for improving development prospects in accordance with world experience. The concept of sustainable development of agriculture is inextricably linked with the efficient use of economic and intellectual resources, improving the well-being and quality of life of the rural population, sustainable and balanced nature management. Only with a balance of economic, social and environmental components can sustainable development of this sphere of production be ensured in the long term. To achieve sustainable development of agriculture, it is necessary to systematically consider all three factors, and on this basis, it is advisable to develop mechanisms and tools that allow for quantitative and qualitative transformations.

Key words: sustainable development, agriculture, green economy, rural development.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

The role and significance of crop production in the global economy

Aygun Hajiyeva[1] [0000-0002-5673-6725], Mehriban Hasanova[2] [0009-0000-0950-1934], Valida Saliyeva[3] [0000-0002-8860-6343], Gulnara Tagiyeva[4] [0000-0002-4505-5852] and Nasimi Abbaszade [5] [0009-0001-4926-7166]

[1, 2, 3, 4, 5] Azerbaijan State Agricultural University, Faculty of Agricultural Economics, Department of Agricultural Economics, Ganja, Azerbaijan.

aygun.haciyeva@adau.edu.az

Abstract: Crop production, as one of the two main branches of agriculture, occupies a vital place in the global economy. It provides the majority of the world's food supply and serves as a primary source of raw materials for processing industries such as textiles, chemistry, and pharmaceuticals. Furthermore, it constitutes the foundation of the feed base for livestock farming while also utilizing organic fertilizers produced by animal husbandry. Currently, more than 20,000 agricultural plant species are cultivated worldwide, of which approximately 650 hold primary significance for the development of human civilization. Modern production technologies are increasingly oriented towards the precise assessment of factors and conditions that influence the productivity and quality of agricultural crops. The role of crop production in ensuring food security and fostering economic growth is substantial. In most countries, especially in rural areas, the livelihoods of the majority of the population depend directly or indirectly on crop production. Therefore, the analysis and evaluation of the role of crop production in the global economy is of particular importance.

Keywords: crop production, agricultural output, food security, food products, evaluation, factor, organic farming, digital technologies

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Traditional knowledge and climate-resilient agrobiodiversity: pathways to sustainable food systems in Lebanon

Lamis Chalak[1] [0000-0003-1301-982X]

[1]Faculty of Agronomy, The Lebanese University, Dekwaneh, Lebanon

lamis.chalak@gmail.com

Abstract: Lebanon's diverse agroecosystems sustain rich agrobiodiversity, shaped by centuries of traditional knowledge (TK) that underpins climate-resilient and multifunctional food systems. This study documents TK across coastal plains, inland valleys, mountain terraces, and highland pastures, highlighting how farmers, pastoralists, and women's networks maintain crop diversity, local livestock breeds, and wild edible plants. Key practices include terracing, agroforestry, intercropping, seed saving and exchange, rotational grazing, water harvesting, and traditional food systems, which collectively enhance soil fertility, conserve resources, support ecosystem services, and buffer communities against climatic variability. TK is deeply embedded in socio-cultural systems: women and elders act as custodians of seeds, culinary traditions, and ecological knowledge, while pastoralist networks sustain rotational grazing and landscape stewardship. Agrobiodiversity traditional food reinforces circular economy pathways linking crop, livestock, and wild plant management in closed-loop systems that support sustainable livelihoods. Farm-to-fork initiatives and agritourism further integrate TK with economic resilience and heritage preservation. Despite its adaptive value, TK faces growing threats from climate change, rural outmigration, and generational knowledge gaps. Strengthening intergenerational transfer, policy support, and market-oriented approaches is essential to safeguard Lebanon agrobiodiversity heritage and enhance the resilience of its food systems under a changing climate.

Keywords: Lebanon; Agrobiodiversity; Traditional knowledge; Climate resilience practices; Traditional food; Circular economy.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Nutritional benefits and health risks of seafood consumption

Yesim OZOGUL[1] [0000-0001-7769-9225] and Fatih ÖZOĞUL[1,2] [0000-0002-0655-0105]

[1] Çukurova University, Faculty of Fisheries Department of Seafood Processing Technology, Adana, Turkiye, yozogul@cu.edu.tr
[2] Çukurova University, Biotechnology Research Centre, Adana, Turkiye,

fozogul@cu.edu.tr

Abstract: Around the world, seafood especially fish is an important part of people's diets because of the presence of both macronutrients (proteins, lipids and ash) and micronutrients (vitamins and minerals). These are key nutrients that support general health and wellbeing. Numerous marine species, including fish, shellfish, and crustaceans, are distinguished by its particular nutritional characteristics. Many nutritionists and health experts support consuming more seafood because of its high-quality protein, low fats, and essential micronutrients like vitamin D, iodine, and selenium. The polyunsaturated omega-3 fatty acids found in seafood, especially EPA and DHA, are necessary for brain development, cardiovascular health, and inflammation reduction. In addition, their regular intake has been shown to help with weight control, cognitive development in children, and lowering the risk of high blood pressure, inflammatory and neurodegenerative diseases. Despite its benefits, seafood consumption also poses certain risks. Environmental contamination introduces hazardous compounds such as heavy metals, pesticides, polycyclic aromatic hydrocarbons (PAHs), and microplastics into marine ecosystems. These pollutants can accumulate in seafood and potentially threaten human health. This review discusses the benefits and risks of eating seafood and the main points to consider when choosing and consuming it.

Keywords: Seafood, nutrition, health benefits, health risks

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Modelling and predicting quality in fish using image processing and artificial intelligence

Nermin DELİÇAY[1] [0009-0004-6589-345X], Yesim OZOGUL[1] [0000-0001-7769-9225], Sakhi MOHAMMAD HAMIDY[2] [0000-0002-7389-7352], Yusuf KUVVETLI[3] [0000-0002-9817-1371]

[1] Çukurova University, The Faculty of Fisheries, Fisheries and Seafood Processing Technology Department, Balcalı, Adana, Turkiye.
[2] İstanbul Arel University, Faculty of Engineering, Industrial Engineering, 34537, Büyükçekmece, İstanbul, Turkiye,
[3] Çukurova University, Faculty of Engineering, Industrial Engineering, Balcalı, Adana, Turkiye.

yozogul@cu.edu.tr

Abstract: Fish and seafood are an integral part of the world's diet since they are rich in proteins, polyunsaturated fatty acids, vitamins, and minerals. Their perishable state, however, leaves them extremely vulnerable to physical, microbiological, and metabolic degradation while being handled and stored. Therefore, maintaining freshness and quality is a top priority in the food, aquaculture, and fishing industries. This study aims to predict the freshness of sea bass (*Dicentrarchus labrax*) fillets using deep learning models based on image data. For this purpose, 10 fillets were monitored daily from the day of purchase until the third day after spoilage. Each fillet was imaged from six different angles, and corresponding color and sensory analyses were performed. In total, classification models were developed for 7 categorical parameters. Three pre-trained transfer learning models (VGG19, ResNet50, and EfficientNetB0) were employed. For each parameter, all image angles and transfer models were evaluated separately, resulting in the development of 18 prediction models. The findings revealed that the VGG19 model achieved the best overall performance. Ultimately, a model capable of predicting the spoilage status of fillets (purchasability parameter) with an accuracy of 83% was obtained. This research is financed by the Scientific Research Projects Unit of Cukurova University (FBA-2024-16557).

Keywords: Artificial Intelligence, Predicting Quality, Image Processing, Fish Quality

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Principles of environmental impact of production technology and technical means in the agricultural sector

Ayaz HASANOV [0009-0003-3786-8938]

Azerbaijan State Agricultural University, Faculty of Engineering, Department of Agricultural Machinery and Technical Service, Ganja, Azerbaijan.

hesenov.adau@gmail.com

Abstract: The article reflects on the numerous challenges facing the agricultural sector worldwide, such as population growth, increasing demand for food, and the impact of climate change. It was noted that humans have always used nature for their own purposes, as well as introduced technology and technical means into the production of material goods. In the modern era of rapid globalization, human impact on nature is spreading across the globe. Discussions of the potential consequences associated with human forces becoming comparable in power to existing natural forces require a rethinking of the impact of large-scale technological linkages. It is from this perspective that the concept of the technosphere has gained prominence as a special approach to the study of technological impacts and their scale. In order to consider the global dimension of technology, it is necessary to analyze the main advantages and limitations of the technosphere. Thus, a person creates a new habitat for himself in nature. The emerging technical environment is important for people and is based on common social experience. Here, through special management based on human activity, a new, unchangeable natural environment is formed. In general, all analyses show that the technosphere is an environment formed as a result of people's scientific thinking and their use of equipment and technology in their effective activities to meet their needs. Based on the studies, it has been established that excessive use of energy-intensive technologies, herbicides, pesticides and mineral fertilizers has a negative impact on the environment and rural areas. Today, it was noted that the main factor ensuring sustainable and stable development of mankind is land protection and increasing their productivity. The article reflects comprehensive measures to reduce the impact on the agroecosystem based on the use of biotechnology by introducing natural ecosystem organizers in the production of agricultural products.

Keywords: Population growth, Food demand, Climate change, Technology / Technical means

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Sustainability in livestock from the perspective of nutrigenomics

Ercan Mevliyaoğulları[1] [0000-0003-3333-1490] Serap Göncü[2] [0000-0002-0360-2723] Mustafa Güçlü Sucak [30000-0001-6147-470X]

[1] Başkent University Kahramankazan Vocational School Ankara Türkiye
[2] Çukurova Üniversity, Agriculture Faculty, Department of Animal Science, Adana Türkiye
[3]Adıyaman University, Kahta Vocational School, Adıyaman, Türkiye

serapgoncu66@gmail.com

Abstract: Sustainability in livestock means production considering the ecological, social, and animal welfare dimensions and not only as an economic aspect. The goal is to efficiently use natural resources while minimizing negative environmental impacts, protect animal health and welfare, provide revenue for producers, and ensure that systems are able to produce high-quality food and drink for future generations. Nutrigenomics of livestock is a cross-disciplinary approach that studies nutrition on the genome at the molecular level. These studies are in the field of optimizing the genetic potential of animals to improve feed efficiency, production performance, and environmental outcomes. Nutrigenomic approaches control the expression of genes by specific nutrients, which have also been shown to influence metabolic pathways and enhance the quality of milk, meat, and other animal products. They also help choose disease-resistant animals, control antibiotic use, and promote animal well-being. Genomic assays identify the genetic profiles of animals and identify nutrition-responsive genes (Liang et al., 2020). Transcriptomic and proteomic analyses uncover which genes are upregulated or suppressed by distinct dietary components, shedding light on the molecular mechanisms of metabolism, immunity, and growth (Musa et al., 2023). Metabolomic studies evaluate the effects of feeds on metabolites produced in animals, helping optimize energy and nutrient utilization (Patil, 2021). The molecular and omics information acquired contributes to personalized feeding strategies according to each animal's genetic potential and metabolic capabilities and consequently helps in enhancing animal productivity, immune capacity, and product quality. The objective of this review is to examine nutrigenomic researches which offer an economic and ecological dividend to sustainable farm practices including in terms of lower greenhouse gas emissions, better use of natural resources, and food security.

Keywords: Nutrigenomics, livestock, nutrition, genes, sustainability

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Study of residual antibiotics in feed and feed additives using randox evidence investigator

Shaikenova K.H. [1], Akanova Zh.Zh. [1], Suranshiyev Zh.A. [1], Uskenov R.B. [1], Sharipova G.F. [1]

[1]NCJSC S.Seifullin Kazakh Agro Technical Research University", Astana, Kazakhstan

mika-leto@mail.ru

Abstract. In Kazakhstan, organic animal husbandry is also developing along with traditional livestock farming. Organic animal husbandry is one of the methods of farming that is as close as possible to natural farming. As part of the scientific program, studies were conducted on samples of feed and feed additives of domestic and imported production. As a result, samples were identified that contained antibiotics in quantities exceeding the permissible limit of the method used using the RANDOX EVIDENCE INVESTIGATOR. However, there is currently no regulatory documentation of the customs union regulating the standards for the content of residual antibiotics in feed and feed additives.

Keywords: organic livestock farming, feed, feed additives, antibiotics, analysis, sample.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Biosecurity (bs) levels of horse farms and factors affecting bs scores in Turkiye: a cross-sectional survey

Nuri ALTUĞ[1] [0000-0001-5805-0340], Mehmet Ferit CAN[2] [0000-0002-0944-9192], Merve ÖZTÜRK[2] [0000-0002-8500-7599], Yavuzkan PAKSOY[3] [0000-0002-0935-7693]

[1]Necmettin Erbakan University, Faculty of Veterinary Medicine, Department of Internal Diseases, Ereğli, Konya, TÜRKİYE
[2]Hatay Mustafa Kemal University, Faculty of Veterinary Medicine, Department of Animal Health Economics and Management, Antakya, Hatay, TÜRKİYE
[3]Çukurova University, Faculty of Ceyhan Veterinary Medicine, Department of Animal Sciences, Adana, TÜRKİYE

nurialtug@gmail.com

Abstract: Biosecurity (BG), a multidimensional preventive medicine concept, when implemented adequately, protects animal health and welfare and minimizes economic losses caused by diseases. The aim of this study, conducted through a survey of 87 horse breeders from different regions of Turkiye, was to determine the frequency and adequacy scores for 31 BG components and to estimate their relationships with demographic, socioeconomic, and technical variables. As a result of the study, the lowest-scoring BG item for all score types was determined to be "frequency and adequacy of disinfection of vehicles entering the farm." The highest scores were obtained for "regular internal and external parasite control" for the adequacy and combined scores, and for "treatment of animals showing signs of disease" for the frequency score. A significant difference in BG scores between different regions of Turkiye was found only in terms of adequacy ($P<0.05$) between the Black Sea Region and the Eastern Anatolia and Aegean Regions. Univariate analyses revealed that all scores had a negative and significant correlation with the number of horses in the farm ($P<0.01$). All multiple linear regression models were found to be significant overall ($P<0.01$). In the first model for the frequency score, only "number of horses in the farm" was a significant variable; in the second model for the adequacy score, both "age of the breeder" and "number of horses in the farm" were significant variables; and in the third model for the combined score, only "age of the breeder" was a significant variable. It may be recommended to raise awareness of BG components that are below 50% in terms of score, starting with large enterprises and older growers, in cooperation with relevant professional organizations and universities. In addition, state support for horse farms that meet the determined scores and criteria, and the deepening of this study, which is a first for Türkiye, with other research will be beneficial for horse breeding.

Keywords: Biosecurity, horse, economic, score, Türkiye

"This work is supported by the Scientific Research Project Fund of NECMETTİN ERBAKAN UNIVERSITY under the project number 24GAP29001"

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Differentiation of soil bio-activity hazelnut orchards of Zagatala region

Gunay Mammadova Israphil[1,2*], Firoza Ramazanova Muxurovna[1], Rena Mirzezadeh Islam[1], Vusale Isaqova Gudrat[1], Lala Bunyatova Novruz[2], Sevil Akhundova Maharram[2], Aida Gahramanova Yarish[2], Gulnara Alakbarli Yashar[2]

[1]Institute of Soil Science and Agrochemistry of Ministry of Science and Education of the Republic of Azerbaijan, Baku, Azerbaijan Republic
[2]Sumgayit State University, Sumgayit city, Republic of Azerbaijan

gunaymammadova.soilscience@gmail.com

Abstract. The study of bioecological properties of soils formed under hazelnuts is a very important and urgent issue for the economically efficient cultivation of hazelnuts in the Republic of Azerbaijan. The bio-activity of row spacing and tree trunk strips was determined. In ten-year-old hazelnut orchards, the cellulolytic activity of the soil (in the 10–100 cm layer) between rows is lower than in tree trunk strips: on mountain gray-brown soils, gray-brown soils – by 6.8 times, on gray-meadow soils – by 5.8, on forest soil – by 8.5 times. Least significant difference in gray-brown soils (LSD_{05} = 4.5%): in the 0-10 cm layer by 7.1%, 10-40 cm – 11.2%; in the near-trunk strips, compared to the inter-rows, less yeast was noted: in the 0-10 cm layer at 4481 CFU/g, 10-40 cm – 1427 CFU/g (LSD_{05} = 55 CFU/g); fewer mold fungi in the near-trunk strips than in the row spacing in the 0-10 cm layer at 388 CFU/g, 10-40 cm – 63 CFU/g (LSD_{05} = 25 CFU/g). In forest soil, the bacterial content in the inter-row zone is lower than in the near-trunk strip: in the 0-10 cm layer at 15 CFU/g, 10-40 cm – 21 CFU/g (LSD_{05} = 8 CFU/g). The yeast content was lower in the row spacing, relative to the trunk strip (LSD_{05} = 45 CFU/g): in the 0-10 cm layer by 1436 CFU/g, 10-40 cm – 1901 CFU/g. mold fungi are less (LSD_{05} = 22 CFU/g): in the 0-10 cm layer at 337 CFU/g, 10-40 cm – 139 CFU/g. Mountain gray-brown soils in the inter-row zone, relative to the near-trunk strip, there were fewer bacteria (LSD_{05} = 4 CFU/g) in the layer of 10-40 cm by 6 CFU/g. The amount of yeasts in the inter-row zone is lower (LSD_{05} = 32 CFU/g) than in the near-trunk strip: in the 0-10 cm layer by 44246 CFU/g, 10-40 cm – 29014 CFU/g. Mold fungi were counted less (LSD_{05} = 32 CFU/g): in the 0-10 cm layer by 703 CFU/g, 10-40 cm – 2113 CFU/g. It has been established that in all areas of the garden, yeast and mold fungi are usually more abundant in the 0-10 cm layer, and bacteria in the 10-40 cm layer.

Keywords: Fungi, Microflora, Cellulolytic Activity, Humification

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Age-related distribution dynamics of eimeria species parasitizing domestic chickens in different regions of Sahbuz district

S. Y. Bakhshaliyeva[1] [0009-0005-8103-9568]

[1]AR ETN Bioresourches İnstitute, Nakhchivan State University, Nakhchivan, Azerbaijan,

sekinebaxseliyeva@ndu.edu.az

Abstract: In this study, the prevalence of *Eimeria* species among domestic chickens in Shahbuz district of Nakhchivan Autonomous Republic during 2021-2024 was analyzed according to age characteristics. For this purpose, 533 chicken feces of different age groups were collected from the mountainous and foothill areas of the region and *Eimeria* species were found in 372 (IE-69.7%) samples. As a result of morphological analysis, *E. tenella*, *E. maxima*, *E. acervulina*, *E. praecox*, *E. mitis*, *E. necatrix* and *E. brunetti* species were detected and differences were observed in their distribution according to age groups. The infection level was found to be higher in 0-3 and 4-7 months old chickens, especially in the skirt sections. The results obtained in the study indicate that the age of the chickens plays an important role in the distribution of species of the genus *Eimeria*. These results are of great importance for establishing effective control and prevention strategies in the region.

Keywords: Nakhchivan Autonomous Republic, Shahbuz region, poultry, domestic chickens, invasive diseases, *Eimeria*

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Increasing the strength of casting parts of agricultural machinery made of aluminum alloys under the influence of modifying elements

Sarvar Tursunbaev[1] [0000-0003-2516-3597], Azizakhon Turakhujaeva[1] [0009-0002-8419-3083], Mukhayyokhon Saidova[1] [0009-0007-0870-4802], Sharofuddin Mardonakulov[1] [0009-0008-0964-3519], Nargiza Nazarova [1] [0097-0007-2613-3623]

[1]Tashkent State Technical University, Tashkent, 100095, Uzbekistan

tursunbayev.sarvar@tdtu.uz

Abstract. Currently, aluminum alloys are widely used in the production of agricultural machinery parts. This article discusses the technology of increasing the tensile strength of aluminum alloys under the influence of various modifying elements. Samples were cast and tested. The studies were conducted on aluminum-copper and aluminum-magnesium alloys from aluminum alloys. As a result of the tests, the tensile strength of aluminum alloys was increased by 5%-7%. Based on the results obtained, a graph was constructed showing the dependence of the number of modifying elements on the tensile strength. At the end of the article, the authors present their conclusions based on the results of the studies.

Keywords: aluminum, agricultural machinery, modification

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Consumer risk assessment to aflatoxin m1 in uht and pasteurized milk marketed in Tirana, Albania

Lorena Mato[1] [0009-0005-0821-4358], Dritan Topi[1]* [0000-0001-7852-5374]

[1]University of Tirana, Faculty of Natural Sciences, Department of Chemistry, Blvd, Zogu 1, No. 25, Tirana, Albania
[2]University of Medicine of Tirana, Faculty of Technical and Medical Sciences, Mother Teresa, University Center, Tirana, Albania

dritan.topi@unitir.edu.al

Abstract: Dairy products, especially milk, are an important part of the human diet and have influenced human metabolism. Milk is collected from different lactating animal species to ensure product safety. This study aimed to monitor aflatoxin M1 (AFM1) contamination in milk sold in Tirana, Albania, during the Autumn-Winter period of 2023-2024. Seventy-six commercial milk samples, both pasteurized and UHT, were analyzed using High-Performance Liquid Chromatography with Fluorescence Detection (HPLC-FLD). The contamination levels ranged from the limit of quantification (LOQ) to 0.399 µg/l), with a mean value of 0.145 µg/l. The study found that 89.5% of the milk samples contained AFM1, and 17.1% exceeded the EU maximum residual level (MRL) of 0.05 µg/l. The incidence rates were 20.4% for pasteurized milk and 12.5% for UHT milk. Regarding the average values for the milk samples, pasteurized milk was 0.164 µg/l, and UHT milk was 0.121 µg/l. These results underscore the importance of ongoing surveillance for consumer health protection. Additionally, intervention in AFB1 contamination in feeds is of utmost importance.

Keywords: Aflatoxin M1, Pasteurized milk, UHT milk, Food safety, Tirana, Albania

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Study of the prevalence of ixodid ticks in Tashkent region

Shavkat Abdurasulov[1] [0009-0003-9650-3154], Abdumumin Amirov[1] [0009-0000-7266-9641], Abbos Turakulov[2] [0009-0011-63426-8523], Muzaffar Muhammadiyev[2] [0009-0011-43426-8528]

[1]Tashkent State Agrarian University, Tashkent, 100140, Uzbekistan
[2]Tashkent Branch of Samarkand State University of Veterinary Medicine, Animal Husbandry, and Biotechnology, Tashkent, 140103, Uzbekistan

sh_abdurasulov@mail.ru

Abstract. The article presents information about the important role of animal husbandry-one of the main branches of agriculture-in ensuring the food security of our country and meeting the population's needs for milk and dairy products, meat and meat products. It also emphasizes that breeding highly productive cattle breeds is one of the priority directions in the development of the livestock sector. In connection with the rapid development of animal husbandry, the article provides information on measures aimed at ensuring rural employment, preventing unemployment, reducing poverty, and increasing the income of the population. Furthermore, numerous data indicate that ixodid ticks are the main carriers and reservoirs of piroplasmosis infection in nature and cause significant economic damage to the livestock industry. They also pose a threat to humans as vectors of transmissible diseases. When attacking cattle, ixodid ticks inject toxic substances into the organism, leading to pathological conditions such as a decrease in body temperature, weakness, anemia, depression, lack of response to external stimuli, thickening of damaged skin areas, occasional formation of purulent wounds, and heart failure.

Keywords: Tick, larva, nymph, imago, livestock, piroplasmosis, ectoparasite, infection, reservoir, transmissible

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Development of technology for growing seedlings of local citrus varieties

Narzullo Oblomurodov[1] [0009-0007-5892-9778], Muhamadaziz Fakhrutdinov[1] [0009-0003-0345-8690], Sirojiddin Juraev[1] [0009-0004-0220-1807], Gulchehkra Narmatova[1] [0009-0002-1593-9160], Akbar Kurbonmurodov[1] [0009-0005-0051-5753]

[1]Tashkent State Agrarian University, Tashkent, 100140, Uzbekistan

wnf1055@gmail.com

Abstract. The study presents the development of an innovative technology for propagating seedlings of local citrus varieties—lemon, orange, and mandarin—using the biopolymer-based preparation UZKHITAN. This preparation, a polymer mixture of chitin and carboxymethyl cellulose, was applied to citrus cuttings to enhance rooting efficiency under controlled conditions. Experimental results demonstrated that treatment with UZKHITAN significantly accelerated the rhizogenesis process and improved the rooting percentage of citrus cuttings compared to conventional stimulants. The highest rooting rates (91–94%) were observed in lemon cultivars *F-1 Tashkent* and *F-2 Yubileiny*, while orange and grapefruit–pomelo hybrids showed moderate rooting (34–37%), and mandarin cuttings exhibited the lowest rate (22%). The optimal treatment duration was found to be 5 minutes, resulting in callus formation on days 9–10 and complete rooting within 25–28 days. This method reduces the rooting period nearly by half compared to traditional heteroauxin treatment. The study concludes that encapsulating citrus cuttings in UZKHITAN prior to planting provides a highly effective, eco-friendly, and economically feasible propagation technology for citrus crops in Uzbekistan. This approach enables the year-round production of high-quality planting material, maintains varietal purity, and ensures early fruiting, thereby contributing to the development of intensive citrus cultivation and the achievement of the national agricultural goals outlined in the *Strategy for the Development of New Uzbekistan (2022–2026)*.

Keywords: citrus propagation; UZKHITAN; rooting stimulants; lemon; mandarin; orange; biopolymer encapsulation; seedling technology; root formation; Uzbekistan horticulture

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Theoretical foundations of forming working fluids into highly dispersed droplets using aerial vehicles

Khusniddin Irisov[1] [0000-0001-9555-8813], Farida Isakova[1] [0000-0003-2342-8459], Fazliddin Kurbonov[1] [0009-0006-1026-6808]

[1]Tashkent State Agrarian University, Tashkent, 100140, Uzbekistan

Isakova.fj19021986@gmail.com

Abstract. The article discusses the possibility of applying precision and smart agriculture while reducing the environmental impact of chemical treatments, associated with drones that form highly dispersed droplets. This allows for the protection of agricultural, medicinal, and other plants from pests and diseases, as well as targeted fertilization with liquid mineral fertilizers during the growing season, ensuring uniformity of nutrient concentration. The targeted use of drones in various agricultural operations can reduce labor requirements and also decrease working time. The hydraulic systems of UAVs and their working elements are aimed at improvement and are relevant issues of today. In addition, with the help of a special camera installed on the UAVs, image processing over the internet and machine learning algorithms assists in studying the precise results of agricultural activity, future achievements, shortcomings, and challenges. The article also examines the hydro-and aerodynamic forces acting on a thin curtain of liquid ejected from the annular slot of a turbulent tedder developed by the authors. This technological process investigates the stages of destruction of a two-phase (air-droplet) jet, resulting in the formation of large droplets, the physical essence of the Weber number, and elaborates on the likelihood that small droplets have probabilistic characteristics. The ability of the working medium to break down under the influence of modifiers is assessed by the increase in the Weber number. ($10 \leq We_{кр} \leq 10^5$). Using the UAVs, it was found that for fan spray nozzles the Weber number We=42, while for the proposed turbulator spray nozzles during the spraying of two-phase flow We=85, which confirmed the validity of the working hypothesis.

Keywords: UAV, tedder, turbulence, droplets, hydrodynamics, aerodynamics, dispersity

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

On preventive measures necessary to prevent anthrax

Gayrat Mengliev[1] [0009-0009-9886-6489], Batir Ulmasov[1] [0009-0004-6834-6662], Xusniddin Donayev[1] [0009-0007-2826-9238], Zamon Kholmirzaev[1,] [0009-0004-9535-7420], Shokhruzkhan Khojakhonov[2] [0009-0000-7159-5396], Raxmonali Qodirov[1] [0009-0007-9651-3154], Nazokat Abduzhamolova [1] [0009-0004-7266-8441]

[1]Tashkent State Agrarian University, Tashkent, 100140, Uzbekistan
[2]Tashkent Branch of Samarkand State University of Veterinary Medicine, Animal Husbandry, and Biotechnology, Tashkent, 140103, Uzbekistan

dgayrat2@mail.ru

Abstract. This article presents information on the need for preventive measures in natural and hazardous areas to prevent the spread of anthrax among animals and humans. The disease occurs worldwide, and there is a risk of its occurrence in our republic. Therefore, consistent and systematic anti-anthrax measures are essential for disease prevention. Since anthrax can be transmitted not only through animal products but also from nature to humans and animals, implementing preventive measures against anthrax is not the final conclusion of ongoing disease prevention efforts. Therefore, a brief overview of measures that are essential for implementing measures to combat this disease is provided.

Keywords: anthrax, infection, bacillus, spore, vaccination, prevention, medicine, veterinary medicine, obligate, enzootics, epizootics, epidemic

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Effect of drying and solvent on phenolic extracts from pistachio red hull

Nebahat Taş[1] [0000-0003-4099-4583] and Medeni Maskan[2] [0000-0001-6313-897X]

[1] Gaziantep University, Sehitkamil- Gaziantep 27310, Turkiye
[2] Gaziantep University, Sehitkamil- Gaziantep 27310, Turkiye

nebahat.tas@yahoo.com

Abstract: The red outer hull of pistachio, a by-product generated during processing, is rich in phenolic compounds and represents a promising source of natural antioxidants. In this study, phenolic compounds were extracted from pistachio red hull using two different solvents: ethanol and methanol. The obtained extracts were subjected to two drying techniques freeze-drying and conventional oven drying to evaluate the effects of drying methods on phenolic compound retention. Following the drying processes, the total phenolic content and antioxidant capacity of the extracts were determined. The results demonstrated that both the solvent type (methanol and ethanol) and the drying method (conventional and freeze drying) had a significant influence on preserving phenolic compounds and maintaining antioxidant activity. Notably, freeze-drying minimized the loss of phenolic compounds, retaining approximately 31 % more than oven drying, thereby better preserving the bioactivity of the extracts. These findings suggest that pistachio red hull is a valuable bioactive source, and its potential can be more effectively utilized through freeze-drying for functional food formulations and natural antioxidant applications.

Keywords: Pistachio Red Hull, Drying Methods, Antioxidant Capacity

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Extraction and optimization of phenolic and antioxidant compounds from pistachio red outer hull

Nebahat Taş[1] [0000-0003-4099-4583] and Medeni Maskan[2] [0000-0001-6313-897X]

[1] Gaziantep University, Sehitkamil- Gaziantep 27310, Turkiye
[2] Gaziantep University, Sehitkamil- Gaziantep 27310, Turkiye

nebahat.tas@yahoo.com

Abstract: Pistachio Fruit (Pistachio Vera L.) is a very nutritious nut consumed widely as a snack. While fresh pistachio nuts are processed, they result in a significant amount of waste, particularly in the form of peels which contain high amount of polyphenols with rising health-promoting properties. The soft hull (40%) makes up most of these by-products. It contains important amount of phenolics compounds and antioxidants. This study was carried out to retain bioactive compounds from the red hull by ethanolic-solvent extraction method. To optimize extraction of phenolic compounds, central composite experimental design was used. The three independent factors were solvent concentration (%), solid–liquid ratio (g/mL) and extraction time (h) at room temperature (25 °C). The optimum conditions were found as 52 % ethanol concentration, 5.2 g/mL solid–liquid ratio, and 5 h extraction time considering enhancement in three responses including total phenolic compounds (mg gallic acid/g), and antioxidant activity (mg gallic acid/g) DPPH and CUPRAC (mg gallic acid/g), respectively. In the analyses of phenolic compound identification some important phenolics have been found. The bioactive compounds such as kaempferol (+), ellagic acid, silymarin (-), chlorogenic acid, gallic acid (-), protocatechuic acid (-), catechin hydrate (+) have been found in the pistachio red outer hull.

Keywords: Pistachio Hull, Antioxidant Activity, Phenolic Compounds.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Drying efficiency of purple and green basil (*ocimum basilicum* l.) At different growth stages with mycorrhiza and trichoderma treatmentsunder Niğde ecological conditions

Tefide Kızıldeniz [1*] [0000-0002-5627-1307], Ahmet Fatih Akansu [2] [0000-0002-5254-1082]

[1] Niğde Ömer Halisdemir University, Faculty of Agricultural Sciences and Technologies Department of Biosystems Engineering, Türkiye.
[2] Niğde Ömer Halisdemir University, Graduate School of Natural Sciences, Interdisciplinary Department of Digital Agriculture,Türkiye.

tkizildeniz@ohu.edu.tr

Abstract: This study evaluated the drying efficiency of green and purple basil (*Ocimum basilicum* L.) varieties at three phenological stages (two weeks before flowering, one week before flowering, and at flowering) under Niğde ecological conditions, incorporating Mycorrhiza and Trichoderma treatments to assess their impact on leaf water loss and overall drying performance. Plants were grown in peat-filled pots, and 1 cm² leaf discs were oven-dried at 80 °C for 48 h. The drying ratio (%) was determined by dividing the dry weight of the leaf samples by their fresh weight and then multiplying the result by 100, and data were analyzed using ANOVA and LSD tests ($p \leq 0.05$). Results revealed that drying efficiency peaked at the flowering stage in both varieties. The highest drying ratio was recorded in purple basil at flowering under control conditions (54.7%), significantly higher than green basil ($p \leq 0.05$). Purple basil also showed a high drying ratio two weeks before flowering (43.5%) in control treatment. Green basil consistently exhibited lower drying ratios, with its highest value under Trichoderma at the earliest stage (26.1%). Mycorrhiza and Trichoderma treatments reduced drying ratios in purple basil but had minimal effect on green basil, indicating varietal differences in treatment responsiveness. At one week before flowering, drying ratios ranged from 22.0% to 31.2% with no significant differences. These findings suggest that purple basil is more suitable for drying-focused processing, particularly when harvested at flowering without biological treatments. For freshness preservation, applying Mycorrhiza or Trichoderma can reduce water loss in purple basil. In contrast, green basil shows more stable but lower drying efficiency across treatments. Overall, integrating growth stage, variety, and microbial treatments is essential for optimizing basil postharvest quality and drying strategies under semi-arid ecological conditions.

Keywords: *Ocimum basilicum*, drying efficiency, growth stage, purple and green basil, postharvest handling

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Comparison of different sweet sorghum (*sorghum bicolor* l. Moench) varieties grown as second crop in eastern mediterranean conditions in terms of forage efficiency and quality characteristics

Osman Turgut[1], Asiye Sena Çavdar[1] [0000-0002-8634-5856], Recep İrfan NAZLİ[1] [0000-1111-2222-3333],

[1] Department of Field Crops, Faculty of Agriculture, Cukurova University, Adana, Turkiye.

inazli@cu.edu.tr

Abstract: Sweet sorghum is an important crop for forage production due to its high biomass yield, adaptability to adverse environmental conditions, and suitability for cultivation as a second crop. This study was conducted to evaluate the forage yield and quality characteristics of eight sweet sorghum (*Sorghum bicolor* (L.) Moench) cultivars (Dale, ICSV 93046, Erdurmuş, Uzun, Gülşeker, IS 2331, IS 3556, and Umbrella) under second crop conditions of the Eastern Mediterranean Conditions during the 2024 growing season. Significant differences were observed among the cultivars in terms of fresh biomass yield, dry matter yield, crude protein, ash, ADF, NDF, and relative feed value (RFV). ICSV 93046 produced the highest fresh biomass yield (55.31 t ha^{-1}), highest dry matter yield (13.88 t ha^{-1}), and RFV (126.26). Umbrella exhibited the lowest ADF (30.93 %), lowest NDF (47.74 %), and the highest RFV (126.26) among the cultivars, indicating its superior forage quality under second crop conditions. In contrast, Gülşeker recorded the lowest values for most traits. These results suggest that ICSV 93046 and Umbrella are the most suitable cultivars for sustainable forage production under second crop conditions of the Eastern Mediterranean Conditions.

Keywords: Sorghum, Forage Yield, Quality

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

The role of starter cultures in controlling biogenic amine formation in cheese

Firuza Koboyeva[1] [0000-0002-0745-203X]

[1] Çukurova University, Adana, Türkiye

firuza.koboyeva@gmail.com

Abstract: Biogenic amines (BAs) are organic nitrogen compounds that can accumulate in fermented foods, particularly cheeses, as a result of microbial decarboxylation of amino acids. While moderate levels are typical during fermentation and ripening, excessive accumulation may lead to toxicological effects and represent a serious food safety concern. The formation of BAs in cheese is influenced by both microbial activity and processing conditions. Among these, the selection and management of starter cultures play a critical role. Starter cultures that lack amino acid decarboxylase activity or that possess amine-degrading capacity can significantly reduce BA levels without compromising product quality. In contrast, uncontrolled fermentation in traditional cheese production may result in variable and higher concentrations of these compounds. Therefore, the rational use of functional and safe starter cultures represents a sustainable approach to ensure microbiological stability, improve product safety, and meet consumer expectations for clean-label and health-oriented dairy products. The aim of this study is to evaluate the influence of starter culture use on the formation of biogenic amines in cheese and to emphasize its importance in ensuring product safety and quality.

Keywords: Biogenic amines, Food safety, Fermentation, Quality control.

5th International Conference on Research of Agricultural and Food Technologies
(I-CRAFT'2025, GANJA/AZERBAYCAN)

Ochratoxin a in maize: origin, occurrence, and health implications, Albania case

Griserda Topi[1][0009-0005-6311-1570] and Dritan Topi[1][0000-0001-7852-5374] *

[1]Department of Chemistry, Faculty of Natural Sciences, University of Tirana, Tirana, Albania

* dritan.topi@unitir.edu.al

Abstract. Mycotoxins are toxic secondary metabolites produced by fungi that frequently contaminate cereal grains, compromising food safety. Among the most concerning are aflatoxins and ochratoxin A (OTA), primarily produced by Aspergillus and Penicillium species. OTA contamination typically occurs under warm, humid conditions, especially during poor post-harvest storage. Albania's maize-growing regions—Lushnja, Fieri, Korça, Shkodra, Elbasan and Gjirokastra—are climatically predisposed to such risks. Although OTA is not the most prevalent mycotoxin in Albanian maize, recent findings confirm its presence in samples associated with inadequate storage conditions. OTA is nephrotoxic and has been associated with renal damage and Balkan Endemic Nephropathy. While the OTA incidence in Albanian maize is relatively low, the risk assessment indicates that positive-contaminated samples may contain high OTA concentrations. Poor storage and limited monitoring elevate the crop vulnerability. These findings underscore the need for systematic testing and improved post-harvest practices to mitigate contamination and protect public health.

Keywords: mycotoxins, ochratoxin A, maize, Albania, food and feed safety, nephrotoxic

5th International Conference on Research of Agricultural and Food Technologies (I-CRAFT'2025)

CONFERENCE WITH PARTNERS

ISSN:3062-3235