

Abstract Book



World Summits on Food, Agriculture and Animal Science (WSFAAS-2026)

WSFAAS-2026

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April 22-23, 2026 | Amsterdam, Netherlands





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Abstract

The World Summit on Food, Agriculture and Animal Sciences (WSFAAS-2026) was held from April 22–24, 2026, in Amsterdam, Netherlands. This international summit served as a vital platform for researchers, industry experts, and professionals to exchange knowledge, present innovative research, and discuss emerging trends in food production, sustainable agriculture, and animal sciences.

The event addressed key challenges in global food security, advancements in agricultural technologies, and innovations in animal health and livestock management. Attendees engaged in insightful discussions, explored the latest scientific developments, and collaborated on solutions to enhance sustainability and efficiency across these fields.

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Featuring plenary sessions, keynote lectures, panel discussions, and scientific presentations, the summit provided a dynamic environment for meaningful dialogue and knowledge-sharing. Networking opportunities enabled participants to connect with experts, strengthen collaborations, and help shape the future of food, agriculture, and animal sciences.

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Abstract

Food safety and halal requirements in a changing world: quality, novel proteins, consumer awareness, and our shared responsibility

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WSFAAS-2026

Abstract

The global food landscape is undergoing rapid transformation driven by technological innovation, population growth, sustainability challenges, and evolving consumer expectations. As new food sources emerge, including insect-based proteins, genetically modified ingredients, and other novel foods, the need to strengthen food safety systems and halal compliance frameworks has become more urgent than ever. This presentation explores the intersection of food safety, halal integrity, and public health in an era of unprecedented change.

The talk will examine the scientific, regulatory, and ethical considerations surrounding novel proteins, with particular attention to allergenicity, cross-contamination risks, and the cultural sensitivities associated with halal certification. It will highlight the increasing importance of transparent labelling, especially for vulnerable groups such as children, who rely on adults and institutions to safeguard their dietary well-being. As food systems become more complex, consumer awareness and literacy must be strengthened to ensure individuals understand what they eat and how it affects their health.

Government and industry to protect the ecosystem, uphold food quality, and ensure that innovation does not compromise safety or cultural values. By fostering collaboration, investing in research, and promoting regulatory harmonization, stakeholders can collectively build a resilient and ethical food system that supports both human health and environmental sustainability.

This presentation aims to inspire dialogue on how we can safeguard the future of food while honoring the principles that guide our communities; ultimately contributing to a safer, more informed, and more responsible global food ecosystem.

Keywords: Food safety, Halal compliance, Novel proteins, Consumer awareness, Sustainable food systems

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Abstract

Innovative environmental resource technologies for a healthy halal lifestyle: Advancing sustainability, safety, and circular agriculture

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Abstract

This presentation explores the role of advanced environmental resource technologies in developing a global sustainability system that enhances food safety, reduces waste, and improves agricultural productivity. Modern agriculture is increasingly challenged by the accumulation of organic waste, heavy reliance on synthetic fertilizers, declining soil health, and broader environmental degradation. In response, innovative solutions such as precision agriculture and Ecodrum technology offer practical, scalable pathways to convert organic waste into valuable agricultural inputs, thereby supporting more resilient and sustainable food systems. Ecodrum technology is highlighted as a key innovation in modern waste management. It provides a controlled, efficient, and environmentally responsible method for decomposing complex organic materials into nutrient-rich compost. This compost significantly improves soil fertility, enhances microbial activity, increases crop productivity, and reduces reliance on chemical fertilizers. Beyond soil applications, compost can also be used as animal bedding, thereby improving animal welfare, biosecurity, and farm hygiene.

The presentation further emphasizes the integration of Halal standards within sustainability frameworks. A Halal-aligned approach ensures that agricultural and food production systems are guided by ethical sourcing, responsible production practices, and environmentally conscious consumption. It reinforces the protection of natural resources such as soil, water, plants, and animals while ensuring compliance with Islamic principles of stewardship and minimizing harm to living beings. In addition, emerging biotechnologies are transforming agricultural waste into biofuels, organic fertilizers, and alternative animal feed sources. These developments promote circular resource utilization, reduce environmental pollution, limit overexploitation of land and water resources, and contribute to biodiversity conservation.

The presentation also examines the full Ecodrum process, from raw material input to final compost output, with emphasis on its applications in food safety, sustainable agriculture, and environmental management. Key challenges such as operational scalability, regulatory compliance, and risk management are also discussed. Overall, the integration of advanced environmental technologies into agriculture presents a transformative opportunity to enhance sustainability, strengthen food security, improve waste management, and build long-term environmental resilience across global food systems.

Keywords: Animal waste index, Sustainability, Ecodrum, Waste management

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Abstract

Corporates, researchers, and startups accelerating innovation: The unhidden challenges of collaboration

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Abstract

In today's rapidly evolving business landscape, innovation is a key driver of competitive advantage, but it often faces significant hurdles. Successful collaboration between corporates, research institutions, and startups is critical for fostering innovation and addressing global challenges. However, these collaborations frequently encounter hidden challenges that can slow down or even derail progress. This presentation will explore the complexities of these partnerships and provide real-world insights into how to navigate the obstacles that may arise.

Using the example of sustainable apple sourcing in Poland, a case study supported by the International Development Hub (IDH), The Doehler Group, Sustainable Juice Covenant, Riedel, Cawston, and Eckes-Granini, we will examine how corporates and research institutions work together to scale up sustainable agricultural practices. The collaborative effort highlights the crucial role of joint research and development in overcoming supply chain inefficiencies, boosting local economies, and scaling solutions to global sustainability challenges. By sharing the unspoken barriers and practical solutions found in this partnership, this presentation will shed light on how researchers, startups, and corporates can accelerate innovation in an increasingly interconnected world.

Keywords: Collaboration, Innovation, Apples, Poland

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Abstract

The golden mean of cross-breeding: A combination of indigenous sheep breeds conservation and genetic improvement towards increased resilience and productivity. The case of Livadi co-operative, in Mount Olympus, Greece

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Abstract

Sheep farming plays a very important role in the Mediterranean countries, enabling the exploitation of low-productivity semi-mountainous land such as pasture. In Greece, for instance, there are 23 dairy products – cheeses certified as PDO (Protected Designation of Origin) by the European Union authorities, in which sheep milk is implicated, reflecting the intense heritage of this sector. Apart from the high cultural and economic value, sheep in Greece constitute a major component of biodiversity, with more than 25 recognized indigenous breeds, several of which are considered extinct or highly endangered. The main reason for this extinction risk is their abandonment by producers, who prefer to rear more productive breeds, primarily for milk production. In particular, over the last 3-4 decades, extensive crossbreeding of Greek indigenous breeds has been carried out with breeds such as Lacaune and Assaf. Crossbreeding may lead to two contradictory outcomes. On the one hand, it constitutes a major approach towards genetic improvement, but on the other hand, it poses a risk for the loss of pure breeds. Thus, crossbreeding schemes must be designed after ensuring that the stock is not endangered and with a focus on particular traits. In sheep farmed in Greece, in particular, such schemes are successful when targeting increased milk production in combination with tolerance to harsh environmental conditions and diseases. According to recent findings, the crossbred Karagouniko x Lacaune sheep reared in Livadi, at the foot of Mount Olympus in Greece, constitute a promising genetic improvement-applied scheme that has maintained resilience under climatic conditions and resistance to Visna Maedi genotypes, along with a substantial increase in milk production. Since the indigenous breed Karagouniko is not at risk, conservation is also ensured.

Keywords: Karagouniko sheep, Lacaune, Genetic improvement, Conservation, Tolerance

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Abstract

Seaweeds as sustainable alternative ingredients in livestock, poultry & fish diets: Tropical vs. temperate species considerations

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Abstract

Seaweeds are increasingly being investigated as alternative livestock feed ingredients due to their rapid biomass production with low resource inputs, bioactive components with positive health impacts, and potential environmental benefits over terrestrial feed resources, including reduced greenhouse gas emissions. Broad differences exist between tropical and temperate seaweed species in nutritional composition and feed value.¹ Temperate seaweeds, particularly brown macroalgae such as *Ascophyllum*, *Saccharina* and *Laminaria* spp., generally exhibit higher concentrations of poorly digested complex polysaccharides (alginates, laminarin, fucoidan and total carbohydrates; 40-60% dry matter, DM), ash (20-40% DM, high sodium and potassium) and iodine (0.3->1% DM) but moderate to low protein (5-15% DM) and lipid content. Although select tropical seaweeds, including red (*Gracilaria*, *Asparagopsis*) and green (*Ulva*, *Caulerpa*) species, often exhibit higher crude protein levels (15-30% DM) with balanced amino acids, the tropical seaweeds, on average, are of lower protein and fiber content but may display higher soluble carbohydrate concentrations that can be more fermentable and nutritionally available. While lipid content is very low in most macroalgae (<2-3% DM), tropical species may contain higher proportions of omega-3 polyunsaturated fatty acids. Total ash is typically lower in tropical species (10-25% DM), as is iodine content (<0.05% iodine); mineral makeup contains higher Ca and Mg proportions. Antioxidant activities across seaweeds are documented within multiple nutrient categories: pigments (chlorophylls, total carotenoids), flavonoids, and phenolic fractions, and vary by seaweed type as well as sampling location. These compositional differences may influence digestibility, palatability, and safe inclusion rates across all herbivore diets. Awareness of geographic and environmental-driven nutritional variability is essential for species selection, feed formulation, and assessment of the sustainability and scalability of seaweeds as potential livestock feed ingredients across production systems.

Keywords: Aquaculture, Aquatic ingredients, Dietary supplements, Macroalgae, Nutrition

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Abstract

RUNX1: A novel therapeutic target for myocardial infarction and cerebral infarction

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Abstract

Ischemia of organs can have severe consequences, such as myocardial infarction (MI) and cerebral infarction. In the clinical setting, ischemic stroke and MI are both life-threatening conditions with a narrow therapeutic time window that leads to poor patient prognosis. Pharmacological approaches against these diseases remain limited, and thus new therapeutic targets are urgently needed. RUNX1, the Runt-related transcription factor-1, is an emerging target for cardiovascular diseases. RUNX1 is a member of the core-binding factor family of transcription factors. It is a master regulator transcription factor that works at the top levels of signaling cascades and dictates cell fate during development. RUNX1 was classically characterized for its involvement in the hematopoietic system and in the genesis of blood cancers. Recently, the role that RUNX1 plays in the heart has come into prominence, and it represents a promising therapeutic target for MI, adverse cardiac remodeling, and heart failure. Here, we present our recent progress in studying RUNX1 using animal disease models of MI and ischemic stroke. Our data show that targeting RUNX1 reduces infarct size and improves cardiac function following MI. The protective effect is associated with the repression of a key type of lysosomal proteases, cathepsins. Inhibition of RUNX1 reduces the expression of cathepsins and prevents the activation of cathepsin-mediated cell death signaling following ischemic injury. Based on our data and recent findings from other groups, we envisage that using RUNX1 as a therapeutic target for tissue protection has the potential to translate into clinical applications for the treatment of MI and ischemic stroke.

Keywords: Novel therapeutic, myocardial infarction, cerebral infarction

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Abstract

Extending the grazing season with bale grazing and the subsequent effect on feedlot performance

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Abstract

Yearling beef cattle steers ($n=144$) were randomly assigned to an extended grazing study to compare grazing native range (NR) or a sequence of NR and annual forages (ANN: field pea-barley, corn, cover crop) to evaluate the effect of extending the grazing season by feeding cover crop bales (bale grazing) before feedlot entry and the subsequent effect on steer performance and economics. Bale-grazing cover crop bales extended the grazing season 41.5 days (180 to 221.5 days). Forage sequence grazing, combined with cover crop bale grazing, supported an ADG of 0.953kg/day for steers that grazed a combination of NR and ANN forages, compared to 0.771kg/day for steers that grazed NR for the entire period ($P = 0.01$). The ANN steers were 43.04kg heavier at the end of grazing ($P = 0.001$). Muscling expressed as the ratio of hot carcass weight to ribeye area (REA) did not differ (NR 1.05; ANN 1.05, $P=0.53$); however, ANN steer REA ($P=0.002$) and percent intramuscular fat (IMF) were greater ($P=0.05$). In the feedlot, the steers were on feed for 95.7 days. The ANN steers entered the feedlot heavier ($P=0.04$) and were 33.6kg heavier at the end of finishing, but did not differ (717.62 vs. 684.0 kg; $P=0.19$). For carcass measurements, the ANN steer HCW was 25.7kg heavier ($P=0.03$). The NR steer dressing percentage was greater, and muscling was also greater for the NR steers ($P = 0.007$), i.e., improved yield grade ($P=0.01$). Carcass quality grade was 98.6% Choice/Prime. Grazing a sequence of ANN forages for 177.9 days and cover crop bales for 43.66 days resulted in a weight margin entering the feedlot that remained to the end of finishing. Gross carcass value was greater for the ANN forage steers (\$1,921.67 vs. \$2,013.93; $P=0.031$). Net return was greater for the NR steers (ANN: \$483; NR \$545) due to greater ANN forage farming expenses. Overall, the two systems were similar and easily adaptable depending on the farm operator's goals.

Keywords: Beef cattle, Steers, Native range, Annual forages, Feedlot finishing, Carcass

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Abstract

Reducing the beef cow winter maintenance cost

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Abstract

Inputs for beef cattle production are predominantly feed for maintenance and production, including harvested and grazed forages, supplemental protein and energy, minerals, grain, and by-products from grain and oilseed processing. By comparison to feeding harvested feeds (hay and silages) to non-lactating gestating beef cows after weaning, grazing mature grasses (bromegrass and crested wheatgrass), crop residues (corn, sunflower), and cover crops are ideal options for reducing cow wintering expenses. The digestible protein content of “low-quality” forages is below the nutrient requirement for non-lactating beef cows in the middle third of pregnancy, which, depending on cow weight (600 – 650 kg), is approximately 2.8% of dry matter intake. Mature forage and crop residue crude protein content declines with advancing season from late fall (November) to mid-winter (December-January), ranging from 7.0% early in the fall to lows of 4.0-5.0% during the winter. Replacing low-quality forage protein deficiencies can be accomplished easily by feeding a small amount of supplemental protein. Beef cow winter grazing research at the Dickinson Research Extension Center documented that daily feeding of 0.79 kg of a 32% crude protein compound range cube supplement to May-June calving cows that grazed 0days Control (C), 73days Cover Crop & Residue (CC/RES), and 107daysGrass&Residue (G/RES) maintained their starting body condition; however, C cows fed harvested feed over the winter were 42.2 kg heavier than G/RES cows ($P=0.001$). Although the cows wintered in confinement were heavier, calving cycle percentages were similar, i.e., first calving cycle: C 72.6%, CC/RES 69.3%, and G/RES60.5% ($P=0.12$), and the 2nd calving cycle was C 10.4%, CC/RES 23.8%, and G/RES20.8% ($P=0.15$). Total calving percentage did not differ: C 89.3%, CC/RES 95.5%, and G/RES89.6% ($P=0.46$). Winter feeding cost per cow was C \$208.81, CC/RES \$140.59, and G/RES\$73.33 ($P=<0.001$). Replacing harvested feed with low-quality forage grazing, combined with protein supplementation, reduces winter feed costs, labor, tractor fuel costs, and equipment repair costs without impacting reproductive performance. Caution. Blizzards with high winds and blowing snow can create dangerous, life-threatening conditions for winter-grazing cows. Storm protocols must provide for wind protection and emergency hay supplies well in advance.

Keywords: Beef cows, Non-lactating, Mature grass, Crop residue, Economics

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Abstract

Organic, more healthy? Indications towards a positive conclusion are increasing

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WSFAAS-2026

Abstract

Working as a medical researcher at a multidisciplinary research institute - the Dutch Louis Bolk Institute - I became increasingly fascinated by the comparative research on cultivation systems by my agricultural colleagues. Especially the findings of decreasing secondary metabolites, connected to increasing amounts of fertilization, struck me, as these secondary metabolites are, besides being part of the plants' defense system, most important for the nutritional value for consumers.

So could it be that lower fertilization, as used in organic agriculture, would grow healthier food? Pursuing research on that topic became my aim, and since this is a very complex research question, I first organized a two-day conference with a wide range of researchers to discuss potential biomarkers and a research design. We reached consensus that if there were any effects on health, these would first appear in the immune system of the second generation of animals fed foods from different cultivation systems.

As the University of Wageningen had a 25-generation old immunological chicken model, we did choose these animals for our research. The knowledge of the human immune has a basis in research in birds, so this was not so strange. As the chickens were meant to be models for humans, we built 'chicken-Hiltons' for them, so they could perform their typical behavior.

We followed two generations with a very broad range of observations, including growth, broad immunology, metabolomics and at the end pathological anatomy and taste research. The problem was that, during their development, all animals were perfectly healthy, although there were some differences in growth and in reaction to vaccinations. But when we challenged them, differences appeared! Then a problem arose when we had to draw conclusions.

Which food group is healthier? Although most researchers preferred which animal they would want to be, this is not a scientific conclusion. We concluded that we could not draw conclusions, 'as we do not know what health is...' The study was published using 'resilience' instead of 'health'.

This led to follow-up work on a new definition of health, which resulted in a proposal, published in the British Medical Journal, and by now cited more than 4000x. Based on that proposal, after all, a conclusion can be drawn. The Keynote will describe the chicken study, the newly proposed concept of health, as well as the latest literature review on comparative studies on organic and conventional food consumption.

Keywords: Organic nutrition, Health effects, Health definition

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Abstract

Addressing AMR challenges for food safety and public health

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Abstract

Antimicrobial resistance (AMR) has emerged as one of the most serious global public health threats, with Pakistan facing a rapidly increasing burden of multidrug-resistant (MDR) and extensively drug-resistant (XDR) bacterial infections. The misuse and overuse of antibiotics in human medicine, livestock, poultry, aquaculture, and agriculture have significantly contributed to the spread of resistant pathogens. Factors such as self-medication, over-the-counter availability of antibiotics, inappropriate prescribing practices, poor infection control, and low public awareness have accelerated the AMR crisis in Pakistan.

This presentation highlights the alarming rise of resistant pathogens, including XDR *Salmonella typhi*, MDR tuberculosis (MDR-TB), methicillin-resistant *Staphylococcus aureus* (MRSA), extended-spectrum beta-lactamase (ESBL) producing Enterobacteriaceae, vancomycin-resistant Enterococci (VRE), and carbapenem-resistant *Klebsiella pneumoniae*. XDR typhoid strains resistant to multiple antibiotics, including cephalosporins and fluoroquinolones, have been increasingly reported in Karachi and Hyderabad, particularly among children aged 2–10 years. Treatment options for these infections are now limited to azithromycin and carbapenems, posing a major challenge to healthcare systems.

The presentation also examines the role of contaminated food, poor hygiene practices, and excessive antibiotic use in food-producing animals in the transmission of AMR pathogens. It emphasizes the urgent need for stronger surveillance systems, regulatory enforcement, responsible antimicrobial use, and improved infection prevention measures in both healthcare and agricultural sectors.

A One Health approach is proposed as a comprehensive strategy to combat AMR by recognizing the interconnectedness of human, animal, and environmental health. Collaboration among healthcare professionals, policymakers, food producers, veterinarians, and environmental sectors is essential to strengthen food safety, improve public awareness, and prevent the spread of resistant organisms from farm to fork.

Overall, this presentation calls for coordinated global and national efforts to address AMR through education, surveillance, regulation, vaccination, and sustainable antimicrobial stewardship practices.

Keywords: Not applicable

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Abstract

The impact of wheat rotation and integrated livestock practices on agricultural products, soil health, and the economy for sustainable agriculture

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Abstract

Integrating plant and animal production for sustainability in agriculture can increase farm profitability. Increasing nitrogen, a symbol of soil fertility, through legume rotation, combined with grazing systems and no-till methods, has improved soil fertility, grain yield and quality, and livestock production, resulting in higher net returns.

In a 12-year long-term integrated system study, continuously planted spring wheat (HRSW-CTRL) in the same field was evaluated alongside spring wheat (HRSW-ROT) grown in a five-crop rotation. This rotation was designed to include: 1) spring wheat, 2) a seven-species cover crop, 3) forage maize, 4) a pea/forage barley mixture, and 5) sunflower. Beef cattle were integrated into this rotation for grazing. One-year-old Angus cattle grazed on three different crops: a pea/forage barley mixture, unharvested maize, and a seven-species cover crop. The other two rotation crops (spring wheat and sunflower) were considered cash crops. No nitrogen fertilizer was applied after the third year of the study. Significant results were obtained in this research. Briefly, these are: 1) Improvement in soil fertility was observed in HRSW-ROT plots for soil organic matter (SOM), nitrogen (N), phosphorus (P), and potassium (K). 2- With the integration of animal grazing management into the rotation, although not statistically significant, a significant decrease in input costs was obtained in gross and net yield over a 12-year period. 3- Grain yield varied between the HRSW-ROT and HRSW-CTRL groups depending on weather conditions year-to-year. 4- The input cost of the rotated wheat (HRSW-ROT) was significantly lower compared to the control group wheat (HRSW-CTRL) ($p < 0.001$). However, there was no difference between the practices in terms of gross yields for the 12-year study. 5- In terms of soil fertility, post-planting N values in the soil were found to be significantly different in the HRSW-CTRL group and the HRSW-ROT group over a 12-year period ($p < 0.05$). 6- Over a 12-year study period, hard red spring wheat (HRSW-ROT) sown and grazed in rotation showed significantly higher levels of pH, organic matter, and phosphorus ($p < 0.05$), as well as potassium and chlorine ($p < 0.10$), compared to hard red spring wheat sown continuously. In summary, the higher soil test levels observed in the rotation group wheat are thought to be due both to legumes in the rotation and to the return of nutrients from animal manure or urine to other fields, i.e., nutrient recycling.

Keywords: Annual forage grazing, Beef cattle, Diverse semi-arid environment, Multi-crop rotation, Spring wheat, Soil health

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Abstract

Effects of light duration and feeding frequency on growth performance and carcass traits of broiler chickens

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WSFAAS-2026

Abstract

Broiler production efficiency is strongly influenced by management practices such as feeding frequency and lighting regimes. However, limited research has investigated their combined effects under tropical conditions, where environmental stressors may constrain growth performance and carcass yield. Therefore, this study addresses this gap by examining the interactive effects of feeding frequency and light duration on the growth performance and carcass characteristics of broiler chickens raised under tropical conditions. A total of 600 ten-day-old Ross 308 broiler chicks were randomly assigned to twenty-four pens in a 2×3 factorial arrangement with two feeding frequencies (twice daily vs. four times daily) and three light durations (16, 20, and 24 hours/day). There were six treatments, each replicated four times with 25 birds per replicate. The trial lasted 35 days, with weekly measurements of body weight, feed intake, average daily gain (ADG), and feed conversion ratio (FCR). At the end of the trial, four birds per treatment were slaughtered for carcass evaluation. The results showed no significant interaction ($P > 0.05$) between feeding frequency and light duration on growth performance. However, Broilers fed twice daily exhibited significantly higher ($P < 0.05$) final body weight (2052 g vs. 1900 g), and improved feed conversion ratio (FCR; 1.46 vs. 1.60) compared to those fed four times daily. In contrast, light duration did not significantly affect growth performance ($P > 0.05$), indicating that varying photoperiods had minimal impact under the conditions of this study. Neither feeding frequency nor light duration influenced carcass yield or major cut weights, but birds fed twice daily exhibited significantly heavier ($P < 0.05$) empty gizzards (46.70 vs 35.0 g). The findings suggest that feeding broilers twice daily under tropical conditions significantly improves growth performance compared to four times daily, while light duration (16–24 hours) did not markedly influence growth or carcass traits. These results highlight the importance of optimal feeding frequency in broiler production, offering practical insights to improve productivity in tropical climates.

Keywords: Broiler chickens, Feeding frequency, Light duration, Growth performance, Carcass traits

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Abstract

Utilization of albizia lebbeck leaf meal in rabbit diets: Growth performance, blood indices, and economic implications

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WSFAAS-2026

Abstract

Tropical plants grow rapidly year-round, making them popular as affordable alternatives to scarce conventional feed resources in tropical livestock production. Albizia lebbeck is a medium-to large-sized deciduous tree in the family Fabaceae, native to West Africa and parts of Asia. Its leaves are utilized as fodder for ruminants and in traditional medicine. While the seed and its oil have been studied in rabbit nutrition, research on its leaf meal and its effects on the rabbit blood profile is limited. This study aimed to determine the impact of graded dietary levels of A. lebbeck leaf meal (ALLM) on growth performance and hematological and serum biochemical indices of weaner rabbits. Twenty-four weaner rabbits of mixed breeds and sexes, weighing an average of 744 g, were allocated in a Completely Randomized Design to four dietary treatments with 6 replicates. ALLM was incorporated into the four diets at 0, 10, 20 and 30 % inclusion levels. Following a one-week adaptation period, rabbits were fed their assigned diets for ten weeks. Feed intake, live weight changes, feed conversion ratio, hematological and serum biochemical indices were measured. Existing market prices for feed ingredients were used to economically appraise diets. Chemical analysis of ALLM revealed favorable attributes for rabbit feeding, with 21.08%, 52.86%, 32.27%, and 2385.9 kcal/kg for crude protein, neutral detergent fiber, acid detergent fiber, and metabolizable energy, respectively. Weight gain and feed conversion ratio at 10 and 20% ALLM inclusion levels were comparable to the control leafmeal-free diet, but declined at 30%. Economic analysis indicated a linear reduction in feed cost with increasing ALLM inclusion. Whilst there were variations in some hematological and serum biochemical indices, all values were within normal physiological ranges for healthy rabbits, suggesting that ALLM inclusion did not exert any deleterious effect on the rabbits. It was concluded that ALLM could be used at up to 20% of the diet of weaner rabbits to reduce feed costs without adverse effects on live weight changes and blood profiles in sustainable rabbit production systems in the tropics.

Keywords: Albizia lebbeck leaf meal, Growth performance, Feed conversion ratio, Blood profile

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Abstract

Mexican food security

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WSFAAS-2026

Abstract

Food security, understood as continuous access to sufficient and nutritious food, faces significant challenges in Mexico due to its growing dependence on imports of staple grains such as corn, wheat, beans, and rice, primarily from the United States and Canada. Since the signing of NAFTA in 1994 and its evolution into the USMCA, this dependence has increased, affecting the country's food self-sufficiency. Analysis of FAOSTAT and INEGI data shows that, although Mexico produces significant quantities of these grains, production does not meet domestic demand, creating high vulnerability to external factors such as international price fluctuations. The study uses indicators such as Apparent National Consumption (ANC), the Food Dependency Index (FDI), and Pearson's evaluation coefficient to assess the impact of production, yield, and cultivated area on reducing the FDI. It concludes that increasing planted area and improving agricultural yields are key to reducing dependence. The research highlights the urgent need to implement policies that encourage domestic production, support small producers, and promote sustainable agricultural practices to strengthen food security and ensure a more resilient and self-sufficient system.

Keywords: Food dependency, Agri-food production, Self-sufficiency

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Abstract**Gastrointestinal nematode parasite resistant selection in small ruminants**

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*Corresponding author: Tumen Wuliji, wulijit@lincolnu.edu**WSFAAS-2026****Abstract**

Gastrointestinal nematode (GIN) parasites pose serious health risks and economic losses for small ruminants worldwide, severely impeding the profitability of US sheep and goat farming. GIN infections cause severe weight loss, diarrhea, protein deficiency, bottle jaw, and anemia in small ruminant animals. Existing conditions urge that an alternative GIN parasite control method needs to be sought to moderate GIN infections in small ruminants. This research initiative aims to evaluate a GIN-resistant selection in the Katahdin hair sheep breed. The objectives of the project are: (a) to establish GIN-resistant selective breeding groups and random control groups by prescreening on phenotypic traits and markers, including fecal egg counting, body condition score, FAMACHA score, and blood immunoprotein profiles. (b) to develop a GIN-resistant selection breeding index for breeding animals and validate correlation coefficients in production traits with disease resistance in the progeny. (c) to identify phenotypic, genomic markers, and single-nucleotide polymorphisms (SNPs) that are related to GIN resistance, growth performance, and carcass traits in Katahdin sheep. The expected outcome of this project is to evaluate selection efficiency for GIN resistance in the Katahdin sheep breed and to identify multiple correlational relationships between genomic and phenotypic performance traits in these genotypes. The preliminary data from flock screening, breeding ewes, and first crop progeny lambs were presented. Whereas finding genetic markers (SNPs) and applying genomic values in sheep breeding may significantly improve selection efficiency for disease resistance and production sustainability.

Keywords: Gastrointestinal parasite resistance, Katahdin, Selection efficiency, Breeding value, Genomic marker

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Abstract

Economic viability and climate resilience in rural communities of Mexico: The case of bean cultivation (*Phaseolus vulgaris*) in San Juan Tezontla, municipality of Texcoco, state of Mexico

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WSFAAS-2026

Abstract

This research examines the role of agroecology as a comprehensive approach to promoting economic viability and climate adaptation in rural communities in Mexico, using common bean (*Phaseolus vulgaris*) production as a reference. In response to the challenges faced by conventional agricultural systems, such as dependence on external inputs, environmental degradation, and climate vulnerability, agroecology emerges as a sustainable, equitable, and culturally relevant alternative.

The main objective of this study is to identify and assess agroecological practices, including the use of compost, organic fertilizers, biofertilizers, crop rotation, and the conservation of native seeds, in bean production units located in selected rural areas of Mexico. Methodologically, a quantitative-descriptive study was conducted based on a literature review and case analysis documented by academic institutions and specialized organizations.

The evidence indicates that the adoption of agroecological practices not only reduces production costs and dependence on imported chemical fertilizers but also strengthens productive autonomy, improves soil health, and enhances adaptive capacity to climate-related events such as droughts. These effects contribute to greater income stability for producers. Additionally, agroecology encourages community participation and restores the value of traditional knowledge.

It is concluded that agroecological practices represent a viable pathway for sustainable rural development in contexts characterized by limited resources and high exposure to climate risks. However, their expansion requires the design of integrated public policies, access to differentiated markets, and the strengthening of local knowledge and skills, in order to ensure their effective implementation.

Keywords: Agroecology, Common bean, Economic viability, Climate change, Rural communities

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Abstract

Analysis of agricultural diversification strategies through investment portfolios in silvopastoral systems in Mexico

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WSFAAS-2026

Abstract

Silvopastoral system represent a key strategy for achieving diversified, profitable, and environmentally sustainable agricultural production. The integration of timber and fruit trees with forage crops and livestock activities enables optimal land use and yields both economic and environmental benefits for production units. The aim of this study was to compare diversification strategies through an investment portfolio in silvopastoral systems adapted to the conditions of the states of Chiapas and Veracruz, Mexico. Productive combinations were designed that include mahogany, forage maize, pasture grasses, and tropical fruits such as mango and lime, to assess their risk and profitability. The results showed that the portfolios achieved acceptable levels of profitability with moderate risk, demonstrating that this strategy can contribute to income diversification for producers and to increasing the productivity of natural resources, thereby strengthening sustainable rural development in both regions.

Keywords: Silvopastoral systems, Production sustainability, Investment portfolio, Rural development, Productive diversification, Sustainable agricultural production

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Abstract

Mexican cocoa in international markets

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WSFAAS-2026

Abstract

It is believed that cacao arrived in Mexico due to the migration of people and the exchange of products from different societies in South America and Mesoamerica. The first traces of this seed date back to 1900 and 1800 BC, in the states of Chiapas and Veracruz. It was there that the natives associated the heart-shaped fruit with the underworld and blood, and it was used in rituals and for the exclusive consumption of the upper classes, merchants, and warriors.

Years later, with the arrival of the Spanish, cacao and one of its main derivatives, chocolate, gradually spread throughout the world.

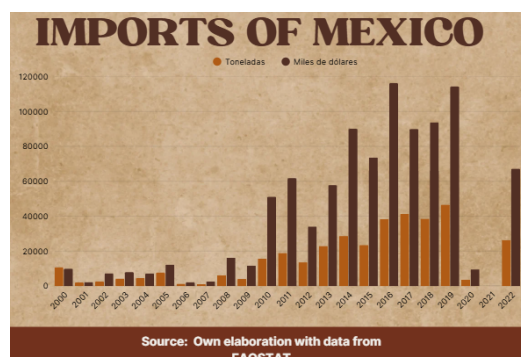
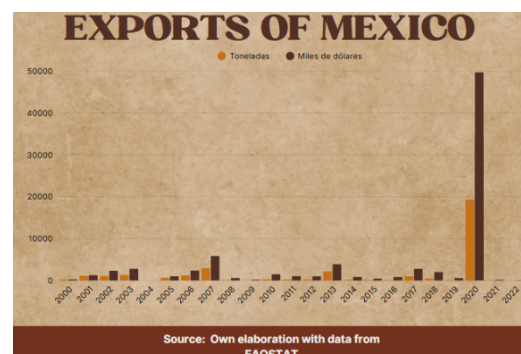
The main cocoa-producing and exporting countries are the Ivory Coast, Ecuador and Ghana, with these three countries accounting for approximately 56.8% of global exports. Meanwhile, Mexico ranks 71st in cocoa exports, with less than 1% of exports, indicating that it is unable to compete with larger countries in cocoa sales.

The value of Mexican cocoa exports has fluctuated significantly over the years. In 2020, the export value was \$1.2 million; in 2022, it was \$1.7 million. This steady growth demonstrates the promising competitiveness of Mexican cocoa in foreign trade.

Now, regarding the international market, it is important to mention that cocoa prices are being somewhat volatile in 2024. It is also said that in 2024 the global cocoa market will suffer a deficit, since the main cocoa producing countries in West Africa (Ghana and Ivory Coast) register lower yields due to the aging of cocoa trees, disease, and bad weather due to climate change.

Keywords: Not applicable

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Abstract

Transforming coconut husk waste into sustainable livelihoods: The KoredoKoir model

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WSFAAS-2026

Abstract

Coconut farming is a key economic activity in coastal Kenya, yet it generates significant waste, with over 49,000 metric tons of coconut husk discarded annually.¹In Kwale County alone, approximately 20 tons of husk waste are produced daily, most of which is burned or improperly disposed of, contributing to environmental degradation and carbon emissions. At the same time, coconut farmers receive limited economic returns beyond the sale of raw coconuts.

KoredoKoir addresses this dual challenge by transforming coconut husk waste into value-added, eco-friendly products, including biodegradable doormats, ropes, and biochar-enriched coco peat. By extracting coir fiber and repurposing the remaining material into a nutrient-rich growing medium, the initiative reduces environmental waste while creating new income streams for farmers. The biochar-enriched coco peat further enhances water retention and soil quality, offering a sustainable alternative for farmers facing soil degradation and water scarcity. This model contributes to sustainable agriculture by supporting soil-independent farming practices such as vertical gardening and greenhouse cultivation. It also strengthens local supply chains by connecting farmers, manufacturers, and consumers in a circular economy framework. KoredoKoir aligns with global sustainability goals by addressing waste management, food security, and economic empowerment. KoredoKoir demonstrates a scalable, community-driven solution to coconut waste management challenges in Kenya and beyond.

Keywords: Coconut husk waste, Coir fiber, Coco peat, Sustainable agriculture, Circular economy, Kenya

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Abstract

Rapid, cost-effective and reliable semen DNA extraction method for quantification of X and Y chromosome-bearing spermatozoa

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WSFAAS-2026

Abstract

This study aims to optimize ovine semen DNA extraction for the application of quantifying X and Y chromosome-bearing spermatozoa (X and Y-CBS). A pooled frozen ovine semen sample was divided into four groups ($n=10/\text{group}$, suspension of 30×10^6 spermatozoa cells). Three cell lysis methods were designed to evaluate the genomic DNA (gDNA) compared to the standard DNA extraction method. Quantitative Polymerase Chain Reaction (qPCR) SYBR Green assay was used to measure gDNA from the extraction method using 18S rRNA (a housekeeping gene). The ratio of Y and X – CBS was assessed using a qPCR TaqMan assay of Y-specific (SRY) and X-specific (PLP) genes. A gBlock Gene fragment was used to develop the standard curve of both SYBR Green and TaqMan assays. The result showed that 24 h + 10 μL of DTT method (standard) yielded the highest amount of extracted gDNA, which was significantly greater than all other methods ($p < 0.05$). Meanwhile, the ratio of Y and X-CBS (Y:X ratio) differed significantly among methods ($p < 0.05$) by the 24 h + 10 μL DTT (Control) and the 1 h + 10 μL DTT treatments yielded comparable Y:X ratios (1.32 ± 0.32 and 1.30 ± 0.21 , respectively), indicating no significant difference between these methods. In contrast, 1 h + 20 μL DTT and 3 h + 20 μL DTT resulted in significantly lower Y:X ratios (0.97 ± 0.22 and 0.97 ± 0.17). These findings indicated that the interaction between the Dithiothreitol (DTT) concentration and incubation period is critical for releasing spermatozoal DNA. Moreover, the amount of DTT is likely to affect the decondensation of X- and Y-chromosome-bearing spermatozoa differently. In conclusion, optimizing the semen DNA extraction method, the 1 h + 10 μL DTT method is less time-consuming and reliable, making it suitable for routine/field use for quantifying X and Y-CBS.

Keywords: Semen DNA extraction, X and Y chromosome-bearing spermatozoa ratio, QPCR

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Abstract

Prepartum and postpartum biomarkers associated with transition disease risk in dairy cows

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WSFAAS-2026

Abstract

The transition period in dairy cows is characterized by substantial metabolic changes that increase susceptibility to disease. The objective of this study was to evaluate associations between prepartum and early postpartum biomarkers and the risk of transition diseases. Blood and milk samples were collected from commercial Danish dairy herds using a standardized protocol. Prepartum blood samples were obtained within 42 d before calving, and postpartum milk samples were collected within the first 21 d in milk.

Biomarkers included indicators of energy balance, liver function, and mineral status, including nonesterified fatty acids (NEFA), β -hydroxybutyrate (BHB), glucose, cholesterol, calcium, magnesium, point-of-care blood analytes, and milk metabolites. Data were filtered using biologically plausible ranges, and complete-case datasets were analyzed. Associations with mastitis, metritis, ketosis, and lameness within 60 d in milk were evaluated using mixed-effects regression models with herd included as a random effect.

Between-herd variability was observed across all biomarker groups. Lifestest analytes showed the greatest clustering (ICC = 0.10–0.42), with blood urea nitrogen (BUN) highest (ICC = 0.42). Serum biomarkers also demonstrated moderate to high clustering, particularly log-cholesterol (ICC = 0.31), NEFA (ICC = 0.29), and BHB (ICC = 0.22). Milk metabolites showed moderate clustering (ICC = 0.06–0.22), with the highest values for isocitrate (ICC = 0.22) and log-glutamate (ICC = 0.16). Inclusion of the herd improved model fit and was necessary for accurate estimation of biomarker–disease relationships.

Elevated NEFA and BHB were associated with increased odds of transition diseases, consistent with impaired energy balance. Overall, these results support the use of blood- and milk-based biomarkers, including point-of-care analytes, for identifying at-risk cows. Accounting for herd-level variability is essential for developing reliable biomarker-based monitoring strategies to improve dairy cow health and antimicrobial stewardship.

Keywords: Transition cow disease, Metabolites, Biomarkers, Dairy

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Abstract

Profile of sugars, minerals, and polyphenols in gluten-free biscuits and crackers from chestnut flour

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Abstract

Chestnuts are characterized by a significant nutritional composition, including starch, essential amino acids, vitamins, and minerals. As they are naturally gluten-free, interest in chestnut flour is increasing as a suitable raw material for individuals with coeliac disease, meeting the rising consumer demand for alternative bakery products [1,2]. This study aimed to characterize the profiles of sugars (sucrose, fructose, glucose, and maltose), major minerals (K, Ca, Mg, P), and total polyphenols in Slovak chestnut flour and two derived gluten-free products: biscuits and crackers. The sugar composition of chestnut flour, dominated by sucrose and maltose, was significantly altered by processing. In the biscuits, the sucrose content was elevated due to added sugar, whereas in the crackers, an increase in maltose suggested starch hydrolysis during baking. Chestnut flour was the richest source of minerals. It contained 5660 mg/kg potassium, 705 mg/kg calcium, 631 mg/kg magnesium, and 900 mg/kg dry weight. After processing, the mineral content of the biscuits and crackers was consistently lower. Furthermore, the high total polyphenolic content of the flour (2.15 mg GAE/g) was substantially reduced by thermal treatment, decreasing to 0.79 mg GAE/g in biscuits and 0.40 mg GAE/g in crackers. In conclusion, this study highlights that chestnut flour is an excellent base for producing gluten-free products with valuable nutritional composition. Although processing affects the final nutritional profile, the resulting biscuits and crackers serve as an important source of carbohydrates, essential minerals, and polyphenols.

Keywords: *Castanea sativa*, Chestnut flour, Sugars, Minerals, Polyphenols

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Abstract

Reactions of pig body as biosensors for indoor thermal environment evaluation

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WSFAAS-2026

Abstract

The thermal and humidity conditions in livestock housing significantly affect pigs' comfort, physiology, and performance. The previous research found that pigs respond sensitively to changes in these conditions. Therefore, physiological parameters like respiratory rate, body temperature, and heart rate, as well as behavioral states such as aggregation, were monitored. By using pigs' physiological parameters as biosensors and integrating environmental data from physical sensors, an evaluation method for assessing environmental quality in pig house was proposed. It was shown that correlations between indoor air temperature and physiological responses support the use of physiological parameters to evaluate thermal conditions. Heat exchange simulation models for the pig body achieved the mean absolute percentage errors (MAPE) of 8.27%, 17.5%, and 25.3% for rectal temperature, heart rate, and respiratory rate, respectively. Aggregation behavioral recognition achieved an accuracy of 98.53%, with a compact architecture of 9.55M parameters. Therefore, the innovative approach for precision thermal environment assessment provides a basis for real-time environmental control based on behavioral and physiological responses.

Keywords: Thermal environment, Bio-response, Behavior, Body temperature, Machine vision

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Abstract

Genetic variation in *TMEM154* and *TLR9* genes in Greek Karagouniko sheep breed and implications for SRLV resistance

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WSFAAS-2026

Abstract

Small ruminant lentiviruses (SRLVs) cause chronic and progressive diseases in sheep, with visna–maedi representing one of the most important clinical syndromes. These infections may lead to considerable economic losses of up to 40% in commercial flocks [1]. As no effective treatment or vaccine is currently available, control actions rely on serological testing and removal of infected animals. Genetic susceptibility to visna–maedi virus (VMV) infection has been strongly associated with polymorphisms in the *TMEM154* gene [2], while additional host genes seem to also contribute. Among these, Toll-like receptors (TLRs), and particularly *TLR9*, exhibit polymorphisms that have been associated with differential host responses to SRLV [3,4]. The aim of the present study was to characterize genetic variation in the *TMEM154* and *TLR9* genes in Karagouniko sheep from Olympus area, Greece. Sequence analysis of *TMEM154* revealed the presence of both K and E alleles at the E35K locus of *TMEM154*, along with further well-known polymorphisms (N70I, I74V) and the T44M variant. Analysis of *TLR9* identified all major polymorphisms previously linked to SRLV resistance (R447Q, A462S, G520R), occurring at variable frequencies. The detection of polymorphisms in *TMEM154* and *TLR9* provides an important first step toward defining genetic resistance profiles against SRLV and supports the application of selective breeding for the control of VMV in Greek sheep.

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Keywords: Sheep genetics, Visna maedi virus, Polymorphisms, Genetic resistance

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Abstract

The contents of selected organic biocompounds in waste pressings of varietal grapes

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WSFAAS-2026

Abstract

In the waste grape extracts of both white and red grapes from the vineyard and wine production in the village of Tajna, located in the Slovak Republic, we defined the amount of selected important bioorganic components: reducing sugars, crude protein, L-ascorbic acid, and in the case of red grapes, also anthocyanins. The aim of our research was to determine the amount needed for the eventual deployment of those grape waste extracts in the continuous production of health food. In dried grape extracts, the amount of reducing sugars was measured at the level between 0.0115-0.5028 mg/g, crude protein 237.8-517.3mg/g, ascorbic acid 1.249-4.822mg/g and anthocyanins 0.6445 – 3.7158 mg/g. “Devín” was the only white grapevine sample in our research that had the highest levels of reducing sugars and C vitamin, but it also had the lowest crude protein. “Merlot” had the highest amounts of crude protein and anthocyanins, and “Cabernet Sauvignon” had the lowest amounts of reducing sugars and C vitamins. The amount of anthocyanins was recorded at a slightly lower level compared with other published works because anthocyanins are organic compounds that are also highly soluble in water, and our samples were technologically disposed of with a large amount of water.

Keywords: Grape, Sugar, L-ascorbic acid, Protein, Anthocyanin

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Abstract**Selected biologically active compounds with antioxidant properties determined in extracts from grape Pomace *Vitis Vinifera* L. from the Slovak Wine region**

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*Corresponding author: Janette Musilova, janette.musilova@uniag.sk**WSFAAS-2026****Abstract**

Wine production generates by-products representing 10–30% of the processed grape weight, consisting of leaves, pomace, stems, and lees. Their valorization is a sustainable strategy that reduces environmental concerns and promotes efficient resource use. The total polyphenol content (TPC) and the content of phenolic compounds (myricetin, quercetin, kaempferol, rutin, resveratrol, gallic acid (GA), cinnamic acid (CA), p-coumaric acid (p-CA), and sinapic acid (SA)) were determined in grape pomace (GP) extracts of four *V. vinifera* L. cultivars (Dunaj – D, Cabernet Sauvignon – CS, Cabernet Franc – samples CF-1 to CF-3, Rizling Vlašský – RV). Grape pomace was used for the analysis, sourced from the 2024 harvest in the Nitra wine region of Slovakia. The total polyphenol content (TPC) was determined using the colorimetric method [3], and phenolic substances were determined using the method described by Lidikova et al. [4]. The Kruskal-Wallis test using Statgraphics statistical software (Centurion XVI.I, USA) was used for the statistical evaluation of the results.

TPC ranged from 3.66 (cv. CF-1) to 43.69 mg/g DW (cv. RV). The lowest contents of the analyzed phenolic compounds were found in the CV. CF samples. In the pomace extracts of CF-1 (CF-2; CF-3; and RV, respectively), the contents of myricetin, CA, and SA (CA and SA; p-CA; and p-CA, respectively) were below the limit of detection. The highest contents of phenolic compounds were determined in GP extracts of cv. Dunaj: quercetin – 246.4, kaempferol – 28.7, rutin – 83.4, resveratrol – 33.6, GA – 147.0, CA – 0.698, p-CA – 29.0, SA – 17.7 mg/kg DW. The myricetin content was highest in the GP extracts of cv. CS (246.4 mg/kg DW). The variability of the results reflects the influence of several factors – grapevine cultivars, climatic and geographic conditions, cultivation location, etc. Based on the LSD test, we can state that there are statistically significant differences in the mean contents of the analyzed compounds.

Keywords: Grape pomace, Polyphenols, Flavonols, Phenolic acids

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Abstract

Anthelmintic effect of plant extracts on larvae mortality in vitro experimentation

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Abstract

Gastrointestinal nematode infection poses significant challenges to small ruminant livestock production, including sheep and goats. The objective of this study is to evaluate selected plant varieties for putative anthelmintic properties and their effect on cultured larvae in vitro experiments. Thirty-six varieties of plants were harvested from farm fields or grown on soil beds in green house facility. Plants were harvested, and samples were collected at the flowering stage and stored at -40°C for further processing. Frozen plant samples were freeze-dried, ground (1mm), and extracted with water for anthelmintic bioactive compounds. Aqueous extracts of 12 plant varieties were selected for in vitro larvicidal testing. The selected varieties were either of forage plants, namely bird foot trefoil (*Lotus corniculatus*), common chicory (*Cichorium intybus*), sainfoin (*Onobrychis vicifolia*), purple prairie clover (*Dalea purpurea*), Sunn hemp (*Crotalaria juncea*) and lespedeza (*Lepedeza cuneata*) or ethnomedicinal plants include goose foot (*Chenopodium album*), goat weed (*Ageratum conyzoides*), sweet wormwood (*Artemisia annua*), callaloo (*Amaranthus viridis*) and broadleaf plantain (*Plantago major*). The aqueous extracts were prepared by immersing and soaking 3 g of dry plant material in 30 mL deionized water for 24 hours, followed by centrifugation to obtain the supernatant. Nematode parasitic larvae were obtained by hatching parasitic eggs from the feces of sheep or goats in coproculture dishes at 27°C for 7-10 days in incubators. The larvae were recovered using a modified Baermann technique. Live larvae numeration (n/ml) was conducted at the initial (0 time) for the resource larvae pool. An in vitro larvicidal experiment was conducted at two treatment dose levels (low and high) over three time intervals, with three replicates per interval. The experiment was conducted by exposing 100 larvae in each well of a 5 ml aqueous extract suspension for 12, 24, and 48 h continuously under room temperature (22°C). Negative control (water) and positive control (Eprinomectin) were included for each time interval and treatment level, respectively. All twelve plant aqueous extracts showed significantly higher larval mortality rates than the negative control at 12, 24, and 48 h for both low and high treatment levels ($P < 0.01$). Mean mortality rates in low-level extract treatment were 40, 66, and 87%, compared with 61, 83, and 95% in high-level extract treatment ($P < 0.05$) at 12, 24, and 48 hours, respectively. There were marked variations in mortality rates among plant varieties, with the highest for birdfoot trefoil and sweet wormwood. The results indicated that these plant varieties contain an effective anthelmintic component that can be utilized as a gastrointestinal parasite control reagent.

Keywords: Gastrointestinal parasite, Goat, in vitro, Larvae mortality, Plant EXTRACT, Sheep

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Abstract

Equine welfare therapies

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Abstract

This article presents the essential concepts of equine physiotherapy and rehabilitation and reviews the therapeutic techniques used to treat musculoskeletal injuries. The article consists of a literature review, followed by the description and short follow-up of specific clinical cases and physiotherapy approaches for the treatment of musculoskeletal injuries and pain management, aiming at the overall well-being of the horse.

Positive results were obtained with the therapies used. The presented chronic pain case maintains maintenance physiotherapy sessions, having overcome the acute phase.

The therapies are shown to be beneficial for athletic improvement and pain management, with immediate manifestations of welfare improvement after each session.

In conclusion, when properly applied and used in conjunction with traditional medicine, these therapies yield favorable results in managing pain and musculoskeletal injuries.

Keywords: Wellness, Pain management, Trigger point, TENS, Manual therapy

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