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ABSTRACT BOOK

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Keynote Speakers

Implementation of Adaptive Evolution in Lactic Acid Bacteria to Enhance Yoghurt Cultures for the Dairy Industry

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The dairy industry faces the challenge of reducing energy consumption while extending product shelf life. This project seeks to improve the genetics of *Streptococcus thermophilus* using non-transgenic methodologies based on biological evolution. Although *Lactobacillus bulgaricus* was used in yoghurt production, the results focused on *S. thermophilus* as the primary model. The engineering team was responsible for the genetic modification process, while practical validation was carried out in the culinary field (by gastronomists).

Gastronomists were responsible for propagating, inoculating, and fermenting experimental yoghurts derived from *S. thermophilus* strains. Subsequently, physicochemical analyses (reducing sugars, proteins, pH, and syneresis), microbiological evaluations, and preliminary sensory tests were performed. The study aimed to compare yoghurts made with improved strains to commercial ones, focusing on the performance of the different strains.

A progressive decrease in pH was observed, attributable to increased lactic acid production in the modified strains K1, K3, and G6, with higher acidification and sugar consumption rates than the wild-type strains and those obtained through mutagenesis. At the microbiological level, higher counts of lactic acid bacteria and lower residual lactose concentrations were observed, while fungal, yeast, and coliform tests indicated safety throughout fermentation. In terms of syneresis, no differences were observed among strains. The yoghurt base exhibited an average syneresis of 11.2%, yielding about 112 g/L.

In conclusion, gastronomic validation is a fundamental step in translating biotechnological advances into practical food applications. This collaborative work demonstrated that the modified *S. thermophilus* strains are comparable to commercial yoghurts only at the scale-up stage. However, during fermentation, they offer significant time advantages; thus, this comparison ensures a product with consumer-recognisable attributes. The gastronomic contribution, in collaboration with engineering, ensured that the technological innovation was evaluated against production realities and the direct sensory experience of food.

Keywords: *strain improvement, yoghurt production, adaptive evolution*

Designing Food with Purpose: Enhancing Food Characteristics

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Food is vital for human survival, and over time, its variety has grown exponentially to meet diverse consumer needs, requirements, and expectations. Public health, environmental, and economic factors increasingly influence food design. Gastronomy plays a key role in this process, leveraging expertise in transformation techniques, food composition, and substitution options to enhance or preserve sensory qualities.

Chefs and gastronomists are experts at collaborating with interdisciplinary teams, using this knowledge to identify diverse alternatives that meet all industry and customer demands. It is crucial to be aware of the numerous ingredients and how to use them to satisfy most requirements, such as reducing costs significantly, targeting customers to ensure there will be people interested in consuming the product, and ensuring the feasibility of obtaining the raw materials and having enough resources to produce it on the required scale.

Designing food with a purpose is one of the key factors nowadays. The growing importance of functional foods and product customisation is among the most valuable trends in the food industry in recent years. However, this trend has also led to increased consumption of highly processed foods. This is why the expertise of chefs is becoming increasingly important, as they find ways to preserve the essential food qualities without adding chemical additives, but by enhancing the natural properties of the ingredients.

Keywords: *food design, gastronomy, customisation, functional foods*

Oral Presentations

Dynamic Managerial Capabilities, Digital Transformation, and Sustainable Performance in 5-Star Hospitality

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The COVID-19 pandemic significantly accelerated the digital transformation in the hospitality sector. This research explores the interplay among dynamic managerial capabilities (DMCs), digital transformation, and digital sustainability approaches to achieve competitive performance in Lithuanian 5-star hotels. Results demonstrate that the cognitive, human, and social capital of the hotel CEOs foster innovation and strategic alignment. By leveraging advanced analytics and CRM systems, hotels achieve measurable improvements in operational efficiency, guest satisfaction, and revenue growth. Practical implications include adopting data-driven decision-making practices and promoting sustainable digital initiatives to secure long-term competitive advantage. These findings provide actionable insights into how digital tools and managerial competencies can enhance performance in the rapidly evolving hospitality sector.

Keywords: *dynamic managerial capabilities, digital transformation, digital sustainability, competitive performance, 5-star hotel*

Development of Mono-Product Vegetarian Dishes in Fine Dining Restaurant *Arrivée*: Creating a Sustainable Consumer Experience Through the “Roots to Leaves” Philosophy

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This study explores the development and evaluation of mono-product vegetarian dishes at the fine dining restaurant *Arrivée* (Kaunas, Lithuania), focusing on how culinary design can enhance consumer awareness of sustainability and regenerative gastronomy. The research is based on the “roots to leaves” philosophy, which encourages the full use of vegetables—from root to leaf—to reduce food waste, highlight seasonality, and strengthen the connection between agriculture, cuisine, and the consumer experience.

Vegetables were sourced from two Lithuanian farms applying regenerative crop rotation systems: Farmers’ Circle (four-field rotation) and a farm in Ukmergė (nine-field rotation). The study involved 50–60 restaurant guests who selected vegetarian mono-product dishes made from cauliflowers, cabbage, mushrooms, and celery from the *à la carte* menu. Data were collected through structured questionnaires that examined dietary habits, motivations, satisfaction, and awareness of sustainable food principles.

Preliminary results indicate that guests perceive mono-product dishes as light, creative, and emotionally engaging. Curiosity, stories of the dish’s background, and aesthetic presentation significantly influenced their choices, while awareness of the dish’s regenerative origins increased its perceived value.

The findings suggest that fine dining can serve as an effective platform for promoting sustainable eating practices. Integrating regenerative agriculture with culinary innovation fosters consumer understanding and contributes to a broader transformation toward environmentally conscious gastronomy.

Keywords: *regenerative gastronomy, sustainability, mono-product dishes, roots to leaves, fine dining, consumer experience*

The Effect of Freeze-Dried Orange Peel on the Properties of Gluten-Free Bread

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Gluten-free bread production poses significant technological challenges because the absence of gluten alters dough structure, texture, and sensory quality. To improve these properties, natural fibres derived from citrus by-products can be used, contributing to functionality and sustainability while reducing food waste.

The objective of this study was to investigate the influence of freeze-dried orange peel addition on the technological and sensory characteristics of gluten-free bread. The bread samples were prepared with varying concentrations of freeze-dried orange peel, and a control sample of bread without fibre was used for comparison.

The results revealed that incorporating orange peel improved the water-absorption capacity and moisture retention of the gluten-free dough. The bread samples with orange peel showed greater volume, a more uniform crumb structure, and a darker colour than the control sample. Sensory evaluation indicated that samples enriched with orange peel were rated higher in aroma, taste, and overall acceptability, while the control bread sample received the lowest scores. Furthermore, the presence of bioactive compounds in orange peel suggests that it may have additional nutritional benefits.

In conclusion, freeze-dried orange peel is a promising ingredient for improving the technological and sensory qualities of gluten-free bread, while supporting circular economy principles by utilising food industry by-products. These findings highlight the potential of citrus fibre applications in functional bakery products.

Keywords: *gluten-free bread, citrus fibre, orange peel*

Sustainable Agricultural Practices and the Environmental Footprint of the Food Supply Chain

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The global food system is a major driver of environmental change, contributing significantly to greenhouse gas emissions, biodiversity loss, and the depletion of natural resources. This study examines the environmental impacts at each stage of the food supply chain—from agricultural production to final consumption—and explores strategies to promote sustainability within this system.

The primary objectives of the study are: (1) to analyse the environmental implications of food production, processing, distribution, and consumption; (2) to identify key inefficiencies and sources of waste throughout the supply chain; and (3) to propose practical, sustainable interventions for both producers and consumers.

The findings indicate that conventional agricultural practices, such as monoculture farming and excessive use of synthetic inputs, contribute to soil degradation and elevated carbon emissions. Additionally, the environmental footprint is exacerbated by energy-intensive processing, long-distance transportation, and reliance on plastic packaging. However, alternative approaches—such as organic agriculture, localised food systems, seasonal consumption, and dietary shifts toward plant-based foods—have significant potential to reduce environmental impact.

The discussion highlights the importance of multi-level action involving consumers, policymakers, and industry stakeholders. Educational initiatives, support for sustainable farming, and improved food waste management are essential to transitioning to a more resilient, environmentally responsible food system.

In conclusion, the journey of food from field to table encompasses numerous environmental challenges but also offers substantial opportunities for sustainable transformation. Embracing green practices across the food chain is vital for mitigating environmental impact and fostering long-term food security.

Keywords: *sustainable agriculture, food supply chain, agroecology*

Accelerated Solvent Extraction for the Recovery of Antioxidant-Containing Fractions from *Echinops sphaerocephalus* L. cultivated in Lithuania

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Echinops sphaerocephalus L. (glandular globe-thistle) is a medicinal plant from the Asteraceae family, traditionally more recognised as a melliferous species. Apigenin, chlorogenic acid, catechin, and quinic acids are key plant-derived phenolic compounds with strong antioxidant, anticancer, antibacterial, antiviral, and cardioprotective properties. However, the extraction of potential bioactive compounds from *Echinops sphaerocephalus* has not been well studied, and there is limited information available on the properties of its extracts.

This study aimed to evaluate the phenolic content, antioxidant capacity, and sun protection factor (SPF) of *Echinops sphaerocephalus* L., using accelerated solvent extraction (ASE) with ethanol, water, and ethanol-water mixtures as food- and pharmaceutical-grade solvents to obtain valuable hydrophilic antioxidant extracts. ASE was carried out under four conditions: 100% H₂O, 100% EtOH, and EtOH–H₂O mixtures at 70/30% (v/v) and 50/50% (v/v). Extraction lasted 45 minutes, with the temperature set to 70°C for EtOH and EtOH–H₂O mixtures, and to 110°C for 100% H₂O.

The results demonstrated that ASE enhanced the extraction yield, ranging from 15.4 to 41.6 g/100 g DW. Extracts obtained under different conditions exhibited variable total phenolic content (25–43 mg GAE/g extract) and in vitro antioxidant capacity (199.4–302.4 mg TE/g extract), with SPF measurements supporting their UV-protective potential. These findings highlight ASE as an effective method for producing high-value fractions from *E. sphaerocephalus*, with potential applications in the pharmaceutical and nutraceutical industries.

Keywords: *extraction, Echinops sphaerocephalus, accelerated solvent extraction*

Advancing Dessert Innovation: Natural Sugars, Plant-Based and Functional Solutions

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Contemporary pastry innovation is increasingly focused on developing healthier, more sustainable, and technologically advanced products. This presentation explores key directions in dessert innovation, including sugar reduction and replacement, applications of plant-based ingredients, allergen-free pastry production, and emerging food technologies.

Reducing sugar content in bakery and pastry products is of growing importance due to its links to health issues such as obesity, diabetes, and cardiovascular diseases. Natural and functional sugar substitutes, including fruit-based ingredients, inulin, and alternative sweeteners, are discussed for their impact on texture, sensory properties, and overall product quality. The technological challenges associated with maintaining desirable product characteristics while reducing sugar are also addressed.

The presentation further examines plant-based pastry, highlighting the complexity of replacing animal-derived ingredients such as eggs, dairy, and gelatin. Emphasis is placed on understanding their functional roles—such as emulsification, aeration, and stabilisation—and identifying suitable plant-based alternatives that ensure comparable performance and quality.

In addition, allergen-free pastry production, including gluten-free and lactose-free products, is discussed as an essential response to the increasing prevalence of dietary restrictions. Finally, the potential of 3D food printing technology is introduced as an innovative approach to personalised food design and production.

Overall, dessert innovation integrates ingredient substitution, functional design, and advanced technologies to meet evolving consumer needs and industry demands.

Keywords: *dessert innovation, sugar reduction, plant-based pastry, allergen-free products, functional ingredients*

Food Security Through Local Innovation: Developing Sustainable Snacks from Indonesian Honey Sweet Potatoes

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In 2024, Indonesia was the Southeast Asian country with the highest amount of food waste, totalling 14.73 tons per year (Goodsats, 2024). Food waste originates from household or business processing of leftovers, such as fruit and vegetable peels, or from root and fruit crops that have less-than-ideal appearances and are therefore not sold. Additionally, Indonesia ranked 63rd among 113 countries in the Global Food Security Index (Impact.Economist, 2022), indicating a need to improve food security, particularly in terms of sustainability and adaptability. In 2024, the Indonesian government issued Presidential Decree No 81 on the Acceleration of Food Diversification Based on Local Resource Potential, encouraging the public not to rely solely on a narrow range of food commodities, such as rice, but also to explore the diverse range of local food sources in Indonesia as potential alternatives for future food sustainability. Indonesia is a tropical country where various root crops, such as cassava, sweet potato, taro, and porang, grow abundantly. One of the crops explored further in this study is sweet potato, specifically Indonesian honey sweet potato, which has less-than-ideal appearances. Using a quantitative approach with experimental methods and a hedonic test, a snack product was developed from a flour blend made from Indonesian honey sweet potatoes to produce thin, crispy snacks and evaluate sensory responses. The experiment involved three formulations, with a 25% interval between each formulation of Indonesian honey sweet potato flour relative to the total dry ingredients used in the snack product. The use of honey sweet potato flour contributed to a crunchy, dense texture and a slightly sweet taste from the plant's natural sweetness. The hedonic test results showed positive feedback from respondents who liked the snack products containing Indonesian honey sweet potatoes.

Keywords: *Indonesian honey sweet potato, snack, food security*

From By-Product to Value-Added Ingredient: Incorporation of Bilberry Pomace in Wheat Bread

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Bilberries are recognised for their high dietary fibre and bioactive compound content, which contribute to human health. However, their limited shelf life leads to processing into juices, jams, and beverages, which generate substantial by-products such as skins, seeds, and pulp. These residues, often discarded, are rich in valuable constituents. Bilberry pomace, in particular, contains anthocyanins, flavonols, phenolic acids, fibre, vitamins, and polyunsaturated fatty acids, which enhance antioxidant activity and nutritional value. Instead of being treated as waste, bilberry pomace is seen as a promising resource for developing functional foods, dietary supplements, and pharmaceutical applications.

This study explores the potential of bilberry (*Vaccinium myrtillus* L.) pomace as a functional ingredient of bread, aiming to enhance its nutritional, biological, and quality attributes. Both defatted pomace from juice pressing (M2) and purée production (M4) and non-defatted pomace from purée production (M3) were incorporated into French-style wheat bread formulations by substituting 5%, 7.5%, and 10% of the flour accordingly. Bread quality was evaluated through measurements of volume, weight, crumb porosity, and moisture content, while antioxidant activity was determined using the QUENCHER method (TPC, ABTS⁺).

Incorporation of bilberry pomace, rich in dietary fibre, sugars, and bioactive compounds, significantly influenced bread quality. Optimal supplementation with 5–7.5% (M3) improved loaf volume from an average of 1,731.67 cm³ to 2,151.67 cm³, crumb porosity from 76.58% to 84.02%, moisture from 41.13% to 45.4%, and sensory attributes, imparting a darker colour, enhanced texture, and a mild berry flavour. Higher levels negatively affected the structure by reducing loaf volume and crumb porosity, and increasing moisture. Antioxidant activity, however, increased proportionally with pomace addition (5–10%), with total phenolic content in different types of pomace ranging from 17.30 to 23.30 mg GAE/g. The average total phenolic content in bread products was 4 to 14 times higher than in the control sample, with the highest levels observed in the M3 and M4 pomace types. These findings highlight bilberry pomace as a promising functional ingredient for bread fortification, contributing to both product quality and health-promoting value.

Keywords: *bilberry pomace, Vaccinium myrtillus, bread, nutritional improvement, quality improvement*

Poster Presentations

Innovative Extraction of Lipophilic Fractions from Chokeberry Pomace

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Black chokeberries, widely used in juices, jams, and wines, generate pomace during processing that is often discarded despite being rich in bioactive compounds. Besides polyphenols, anthocyanins, procyanidins, flavonols, and phenolic acids, this by-product also contains valuable lipophilic substances such as fatty acids, triacylglycerols (TAGs), tocopherols, and phytosterols. The objective of this study was to evaluate the potential for fractionating lipophilic compounds from chokeberry pomace using supercritical fluid extraction with carbon dioxide (SFE-CO₂), applied either alone or with 5% ethanol as co-solvent, and to characterise the yield, antioxidant capacity, and phytochemical composition of the obtained fractions. SFE with pure CO₂ produced a 14% lower yield compared to CO₂ with ethanol. With pure CO₂, most of the extract accumulated in the first separator, whereas ethanol addition shifted yields toward the second separator. Antioxidant activity, measured by the L-ORAC assay, was about two-fold higher in lipophilic extracts from the first separator when ethanol was present, while fractions from the second separator showed similar activity in both cases. The extracts were rich in highly unsaturated TAGs, particularly LLLn (23.26–24.18%), OLnL (20.35–22.10%), LLnLn (13.20–15.10%), and OLL (10.02–12.06%). Four tocopherols and four phytosterols were detected: under pure CO₂, tocopherols were more abundant in the second separator, while phytosterols were slightly higher in the first. Ethanol addition increased the concentration of both in the second separator. In conclusion, modifying the solvent composition and separator conditions during SFE enables the production of lipophilic fractions with distinct profiles, thereby supporting the valorisation of chokeberry pomace as a source of functional bioactives.

Keywords: *chokeberry pomace, supercritical fluid extraction, phytochemical composition*

From By-Product to Resource: *Extraction and Profiling of Bioactives in Camelina sativa* Seed Press Cake

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Growing emphasis on sustainable food production and circular economy practices has led to increased efforts to utilise agro-industrial by-products. *Camelina sativa* (false flax) is gaining attention as an oilseed crop owing to its high content of omega-3 fatty acids and natural antioxidants. Although cold-pressing is commonly applied to extract high-quality oil, the leftover press cake still contains significant amounts of bioactive compounds, such as polyunsaturated fatty acids, tocopherols, phytosterols, and carotenoids, which can be exploited for applications in functional foods, nutraceuticals, and cosmetics.

This study evaluated the valorisation potential of *Camelina sativa* press cake by comparing various extraction techniques to recover residual lipids. Maceration, Soxhlet, pressurised liquid extraction (PLE-hex), and supercritical CO₂ extraction (SFE-CO₂) were applied. Fatty acid composition was analysed by gas chromatography, while triacylglycerols, tocopherols, and phytosterols were determined using ultra-performance liquid chromatography. Total carotenoids were determined spectrophotometrically, and the L-ORAC assay assessed the antioxidant capacity of lipid fractions. Residues and raw press cake were evaluated using the QUENCHER approach (TPC, ABTS⁺, CUPRAC).

Extraction yields ranged from 9.99% (maceration) to 11.73% (SFE-CO₂-II), with L-ORAC values ranging from 41.82 to 48.72 mg TE/g extract. Soxhlet and PLE-hex extracts showed higher carotenoid content (262.10 ± 5.04 and 255.39 ± 11.66 µg/g, respectively). Four phytosterols (stigmasterol, β-sitosterol, campesterol, ergosterol) and four tocopherols (α-, β+γ-, δ-) were identified, with β-sitosterol and β+γ-tocopherols being dominant. Maceration residues exhibited the highest TPC (15.24 ± 0.74 mg GAE/g DW) and antioxidant activity (ABTS + 45.73 ± 2.09 mg TE/g DW; CUPRAC 33.69 ± 2.9 mg TE/g DW).

Overall, SFE-CO₂ and PLE were most efficient for lipid recovery; Soxhlet and PLE retained higher carotenoid levels; and maceration residues preserved the most phenolic antioxidants. These findings demonstrate the potential of *Camelina sativa* press cake as a sustainable source of lipophilic and hydrophilic bioactive compounds for food, nutraceutical, and cosmetics applications.

Keywords: *Camelina sativa*, extraction of bioactives, phytochemical composition

Characterisation of Matcha Tea Effects on Yoghurt Quality

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Fermented foods are increasingly integrated into daily diets due to their health benefits. Among these, yoghurt is widely consumed and often enhanced with bioactive plant-based ingredients. This study investigates the impact of matcha tea powder, a green tea derivative known for its rich antioxidant profile, on the rheological and technological properties of yoghurt during storage. The following objectives have been set: to assess the influence of matcha tea concentration on yoghurt viscosity over the storage period; to analyse changes in pH, dry matter content, and whey separation in relation to matcha concentration and storage duration; and to evaluate the effect of matcha tea addition on yoghurt colour parameters. Yoghurts were prepared with varying concentrations of matcha powder (0%, 0.2%, 0.5%, and 1%). Afterwards, they were analysed over 27 days for viscosity, pH, dry matter, whey separation, and colour parameters. Results indicate that higher matcha concentrations lead to reduced viscosity from 1,771.52 cP (control sample) to 705.39 cP (1% matcha), increased dry matter (from 13.50% in the control sample to 14.16% in the 1% matcha), greater whey separation (from 41.65% in the control sample to 46.07% in yogurt with 1% matcha), and intensified colour characteristics. These findings suggest that matcha can serve as a functional additive in yoghurt, though its concentration should be optimised to maintain quality during storage.

Keywords: *yoghurt, matcha tea, rheology, whey separation*

Beeswax as a Sustainable Alternative to Vacuum Packaging for Beef Storage

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Rising beef consumption in the European gastronomic sector has intensified sustainability concerns, particularly due to reliance on disposable plastic vacuum packaging. Although vacuum storage effectively prolongs freshness by removing oxygen and retaining moisture, it contributes to environmental pollution. Beeswax, unlike other bee products, has been less extensively studied, and its potential as an alternative packaging material for meat remains underexplored, particularly with respect to microbiological parameters over time. This study aimed to analyse the microbiological properties of beef coated with beeswax and to compare them with those of beef stored in vacuum packaging and in standard box storage. The research involved literature analysis and microbiological testing, including evaluation of weight loss over time, pH measurements, and determination of total bacterial count, lactic acid bacteria, and viable *Escherichia coli* and *Pseudomonas aeruginosa*. The results indicated that beeswax coating had a positive effect on microbial stability. Beef stored in beeswax exhibited significantly lower weight loss – nine times less than vacuum-packed meat and two times less than box-stored samples. After nine days, a reduction in lactic acid bacteria was observed, while pH levels showed no significant fluctuations. The antimicrobial effect of beeswax was limited against *E. coli* and *P. aeruginosa*, suggesting that beeswax primarily contributed to preservation by reducing moisture loss and slowing general microbial growth rather than eliminating specific pathogens. In conclusion, beeswax coating offers a promising, more sustainable alternative to plastic vacuum bags for beef storage. However, further long-term studies are necessary to determine precise storage duration and optimise antimicrobial performance for broader application in the meat industry.

Keywords: *beef, beeswax, sustainable meat packaging, microbiological analysis*

Production of Fermented Vegetables for Kimchi Using Locally Sourced Ingredients

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The challenges posed by climate change highlight the need for more sustainable, localised food production and the application of innovative technologies. One potential solution is substituting widely imported raw materials with local alternatives. In Lithuania, yellow peas offer a promising alternative to soybeans for soy sauce production, as they are protein-rich, environmentally friendly, and logistically advantageous. Despite this potential, research has barely examined the microbiological and sensory properties of pea-based soy sauce alternatives. This study aimed to evaluate the microbiological and sensory characteristics of soy sauce produced from yellow peas. The research combined a literature review with microbiological testing, questionnaire surveys, sensory analysis, hedonic scaling, and scoring tests. Microbiological results revealed the presence of lactic acid bacteria and yeasts, a suitable pH level, and also indicated traces of pathogenic microorganisms. Sensory intensity analysis showed that traditional soy sauce had sharper colour, aroma, and viscosity than the pea-based alternative. However, consumers did not perceive these differences as significant, and the alternative was generally viewed favourably, particularly in its pasteurised form. Respondents emphasised taste and aroma as the most important intrinsic product characteristics, while packaging information was regarded as the most important extrinsic attribute. Nonetheless, many participants expressed doubts about choosing the pea-based product over traditional soy sauce, and limitations in the sensory evaluation—namely, that evaluators could not directly taste the product—suggest that further testing is required. In conclusion, developing a high-quality pea-based soy sauce requires controlled laboratory conditions, extended fermentation periods, and ongoing microbiological monitoring. While initial consumer responses indicate potential acceptance, improvements in sensory attributes and repeated testing are necessary to establish the viability of this sustainable alternative.

Keywords: *soy sauce, yellow peas, microbiological analysis, fermentation*

Factors of Sustainable Management in High-Level Restaurants

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High-level restaurants operate in an environment where taste, quality, creativity, presentation, and service are paramount, yet their ability to sustain these standards has recently been challenged by external shocks that threaten both short- and long-term goals. While the scientific literature often addresses specific aspects of sustainability, there is limited research on holistic sustainability, particularly in contexts such as Lithuania, where sustainable management traditions are still evolving. This study aimed to identify the factors that contribute to sustainable management in high-level restaurants and to provide recommendations for their application. The research employed a mixed-methods approach, including analysis of the scientific literature and semi-structured interviews with restaurant representatives, and was structured into three parts: literature review, empirical data analysis, and conclusions.

The findings highlight several key factors shaping sustainable management. Although restaurants value local suppliers and organic products, they face challenges related to quality, high prices, and supply instability, with cost often becoming the decisive factor in supplier selection. Efforts are made to create an attractive and supportive work environment through efficient scheduling, good communication, and employee motivation, yet sustainability-specific training remains minimal. Waste management has emerged as the most advanced aspect of sustainability, with practices such as LEAN systems, zero-waste strategies, and careful menu planning widely adopted, though advanced technologies such as composting and waste analysers are not yet common. Energy management is recognised as important but remains difficult due to economic and technological constraints. Finally, consumer behaviour in Lithuania exerts limited influence on restaurant sustainability practices, aside from growing interest in organic products, and restaurants generally do not perceive themselves as educators on sustainability issues.

Overall, the research demonstrates that sustainable management is a critical determinant of success for high-level restaurants, enabling financial stability, social responsibility, and adaptability to shifting environmental and market conditions.

Keywords: *sustainable management, waste management, employee environment*

The Effect of Cricket Flour on the Quality of Gluten-Free Bread and the Choices of Consumers

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The growing world population requires more sustainable and efficient use of food resources. In response, the European Union included the house cricket (*Acheta domestica*) in the 2018 list of novel foods, emphasising its high nutritional value and protein content. Cricket flour, produced from dried crickets, offers potential for improving the nutritional quality of various food products and can also be used in gluten-free bread, which is often characterised by poor sensory and nutritional properties. Despite these advantages, crickets remain an unusual and unfamiliar food source in Lithuania and Europe, posing challenges for consumer acceptance. This study aimed to evaluate the effect of enriching gluten-free bread with cricket flour on both bread quality and consumer choice. The research combined scientific literature analysis with empirical testing, including questionnaires, the 7-point hedonic scale, priority ranking, and sensory attribute intensity analysis. The findings revealed that adding cricket flour negatively affected several bread quality indicators, including porosity, volume, and specific volume. Sensory attribute intensity analysis demonstrated that higher concentrations of cricket flour increased the intensity of certain sensory properties, although consumers did not report significant differences in overall liking or priority rankings among the bread samples. Importantly, while consumers accepted cricket-flour-enriched gluten-free bread, hedonic scores remained moderate rather than high. The most valued characteristics of bread were identified as taste, aroma, and nutritional value. In conclusion, enriching gluten-free bread with cricket flour can enhance its nutritional profile, but further technological advances are needed to mitigate quality losses. Consumer testing suggests that the presence of cricket flour does not significantly alter consumer acceptance, indicating potential for wider application if product development addresses texture and volume challenges.

Keywords: *gluten-free bread, cricket flour, quality, consumer choice, sensory analysis*

Sensory Evaluation and Production Technologies of Traditional and Non-Alcoholic Beer

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Beer has long been regarded as a cultural beverage, with each culture developing unique production traditions that influence its colour, taste, and strength. Traditionally consumed in social settings, beer is increasingly being replaced by non-alcoholic alternatives due to growing concerns about the health effects of alcohol, religious restrictions, and the impact of alcohol on mental well-being. This study sought to compare alcoholic and non-alcoholic beers in terms of sensory properties and to review production technologies. The literature review included an overview of classical beer production and the main methods for producing non-alcoholic beer, as well as an examination of the effects of alcohol consumption and the benefits of fermented beverages. A sensory study was conducted with a group of 10 participants who evaluated eight beer samples, four alcoholic and four non-alcoholic, using a structured sensory evaluation. The results indicated that non-alcoholic beers consistently received lower sensory ratings compared to their alcoholic counterparts. The largest difference was observed in wheat beer, where non-alcoholic samples scored 37% lower, while the smallest difference occurred in stout beer, with a 13% decrease in ratings. These findings suggest that despite technological advancements and growing consumer demand, non-alcoholic beers remain less acceptable to consumers on sensory grounds. The study highlights the challenges faced by non-alcoholic beer producers in replicating the taste, aroma, and overall experience of traditional beer, while also emphasising the importance of continued innovation in production methods to improve consumer satisfaction.

Keywords: *non-alcoholic beer, sensory evaluation, beer production technologies*

Minimising Food Waste in Lithuanian Restaurants: Challenges, Practices and Opportunities for Sustainable Management

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Food waste has become a critical issue in the hospitality sector, with restaurants playing a significant role in both its generation and potential reduction. In Lithuania, growing attention to sustainability highlights the need to better understand the factors driving food waste in restaurants and identify practices that can minimise it. This research focused on leading Lithuanian restaurants to evaluate current food waste management approaches, associated challenges, and opportunities for improvement.

Interviews with restaurant representatives provided insights into sustainability initiatives, major causes of food waste, inventory planning and tracking practices, surplus and leftover management, staff training, and cooperation with local suppliers and farmers. Ethical standards were strictly followed, ensuring confidentiality and privacy of the collected data. The study also examined technologies applied in daily operations, barriers to their broader implementation, and educational gaps that limit the adoption of sustainable practices.

The findings revealed that the primary causes of food waste are unpredictable customer flows, inadequate inventory planning, and insufficient staff knowledge or motivation. Nevertheless, several positive practices were identified, including creative reuse of leftovers, partnerships with local producers, and targeted training activities. Persistent challenges remain, particularly in regulatory frameworks, infrastructure, and staff education.

The research concludes that reducing food waste in Lithuanian restaurants requires innovative technologies, improved employee involvement, and creative approaches to menu planning and inventory management. By addressing these areas, restaurants can not only minimise waste but also enhance their competitiveness, reputation, and social responsibility. The recommendations emphasise that fostering a culture of sustainability through practical, scientifically grounded solutions is essential for the long-term resilience of Lithuania's hospitality industry.

Keywords: food waste, sustainability, hospitality management

Factors Influencing the Choice of Freeze-dried Berries by Consumers

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Lyophilisation has gained increasing attention as a food preservation method due to its ability to maintain nutritional value and product quality. Despite extensive scientific and journalistic coverage of their technological and nutritional aspects, little systematic research has examined consumer perspectives on lyophilised products. This study, therefore, explored the factors influencing consumers' choice of lyophilised berries.

The main objective was to analyse determinants of consumer preference through scientific literature review and sensory evaluation. Specific tasks included: presenting berry preservation methods; describing the lyophilisation process; comparing the sensory qualities of dried, frozen, and lyophilised berries; and assessing their influence on consumer choice. The research focused on lyophilised berries, and the methods included analysis of the scientific literature and sensory testing with consumer participants.

The results of the sensory analysis demonstrated that external attributes, particularly appearance, colour, and texture, were decisive in shaping consumer evaluations. Lyophilised strawberries and raspberries were rated higher on these parameters compared to cranberries and blueberries, suggesting that not all berry types benefit equally from the process in terms of consumer appeal. Furthermore, the comparison with dried and frozen alternatives highlighted that lyophilised products are often perceived as superior in terms of freshness and texture retention.

In conclusion, the research indicates that consumer acceptance of lyophilised berries is strongly influenced by their visual and textural properties rather than purely nutritional or technological factors. These findings suggest that future promotion and development of lyophilised berry products should emphasise sensory quality, particularly appearance and mouthfeel, to enhance market competitiveness and consumer satisfaction.

Keywords: *lyophilised berries, consumer choice, sensory analysis*

Development of Desserts Using Natural Sweeteners: Maple Syrup, Honey and Stevia

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The growing focus on healthy eating and reducing sugar intake has encouraged both consumers and the food industry to seek healthier alternatives in dessert production. While traditional sugar remains the most common sweetener, its negative health effects and limited nutritional value have driven increased interest in natural substitutes. This study analysed the effects of maple syrup, honey, and stevia as alternative sweeteners in desserts, examining their influence on sweetness, texture, and appearance, as well as their potential health benefits compared to sugar. Scientific literature was reviewed to outline the nutritional implications of sugar and the selected natural sweeteners. Three popular sugar-rich desserts – tiramisu, pavlova, and glazed doughnuts – were chosen for experimental production. Each dessert was prepared in both traditional sugar-based and modified sweetener-based versions, following technological process descriptions and recipe adaptations that included adjustments to sweetener quantities and the development of production cards. Challenges encountered during preparation were documented. Sensory analysis was conducted to compare the appearance, aroma, texture, and taste of the conventional and experimental desserts, while consumer opinion surveys further assessed acceptability and preferences. The findings revealed that while natural sweeteners can successfully replace sugar in dessert recipes, variations in flavour profile, texture, and visual appeal were evident, and consumer responses differed by sweetener type. Maple syrup and honey generally contributed to a more favourable taste and aroma, while stevia was less well received due to its aftertaste. Overall, the study concluded that incorporating natural sweeteners into desserts can enhance their nutritional value and appeal to health-conscious consumers, though recipe optimisation and consumer education are necessary for wider acceptance. Recommendations were provided for further technological improvements and the strategic use of natural sweeteners in dessert production.

Keywords: *natural sweeteners, dessert production, sugar alternatives, sensory analysis*

Lactose Reduction in Goat's Milk Cheeses: Microbiological Processes and Opportunities for Small-scale Production

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Lactose intolerance affects approximately 70% of adults worldwide, and in Lithuania, consumer demand for lactose-free products remains insufficiently met. Although the market is dominated by large-scale producers, small farms have the potential to develop authentic and high-quality alternatives tailored to specific consumer needs. This study examined the production of sour goat's milk cheeses, both unripened and matured, under retail farm conditions to evaluate changes in lactose content from raw milk to the final product. Lactose concentrations were measured with support from the National Institute for Food and Veterinary Risk Assessment (NIVRA). Fresh goat's milk initially contained 4.5 ± 0.3 g/100 g of lactose, which consistently decreased during fermentation and maturation as a result of microbial activity. After one month of maturation, lactose levels in the cheese were reduced to below 0.1 g/100 g, confirming the product's suitability for lactose-intolerant consumers. These findings demonstrate that traditional fermentation methods naturally degrade lactose, allowing small-scale producers to create lactose-free products without technological additives. The results highlight significant opportunities for expanding the lactose-free product segment by combining traditional production practices with scientific validation. In addition to nutritional and health benefits, such products contribute cultural and gastronomic value and strengthen local food systems. The study recommends enhancing cooperation with the restaurant sector, promoting short supply chains, and improving consumer communication about product qualities and heritage to increase competitiveness and consumer trust.

Keywords: *lactose-free products, fermentation, sustainable food production*

Crickets: A Sustainable Source of Protein

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Global challenges such as population growth, limited food resources, and the impact of climate change on agriculture are driving the search for sustainable protein alternatives to traditional animal sources like beef and chicken, which require significant land, water, and feed and contribute to greenhouse gas emissions. Edible insects, particularly crickets (*Acheta domestica*), have emerged as a promising protein source due to their high nutritional value, efficient feed conversion, and low ecological footprint. Despite these advantages, cricket-based products face cultural, emotional, and informational barriers in Western societies, as well as concerns about chitin content, digestion, and potential allergenic effects. This study aimed to assess the nutritional potential of crickets as a protein source and to evaluate consumer acceptance of cricket-based food products. The research employed a literature analysis, an online questionnaire, and a sensory evaluation using a 7-point hedonic scale. Results confirmed that crickets are nutritionally favourable and environmentally sustainable, but acceptance remains hindered by cultural attitudes. Survey data indicated that most consumers were aware of edible insects and expressed cautious interest, yet only a minority had actually tasted them. Sensory evaluation revealed that products with less visually apparent insect origin received higher ratings for taste and smell, while appearance consistently scored lowest, underscoring the visual factor as a primary barrier to acceptance. Overall, the findings highlight that the successful integration of cricket proteins into food systems depends not only on their nutritional and ecological benefits but also on consumer perception, product design, and educational efforts. Addressing emotional and visual barriers, along with effectively communicating environmental and health benefits, will be essential to increasing consumer acceptance of cricket-based foods.

Keywords: *edible insects, alternative proteins, food innovation, sustainability*

Sensory Evaluation and Consumer Awareness of Wild Edible Herbs in Food Production

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The increasing dominance of industrially produced foods has reduced the use of wild edible plants in modern diets, despite their potential to enrich nutrition and diversify flavours. This study evaluated the properties of wild herbs in food production and compared them with industrial alternatives. A comparative research design was applied, analysing three products: mayonnaise and pesto prepared with wild herbs versus industrial equivalents, and tomato tartlets made with industrial thyme versus wild lemon thyme. Sensory evaluation through tasting was conducted to assess texture, colour, aroma, and overall acceptability. The results showed that products prepared with wild herbs surpassed industrial versions across all organoleptic properties, receiving higher ratings for flavour complexity, freshness, and aroma. In addition, a consumer survey was carried out to assess knowledge and awareness of Lithuanian wild edible plants. The survey results revealed that consumer use of wild plants in food production remains low, largely due to insufficient knowledge and limited practical experience. However, participants indicated interest in incorporating wild plants if more accessible information and guidance were available. The study concludes that wild edible herbs not only improve sensory quality compared to industrially produced products but also represent an underutilised resource for healthier, more diverse culinary practices. Expanding consumer education and providing practical information could significantly enhance the inclusion of wild plants in modern food production and everyday diets.

Keywords: *wild edible plants, sensory evaluation, consumer awareness*

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