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Sustainability, Innovation and Health

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Welcoming Message of the President

Dear colleagues and participants,

It is with great pleasure that I welcome you to the 2nd International congress on food sciences CISA 2025. This year, The Institute of Nutrition, Food and Agri-food Technologies – INATAA, Constantine 1 University Frères Mentouri is organizing the second edition CISA 2025 under the theme "Durability, Innovation and Health". This edition follows the series of seminars organized since 2014 on food sciences and reflecting the evolution of national research in this strategic field.

The 2nd CISA 2025 highlights the essential interrelation between food, nutrition and health at a time when issues of prevention, quality and food safety are more than even at the forefront of societal priorities of our Country. This edition aims to emphasize scientific advances that improve our understanding of the impact of diet on wellbeing, prevention of metabolic diseases and the promotion of sustainable health.

Special attention is given to functional foods, true drivers of innovation and public health. Rich in bioactive compounds and developed to meet specific physiological needs, these products offer a strategic response to current nutritional challenges by contributing to preventive, personalized and evidence based nutrition.

Furthermore, CISA 2025 will emphasize research on bioactive and smart packaging, a rapidly expanding area aimed at improving food preservation, extending shelf life, enhancing safety and reducing environmental impact. These innovative packaging systems, enriched with natural antimicrobial and antioxidant compounds, represent a key component of sustainable and functional food solutions.

The 2025 edition also highlights the growing integration of artificial intelligence (AI) into food sciences. AI technologies now make it possible to optimize food formulation, enhance processing methods, strengthen traceability and sanitary safety and model complex interactions between food components, the microbiota and human health. AI is thus becoming an essential tool for accelerating innovation and supporting the transition toward smarter and more sustainable food systems.

This congress will bring together Keynote speakers from various countries (Algeria, Belgium, Italy, Spain, Poland, Tunisia and Burkina Faso), more than 350 researchers representing universities, research centers from the national territory, public institutions and socioeconomic partners.

I would also like to express my sincere gratitude to all our sponsors. Their commitment and support have been essential to the success of this congress.

Finally, CISA 2025 offers a unique opportunity to share knowledge, collaborations and promote innovative solutions for healthy, functional and sustainable food.

Prof. Halima Boughellout
President of the 2nd CISA 2025
Director of INATAA

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Themes of the Congress

1. **Food and Public Health**
   - *Food Intolerances and Allergies*
   - *Eating Behavior and Nutrition Habits*
   - *Metabolic Diseases*
   - *Nutrition for Specific Population Groups*
   - *Food Toxicology*
2. **Functional Foods and Health**
   - *Microbiota and Gut Health*
   - *Probiotics and Prebiotics*
   - *Dietary Supplements*
   - *Enteral and Parenteral Nutrition, and Oral Supplements*
3. **Innovative Products and Health**
   - *Bioactive Packaging and Food Preservation*
   - *Product Formulation and Transformation Technologies*
4. **Artificial Intelligence in Food Sciences**
   - *Bioinformatics Applications*
   - *Modeling, Simulation, and Predictive Techniques*
   - *Machine Learning*
   - *Deep Learning*

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Table of Contents

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Dr. GUIDOUM N.
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Mr. MERAZKA A.
Dr. MEZDOUD A.
Dr. MOUMEN C.
Dr MOUZAI A,
Mr. SAOUDI Z.
Dr. SMILI H.
Dr. TRODI A.
Dr. ZOUBIRI L.
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I. Invited Speakers Abstracts

Health 4.0: AI at the Heart of Precision Medicine

Karima Benmohamed
University of Constantine 1 Frères Mentouri, Constantine, Algeria

Abstract
The healthcare sector, like many others, has been revolutionized in recent years by artificial intelligence. AI has enabled the transition to Healthcare 4.0—an intelligent health paradigm based on proactive and digital care; a precision medicine that is also preventive, predictive, and personalized. AI methods, incorporating machine learning and deep learning algorithms, leverage multi-omics data (genomics, proteomics, metabolomics, etc.), allowing for more precise patient risk stratification, prediction of disease susceptibility, and diagnosis of conditions at even earlier stages. On the therapeutic front, AI also plays a role by enabling the identification of optimal therapeutic targets, proposing personalized treatments, and predicting individual patient responses to medications. This enhances efficacy and minimizes side effects. Moreover, connected devices enable in-depth data analysis by AI, offering the possibility of real-time treatment adjustments and remote patient monitoring by practitioners, thus fostering a continuous and participatory care model. However, this intelligent and precision healthcare ecosystem, established through AI, faces major challenges. These are particularly related to data privacy and security, the risk of algorithmic bias, regulatory and ethical frameworks, and the training of healthcare personnel. There is also notable resistance from both patients and practitioners towards these revolutionary methods, driven by fears that AI could displace them.

Keywords: Health 4.0; Precision Medicine; Artificial Intelligence; Multi-Omics Data Integration; Machine Learning.

Anti-Fraud Controls and Agri-food Quality: ICQRF-MASAF

Stefania Carpino
Department of Central Inspectorate for Fraud Repression and Quality Protection of the Agri-Food Products and Foodstuffs (ICARF). Ministry of Agriculture, Food Sovereignty and Forests (MASAF), Italy

Abstract
Food safety and fraud prevention are of great importance in maintaining public health, safeguarding consumer trust, and ensuring the integrity of the import/export fluxes. The increasing complexity and globalization of the food industry have made it increasingly challenging to detect and fight against food fraud effectively. The ICQRF, with its daily action for the protection of “Made in Italy” products gives a significant contribution to consolidate the reputation of the quality of Italian products. Controls in the Agro-food sector are more and more an active marketing factor, which can position Italian food as a high-end product. Fighting frauds and the ‘Italian Sounding’ phenomenon is therefore a priority. This work shows the activity carried out by the ICQRF against frauds, usurpations, and counterfeiting phenomenon, which harms Italian quality products, and consumers as well. The operational results confirm the quality of the Italian control system, where the ICQRF stands among the main enforcement Authorities worldwide. With six laboratories and about 100 laboratory technicians, ICQRF has an independent capacity for analytical verification of agri-food productions, a peculiarity that has few international comparisons. All laboratories operate in compliance with the UNI CEI EN ISO/IEC 17025:2018 standard " General criteria on the competence of testing and calibration laboratories & quot; carrying out checks based on analytical determinations accredited by the national accreditation body ACCREDIA, the accreditation concerns a total of 240 tests, of which 13 managed in a & quot; flexible field & quot;. ICQRF has also tasting panels, responsible for the evaluation and official control of the organoleptic characteristics of virgin and extra virgin olive oils, using the method defined at EU level. The tasting committees admitted pursuant to the Ministerial Decree of 18 June 2014, have obtained international recognition from the IOC. (International Olive Council). All ICQRF Laboratories participate in proficiency tests, i.e. ring tests organized by Providers, preferably accredited based on the UNI CEI EN ISO/IEC 17043 standard, to evaluate their analytical performance, also for the purpose of maintenance of accreditation. The harmonization of the ICQRF Quality System, a priority objective for the uniform application of the specific sector standard and to guarantee the validity of the analytical data produced by the individual laboratories, is managed by the TERR II Office with the active collaboration of a working group which involves all the Quality Assurance Managers of the Laboratories distributed throughout Italy. The ICQRF laboratories, as an institutional task, also carry out research activities with National and International Research Institutions and Universities, coordinated by the TERR II Office. The various lines of research are in fact an essential tool for improving the action to combat fraud in the agri-food sector, as well as for enhancing the quality characteristics of foods. ICQRF develops new methods of analysis on agri-food matrices capable of highlighting any use of fraudulent production practices or identifying new parameters for the qualitative characterization of foods. ICQRF appointed representatives actively also participate as expert members inside the DG AGRI EU Committee for several matrices (i.e. Oil, wine, etc.).

Keywords: Agri-food fraud; Food quality Control; ICQRF laboratories.

Breastfeeding

Souad Taleb-Bachtarzi
Medecine Faculty, University of Constantine 3, Algeria

Abstract
Exclusive breastfeeding up to the age of 6 months remains the gold standard in terms of nutrition for the newborn and the infant.Through this conference, the author details the physiology of lactation, the benefits of breastfeeding, how to initiate successful breastfeeding, the difficulties encountered during breastfeeding (for both the mother and the child), the particular situations that the clinician must manage, the real contraindications of breastfeeding, and concludes with a summary of its advantages.

Keywords: Breastfeeding; Maternal-Infant Health; Clinical Breastfeeding Management; Nutritional Gold Standard.

AI-Based Approaches for Nutritional Risk Assessment

Adel Gouri
Ibn Rochd University Hospital, University of Annaba, Algeria

ABSTRACT
Nutritional risk assessment is essential for preventing and managing clinical issues related to malnutrition, obesity, and dietary imbalances. Traditional tools often depend on static clinical scoring systems that may lack sensitivity to the complex, multifaceted nature of individual nutritional status. Artificial intelligence (AI), especially machine learning and neural network models, offers promising ways to improve the accuracy, responsiveness, and personalization of nutritional risk assessment. This conference reviews current AI-based methods for identifying nutritional risk, both in clinical and community environments. It will highlight models that combine multimodal data, such as biological metrics, clinical signs, dietary intake, and data from wearable sensors, to enable personalized risk classification and real-time tracking. Case studies from oncology, geriatrics, and critical care will demonstrate AI's added value in recognizing high-risk profiles and supporting early nutritional intervention. The performance of AI-driven techniques versus traditional screening tools will be critically analyzed. Lastly, ethical, methodological, and regulatory issues will be addressed, with a focus on transparency and clinical validation of algorithms.

Keywords: Nutritional Risk Assessment; Artificial Intelligence; Machine Learning; Clinical Malnutrition; Personalized Nutrition.

Oxidative Stress, Dietary Antioxidants and their Role in Human Health

Joël Paincemail
Service de Chimie Médicale et Plateforme Nutrition Antioxydante et Santé, CHU de Liège, Belgique

ABSTRACT
The role of oxidative stress (or redox status) in human health in general, but also in the development of various diseases such as cardiovascular and neurodegenerative diseases and cancers, has become a scientific reality. However, it is important to understand that there are three types: physiological, pathological and adaptive, the mechanisms of action of which we will examine in detail. To counteract the harmful effects of pathological oxidative stress, our body has two main types of antioxidants: enzymes and small antioxidants, the latter found exclusively in our diet and, in particular, in the age-old Mediterranean diet. We will focus on the dietary sources of polyphenols, which are still relatively unknown, as well as their roles and modes of action in human health. However, we will also discuss the potential toxicity of antioxidant dietary supplements taken in excessive doses. Finally, we will briefly discuss the different blood markers that can be used to accurately assess oxidative stress and how to interpret the data. All this information can be found in the book: *Oxidative Stress and Antioxidants. New Concepts. J. Pincemail, Testez Edition, 2014.*

Keywords: Oxidative Stress; Dietary Antioxidants; Mediterranean Diet; Polyphenols; Redox Biomarkers.

Advocacy for a National Nutrition Plan, Why and How?

Amar Tebaibia
Head on Internal Medicine department, El Biar Public health Etablissement, University of Health Sciences, Algiers, Algeria

ABSTRACT
Obesity is a chronic, multifactorial disease influenced by genetics, the microbiome, dietary habits, socioeconomic factors, and lifestyles. Obesity represents a major public health challenge: its cost far exceeds prevention expenses. In Algeria, as in many countries, its prevalence is increasing at an alarming rate and affects all age groups. Data from the WHO STEPwise survey show a steady increase in overweight and obesity (overweight: Women: 63.3%, Men: 48.3%. Obesity: women 30%, men 14%. Also, the last two surveys conducted by the INSP (2024 and 2025), in collaboration with SAOMM, highlighted a high prevalence of obesity among school-aged children aged 5 to 11, estimated at 13.4%, as well as among young university adults (students) aged 18 to 24, estimated at 11.3%. Moreover, several studies have shown a shift in dietary habits toward more energy-dense diets, rich in sugars and ultra-processed foods. This nutritional transition, combined with high levels of sedentary behavior, contributes to the increase in obesity and its complications; diabetes, hypertension, cardiovascular diseases, certain cancers, and MASH. In the face of this situation, it is urgent to move beyond individual approaches to build a coherent national response. A National Nutrition Plan, based on solid scientific foundations, is essential. Indeed, no ministerial department can, on its own, solve the obesity crisis: a true plan must mobilize health, agriculture, education, finance, the food industry, and local authorities. A National Nutrition Plan constitutes a major opportunity to improve the health of the population, reduce chronic diseases, and strengthen the Algerian health system. This plan must be based on several essential pillars: nutritional education at all ages; access to healthy and affordable food; regulation of the food industry; land use planning that promotes physical activity; appropriate medical care; and the fight against social inequalities. Algeria has scientific knowledge, reliable local data, and proven international examples. It is time to transform these achievements into a national plan; an ambitious and sustainable collective action.

Keywords: National nutrition plan; Obesity prevention; Public health policy; Nutritional transition; Multi-sectoral collaboration.

Weight Variability and its Impact on Health

Adlen Zaamouche
University Hospital Center of Constantine, Algeria

ABSTRACT
Weight variability, defined as the set of fluctuations in body weight over time, is a frequent but still underestimated phenomenon in the assessment of cardiometabolic risk. Numerous data show that repeated cycles of weight loss and gain, often called "weight cycling" or the "yo-yo effect," are associated with increased morbidity, regardless of the initial body mass index (BMI). Understanding the pathophysiological mechanisms involved in this variability, particularly hormonal, metabolic, and inflammatory changes, as well as their repercussions on cardiovascular risk, type 2 diabetes, and certain chronic conditions, allows for better weight loss management. The objective is to emphasize

the importance of an approach focused not only on weight loss but also on its sustainability, in order to improve overall health outcomes.

Keywords: Weight Cycling; Yo-yo Effect; Cardiometabolic Risk; Weight Sustainability; Metabolic Health.

Factors Influencing Acute Malnutrition in Children Under Five in Burkina Faso

Mariama K. Cherif
Nazi BONI University, Bobo-Dioulasso, Burkina Faso

ABSTRACT

Burkina Faso faces a chronic nutritional crisis. Since 2009, the government has utilized the SMART methodology to strengthen nutritional surveillance. Recent estimates indicate that 699,000 children aged 6–59 months suffer from acute malnutrition—a 10% increase from the 2020–2021 period—with severe acute malnutrition (SAM) cases rising by over 18%. While contributing factors vary by province, common drivers include inadequate food intake, high morbidity (fever, malaria, and diarrhea), poor sanitation, and limited access to potable water. This research was initiated to provide updated provincial data and investigate localized factors influencing malnutrition. **Methods:** This research comprises two distinct components. The first is a prospective descriptive study conducted at Saint Camille Hospital in Ouagadougou (HOSCO) evaluating 201 children under five years old. Data were collected via survey forms covering sociodemographic characteristics, dietary habits, and clinical examinations. Data were processed using Excel 2016 and IBM SPSS (2020). The second, ongoing component is a longitudinal study designed to establish the role of exclusive breastfeeding on immune development and gene expression. This study will compare transcription profiles and epigenetic mechanisms between exclusively breastfed and non-exclusively breastfed children over an 18-month monitoring period. **Results:** In the HOSCO study, the average age of participants was 12.36 ± 7.4 months, with a sex ratio (M/F) of 1.21. The 7–13 month age group was the most represented (59.2%), and first-born children were the most frequently affected (38.3%). Chi-square testing revealed that the mother's professional status (p = 0.025), marital status (p = 0.000), and educational level (p = 0.025), as well as the child's general clinical condition (p = 0.000), were significantly associated with nutritional status. Additionally, a significant correlation was found between the father's education level (p = 0.011) and socioeconomic factors, such as poverty, in the occurrence of acute malnutrition. The secondary prospective study is expected to provide finer molecular data regarding the protective effects of breastfeeding against asymptomatic infections. **Conclusion:** The findings from the initial study highlight that delays in introducing complementary foods, parental education, maternal socio-professional status, and poverty significantly impact childhood nutritional status. Integrating molecular and epigenetic data from the ongoing second study will serve as a proof of concept to optimize the design of highly targeted, effective interventions for malnutrition elimination programs in Burkina Faso.

Keywords: Acute Malnutrition; SMART Methodology; Child Morbidity; Socioeconomic Factors; Exclusive Breastfeeding.

Application and Perspectives of Natural Deep Eutectic Solvents

Bartłomiej Zieniuk
Warsaw University, Poland

ABSTRACT

Natural deep eutectic solvents (NADES) are emerging as green, tunable media formed by hydrogen-bond donors and acceptors that turn liquid near room temperature. Compared to traditional volatile organic solvents, NADES provide low toxicity, minimal vapor pressure, and adjustable viscosity, supporting green chemistry principles for safer and more sustainable processing. In food and health uses, their main benefits include (i) efficient extraction of valuable bioactives from plant and food by-products, (ii) stabilization and delivery of sensitive compounds, and (iii) process intensification with less environmental impact. This contribution synthesizes recent laboratory findings on NADES composed of biocompatible components. Using agri-food waste and plant materials such as chokeberry pomace, spent coffee grounds, hop cones, and various fruits/flowers as matrices, NADES enabled efficient recovery of anthocyanins, carotenoids, betalains, and polyphenols. Response surface methodology highlighted how temperature, time, and solvent-to-material ratio, together with strategic water addition, modulate viscosity and mass transfer to maximize yield and antioxidant activity. Looking ahead, NADES open possibilities for ready-to-use, food-grade extracts, smart/active packaging ideas, and cryopreservation of foods and biological materials. Major challenges for scaling up include solvent recycling, obtaining regulatory approval, conducting thorough toxicological assessments, and integrating with existing processes. Overall, NADES serve as a flexible platform to valorize side streams, develop functional foods, and reduce the environmental impact of extraction and stabilization steps throughout the food supply chain.

Keywords: Natural deep eutectic solvents; Green chemistry; Bioactive extraction; Agri-food waste valorization; Sustainable processing.

Anti-Listeria Bacteriophage-Based Packaging to Enhance the Safety of Traditional Canestrato Cheese

Margherita Caccamo
CoRFiLaC, Ragusa, Italy

ABSTRACT

The project "Anti-Listeria Bacteriophage-Based Packaging to Enhance the Safety of Traditional Canestrato Cheese (Pa4Ca)" aims to promote food safety, sustainability, and circular innovation within the agri-food chain through the development of natural antimicrobial packaging solutions. In this framework, two novel anti-Listeria edible biopackaging systems—based on whey protein (WPS) and tapioca starch (TSS) and activated with the bacteriophage Listex™ P100—were developed and tested to enhance the microbial safety of traditional Canestrato Siciliano cheese. Both formulations ensured phage viability and microbiological stability for 60 days under refrigeration, achieving a ≈2 log CFU/g reduction of Listeria monocytogenes after 3 days of storage in inoculated cheese. Sensory analyses (CATA, QDA, and triangular tests) revealed that the innovative phage-based coating preserved the typical visual and olfactory traits of Canestrato while enhancing aroma intensity and freshness perception. Notably, 70% of assessors preferred the cheese with bioactive packaging, indicating

positive consumer acceptance. Complementary neuromarketing studies showed that bio-packaged products, especially when supported by clear informational priming, elicited higher cognitive engagement, emotional activation, and perceived product innovativeness, safety, and sustainability. These factors were associated with increased purchase intention and willingness to pay. Overall, results demonstrate that bacteriophage-activated edible coatings can ensure microbial protection without compromising sensory identity, aligning with Pa4Ca's mission of integrating biotechnology, tradition, and consumer perception.

Keywords: Food Safety; Bacteriophages; Edible Packaging; Canestrato Cheese; Consumer Perception.

Towards Active and Sustainable Packaging: Natural Deep Eutectic Solvents-Modified Chitosan Films

Magdalena Gierszewska
Faculty of Chemistry, Nicolaus Copernicus University in Toruń, Toruń, Poland

ABSTRACT
Deep eutectic solvents (DES), and more specifically their natural variants (NADES), have emerged in recent years as a promising class of green solvents with potential applications across food, pharmaceutical, and polymer science. These eutectic mixtures, composed of hydrogen bond donors and acceptors, are typically biodegradable, non-toxic, and accessible from natural compounds such as organic acids, sugars, amino acids, or quaternary ammonium salts. Due to their unique physicochemical properties – including low volatility, high solvating power, and tunable polarity – NADES are gaining increasing attention as functional alternatives to conventional organic solvents. In the context of food science, their utility extends beyond the extraction and stabilization of bioactives. They can be employed as plasticizers, carriers for active substances, or even as edible components in the formulation of food-contact materials. The role of NADES in modifying the structure and functionality of biopolymeric films is particularly relevant to the development of sustainable food packaging. Their ability to alter molecular interactions within polymer matrices opens new avenues for improving mechanical properties, enhancing bioactive retention, and controlling release kinetics. Among natural polymers used in food packaging, chitosan stands out due to its film-forming ability, biodegradability, biocompatibility, and intrinsic antimicrobial activity. Recognized as Generally Recognized as Safe (GRAS), chitosan is frequently applied to produce edible coatings and films that act as a protective barrier against oxygen, moisture, and microbial contamination. These coatings can also serve as delivery systems for functional additives, enhancing shelf life and food safety. Ongoing research, including studies conducted by the author, has focused on exploring the potential of NADES in developing chitosan-based films for food packaging applications. These studies investigate how NADES can influence chitosan films' mechanical properties, antioxidant activity, and migration behavior, aiming to enhance their functionality and sustainability in food packaging systems.

Keywords: Active Packaging; Sustainable Packaging; Chitosan Films; Natural Deep Eutectic Solvents; Biopolymer Modification.

Statistical Significance, Plausibility, and Scientific Research

Zineb Azouz
Université Constantine 1, Frères Mentouri, Algeria

ABSTRACT
Through recent and problematic examples concerning the use or intervention of statistics in scientific knowledge and communication in general (particularly in Biology), we will try to address the thorny questions that a researcher encounters today when faced with data and the numerous theories that jostle each other, often giving the impression of contradicting each other. We will try to address the difference between the credibility of a theory and the plausibility of the data. For example, going from the notion of malnutrition based on so-called universal statistical thresholds, to well-known indicators such as statistically "significant" TSH levels for making one or more diagnoses, it seems imperative to us today to restore the predominant role of the expert – the statistical term for a field of competence – and to somewhat disentangle the widespread notions among us that are not without discrediting science and scientists. What meaning should we give to a statistically "normal" value versus an optimal value?. Unlike other branches of Mathematics, where communication remains internal, statistics is almost always invoked as a guarantee of "truth" and effectiveness whenever a scientist whose work abounds in percentages wishes to communicate the results of their research. Between the impossibility of mastering the full theoretical arsenal of Statistics and the danger of reducing it to a mere set of recipes, we face genuine challenges.

Keywords: Statistical significance; Scientific plausibility; Clinical thresholds; Expert judgment; Data interpretation.

Smart and Sustainable Process Manufacturing for Agri-Food Formulated Products: Engineering the Products of Tomorrow

Imène Felfoul
Université de Sfax, Laboratoire Analyses, Valorisation et Sécurité des Aliments (LAVASA), Ecole Nationale d'Ingénieurs de Sfax (ENIS), Route de Soukra, Sfax, Tunisia.

ABSTRACT
The global agri-food system faces an unprecedented challenge, providing safe, nutritious, and appealing food to a growing population while drastically reducing its environmental footprint. This paradigm shift requires a transformation in the manufacturing methods of formulated food products. This study focuses on the innovation in technologies and strategies that will define the future of food production. It highlights the challenges of smart manufacturing for formulated products, which are typically multi-component, structured, and multi-phase. These challenges, prevalent in the agri-food industry, are linked to rapidly evolving customer demands and, in some cases, a strict regulatory framework. This study examines advances in smart manufacturing, including digitalization and the use of large datasets with predictive models and solution-finding algorithms in these industries. While progress has been made, it is imperative to develop demonstrations of model-based tools on realistic problems to demonstrate their benefits and highlight systemic weaknesses.

Keywords: Smart manufacturing; Sustainable food processing; Food formulation; Digitalization; Predictive modeling.

Application of Nuclear and Isotopic Techniques to Enhance Contaminant Detection in Food Safety Systems in Algeria

Mounira Azouz
Research Division of Agri Food Technology, National Research Institute of Agriculture INRAA, Algiers, Algeria

ABSTRACT
Food safety in Algeria faces increasing challenges due to expanding agricultural activities and food processing industries. Conventional analytical techniques, while essential, show limitations in sensitivity and speed when addressing complex chemical and biological contaminants. Nuclear and isotopic methods have demonstrated superior capability for trace-level contaminant detection, contributing to more accurate risk assessments and regulatory compliance. This study evaluates the application of nuclear analytical techniques including gamma spectrometry, DXRF, isotopes and radio receptor assay in Algerian food safety laboratories. These methods were applied to representative samples from agricultural products and processed foods to detect pesticide residues, heavy metals (e.g., lead, cadmium), mycotoxins, and antibiotics. Analytical protocols were benchmarked against international standards, including Codex Alimentarius guidelines, and ISO/IEC 17025 standards to ensure method validity and reproducibility. The integration of nuclear and isotopic methods significantly improved detection limits, reaching contaminant concentrations as low as parts per billion (ppb). Combined, these techniques enhanced traceability and provided reliable datasets for contamination mapping across the food supply chain. Implementation of these methods strengthened national monitoring programs and improved alignment with international food safety requirements. This communication summarizes analytical findings. Nuclear and isotopic analytical techniques offer powerful tools to overcome limitations ofconventional methods in Algeria's food safety framework. Their adoption enhances laboratory capacity, supports early-warning systems, and bolsters quality assurance practices crucial for public health protection and sustainable agriculture. Algeria in 2025 made a Strategic investment in these technologies, in capacity building, and interdisciplinary collaboration that are essential for advancing food safety governance.

Keywords: Nuclear techniques; Isotopic methods; Contaminant detection; Food safety governance; Traceability.

Sustainable Microbial Production of PHAs for Next-Generation Biodegradable Food Packaging

Ghorab Fares Dia Eddine
Infochemistry Scientific Center, ITMO University, Lomonosova, Russia

ABSTRACT
Growing awareness of environmental pollution from petroleum-based plastics has driven the search for sustainable alternatives in food packaging. Polyhydroxyalkanoates (PHAs) are a family of biodegradable polyesters synthesized by various microorganisms as intracellular carbon and energy storage materials. They are fully biobased, biocompatible, and compostable, making them promising candidates for replacing traditional plastics. This study focuses on optimizing the microbial production of PHAs using cost-effective renewable feedstocks and evaluating their performance as biodegradable food packaging materials. PHA was synthesized through bacterial fermentation under nutrient-limited conditions using glucose or agro-industrial waste as the primary carbon source to reduce process costs. Following fermentation, polymers were recovered using solvent and non-solvent extraction techniques, then purified and characterized. Fourier-transform infrared spectroscopy (FTIR), differential scanning calorimetry (DSC), thermogravimetric analysis (TGA), and scanning electron microscopy (SEM) were employed to investigate the chemical structure, crystallinity, morphology, and thermal stability of the resulting materials. PHA films were prepared by solvent casting and tested for tensile strength, elongation at break, oxygen and water vapor transmission rates, and biodegradation behavior under simulated composting conditions. The developed films exhibited desirable flexibility, mechanical integrity, and barrier performance suitable for short-term food preservation applications. Additionally, the materials showed complete biodegradability within weeks to months, eliminating post-use plastic residue and lowering environmental impact. The use of agricultural residues such as molasses and corn steep liquor further improved the economic viability and sustainability of the PHA production process. This research demonstrates the potential of integrating biotechnological polymer synthesis with environmentally responsible food packaging design. Future work will focus on improving polymer properties through copolymerization and blending strategies to expand the applicability of PHAs in various packaging formats.

Keywords: Polyhydroxyalkanoates; Microbial fermentation; Biodegradable packaging; Circular economy; Thermal stability.

Cold Plasma Technology to Enhance the Techno-Functional Properties of Traditional and Novel Flours

Adiletta Giuseppina
Department of Chemical Material and Environmental Engineering, University of Rome La Sapienza, Rome, Italy

ABSTRACT
The growing demand for functional foods tailored to individuals with metabolic or gastrointestinal disorders has intensified research on innovative flour-based formulations supported by emerging non-thermal technologies. In this context, the development of low-protein, allergen-safe mixes with enhanced techno-functional performance is essential to meet the dietary needs of individuals with phenylketonuria, celiac disease, or protein intolerance. This study developed and characterized a low-protein mix treated with cold atmospheric plasma (CP) to improve its functional properties. The control formulation consisted of three starch sources (potato, corn, and tapioca) combined with guar gum, xanthan gum, and psyllium as structuring agents. An enriched formulation was further designed by incorporating apple, date, and orange peel powders through a mixture design approach to enhance nutritional and sensory quality. Cold plasma represents an innovative, sustainable processing method capable of inducing controlled structural and chemical modifications in biomaterials without compromising their nutritional or sensory integrity. The reactive species generated by CP-free radicals, energetic ions, and reactive oxygen species (ROS) enable microbial decontamination,

allergen reduction, and modulation of surface chemistry, while minimizing environmental impact through low energy consumption and absence of chemical effluents. Cold plasma treatment was applied to both formulations under optimized full factorial design (2^2) conditions: 15 minutes at 25 kV for the control mix and 15 minutes at 23.68 kV for the enriched mix. Untreated control and enriched samples exhibited baseline water holding capacity (WHC) values of 1.7 and 1.4 g/g, oil holding capacity (OHC) of 0.63 and 0.70 g/g, and swelling capacity (SC) of 3.1 and 2.85 mL/g, respectively. Following CP treatment, WHC increased by 28% (1.7 to 2.18 g/g) in the treated control mix and 36% (1.4 to 1.90 g/g) in the treated enriched mix; OHC increased by 135% and 168%, respectively, while SC showed a moderate increase to 3.25 and 3.05 mL/g. These enhancements are attributed to plasma-induced oxidation and partial disruption of starch crystallinity, which expose polar functional groups and create additional binding sites. This leads to enhanced hydrophilicity, greater water and oil absorption, and improved matrix accessibility. Overall, cold plasma treatment emerges as a promising non-thermal and eco-efficient strategy for tailoring the functionality of specialized flour systems designed for dietary-restricted populations. The observed improvements in WHC, OHC, and SC demonstrate CP's potential to enhance dough rheology, bread volume, and product stability, offering advantages over conventional modification methods. Future breadmaking trials will further evaluate the technological, sensory, and nutritional performance of CP-treated formulations, focusing on dough development.

Keywords: Cold plasma; Non-thermal technology; Techno-functional properties; Low-protein flour; Starch modification.

II. Oral Communications Abstracts

Anthropometric Measurements, Muscle Mass Assessment, Skeletal Muscle Mass Index (SMI), Older Adults, Type 2 Diabetes

Khadidja Bessaid, Lylia Djenas, Wafa Bounames, Djamila Meskine, Malha Azzouz

Laboratory of Endocrinology and Metabolism, Faculty of Medicine, University of Algiers, Algiers, Algeria

ABSTRACT

Background: Assessing muscle mass in older adults with diabetes is essential for detecting frailty, preventing functional decline, and reducing metabolic complications. Simple anthropometric measurements such as mid-upper arm circumference and calf circumference are frequently used as surrogate markers of muscle mass. **Aims:** To evaluate the relationship between anthropometric parameters (mid-upper arm circumference, calf circumference, waist circumference) and appendicular skeletal muscle mass (ASM) and skeletal muscle mass index (SMI) in adults with diabetes. **Methods:** A cross-sectional study was conducted in 252 diabetic patients aged ≥60 years. ASM was measured using DEXA, and SMI was calculated as ASM/height^2. Anthropometric measures were compared between individuals with low vs normal muscle mass. Correlations were assessed using Pearson and Spearman coefficients. ROC curves were generated to evaluate the discriminatory performance of each measurement. **Results:** Mean mid-upper arm circumference was 28.0 ± 3.1 cm, and mean calf circumference was 34.4 ± 3.1 cm. Mean ASM was 16.99 ± 3.80 kg, significantly higher in men (20.3 ± 2.8 kg) than in women (14.5 ± 2.3 kg; p<0.001). Low ASM was present in 56.3% of participants, and low SMI in 60.7%, with higher prevalence among women ($p < 0.001$). Calf circumferences showed moderate correlations with SMI (r = 0.535, $p < 0.001$) and ASM (r = 0.521, $p < 0.001$). Waist circumference (r = 0.304, $p < 0.001$) and mid-upper arm circumference (r = 0.275, $p < 0.001$) demonstrated weaker correlations with ASM. ROC analysis revealed poor discriminatory ability for both mid-upper arm circumference (AUC = 0.251) and calf circumference (AUC = 0.19) in identifying low muscle mass. **Conclusions:** In older diabetic adults, low muscle mass is highly prevalent, especially among women. Although anthropometric measurements correlate with ASM, their diagnostic performance is limited. More specific techniques such as DEXA remain essential for accurate assessment of muscle mass in this population.

Keywords: Anthropometric Measurements; Muscle Mass Assessment; SMI; Older Adults; Type 2 Diabetes.

Cross-Regional Analysis of Mediterranean Diet Adherence: Sociodemographic and Lifestyle Determinants within the MEDIET4ALL project

Taha Khaldi [1], Sadjia Lahiani [2], Achraf Ammar [3]

[1] *National Biotechnology Research Center (C.R.Bt), Ali Mendjli Nouvelle Ville UV 03 BP E73, Constantine 25016, Algeria,*

[2] *VALCORE Laboratory, Department of Biology, Faculty of Science, University of M'hamed Bougara Boumerdes, Boumerdes, Algeria.*

[3] *Department of Training and Movement Science, Institute of Sport Science, Johannes Gutenberg-University Mainz, Mainz, Germany*

ABSTRACT

Background: The Mediterranean diet (MedDiet) is acknowledged for its health advantages; however, compliance with its principles differs by region and is influenced by geographical, cultural, economic, and life-style factors. **Aims:** This research examines regional differences in sociodemographic and lifestyle factors between Mediterranean (MC) and non-Mediterranean (NMC) countries, with a particular focus on adherence to the Mediterranean diet and lifestyle, as well as the associated barriers in each region. **Methods:** This international survey was conducted across 10 countries, and data were collected from 4,010 participants. Dietary adherence was assessed via the MedLife Index, and additional lifestyle measures included physical activity (IPAQ-SF), sleep patterns (PSQI), mental health (DASS-21), and social participation (SSPQL). Statistical analyses included chi-square tests, Mann–Whitney U tests, and standardized residual analyses to identify significant regional variations. **Results:** The study revealed distinct dietary patterns, with MC participants showing stronger adherence to traditional MedDiet components (legumes, fish) while NMC participants favored modern adaptations (whole grains). Both regions exhibited low physical activities dominance (60%–62%), although MC participants engaged more (21.1% vs. 18.5%) in moderate physical activity. MC maintained higher proportions of "sometimes socially active" individuals, NMC showed greater representation in the "always socially active" category. Sleep quality was poorer in MC (45% below recommended duration vs. 40% in NMC), while NMC reported higher insomnia rates. Mental health symptoms were comparable (33%–35% moderate depression/anxiety in both). **Conclusions:** Our findings highlight that while Mediterranean regions maintain traditional dietary patterns, globalization and modern lifestyle shifts are

narrowing regional health behaviours. Public health strategies should address region-specific barriers, including economic constraints in MC regions and knowledge gaps in NMC regions, while promoting MedDiet adherence. Future research should explore the impact of cultural, socio-economic, and digital factors on dietary behaviours and mental health to develop tailored, effective interventions for improving overall well-being.

Keywords: Mediterranean Regions Differences; MedLife Index; Physical Activity; Mental Health.

Ultra-Processed Foods and Childhood Allergies: Signals from a 45-Case Study in Constantine

Rabiâa Karoune [1,2], Nedjda Rayane Sayoud [1], Manel Nouar [1], Ikram Bouldjadj [1,2], Hanane Kadi [1,2], Lynda Yagoubi-Benatallah [1,2]

[1] *Institut de la Nutrition, de l'Alimentation et des Technologies Agro-Alimentaires (INATAA), Université Constantine 1 Frères Mentouri, Route de Ain-El-Bey 25000, Constantine, Algérie.*

[2] *Laboratoire de recherche alimentation, nutrition et santé (ALNUTS), Université Salah Boubnider, Constantine 3, Ali Medjeli, Constantine, Algerie*

ABSTRACT

Background: Once predominant in high-income countries, Ultra-Processed Foods UPFs are now expanding rapidly in low- and middle-income regions, reshaping traditional food systems. This worldwide transition raises major public health concerns due to the growing evidence linking UPFs to obesity, cardiometabolic disorders, and allergic diseases (especially in children). **Aims:** The aim of this study was to investigate the potential association between the consumption of UPFs and the onset of allergic symptoms among children. Methods: A descriptive cross-sectional survey was conducted among 45 children presenting clinically identified allergic manifestations. The data collection tool consisted of a structured questionnaire specifically designed for this study, addressing dietary behaviours, frequency of UPF intake, and maternal perceptions regarding food-induced allergic reactions. The questionnaire was administered through direct, face-to-face interviews during routine consultations in various medical centres across the city of Constantine. UPF categorization adhered strictly to the NOVA classification, which is widely used in contemporary epidemiological and nutritional research for defining levels of food processing. **Results:** The analysis revealed that the majority of participants consumed UPFs on a daily basis, with several products being ingested many times per day. More than 38% of mothers admitted consuming UPFs daily during their pregnancy. Over 42% of the children consumed UPFs daily during their first year of life. Among the most frequently consumed items were instant sugary preparations, chocolate-flavoured drinks, industrial sliced bread, packaged buns and bakery products, all of which represent highly accessible and widely marketed UPFs in Algeria. Moreover, foods identified by mothers as potential triggers of allergic symptoms were predominantly UPFs. Confectionery, industrial dairy products, chocolate, and savoury snack foods, particularly crisps, were the most frequently incriminated categories. **Conclusions:** These findings highlight a possible link between regular UPF consumption and the emergence or exacerbation of allergic manifestations in children and adolescents.

Keywords: Ultra-Processed Foods; NOVA Classification; Pediatric Allergy; Algeria.

Preference Scores for Salty Foods and Blood Pressure

Esma Boudjouada, Afef Mezdoud, Hayet Oulamara

Department of Nutrition, Nutrition and Food Technology Laboratory (LNTA), INATAA, Brothers Mentouri University Constantine 1

ABSTRACT

Background: Consumption is largely guided by food preferences, which are shaped by biological factors, cultural influences, and environmental availability. **Aims:** To determine whether there is a relationship between blood pressure levels and salty food preferences. **Methods:** A total of 215 subjects aged from 18 to 55 years were recruited, including 110 normotensives and 105 hypertensive subjects. Preferences for salty foods were assessed by scores ranging from 0 ("never tastes") to 5 ("likes a lot"), and thresholds of sensitivity to salty taste were assessed by the three-alternative forced-choice test (3-AFC) with increasing concentrations. Statistical analyses were performed using StatView version 5 software. The significance level was set at 0.05. **Results:** Our results indicate that systolic blood pressure in the whole sample was positively correlated with the preference score for salty foods ($r = 0.28$; $p < 0.0001$), the preference score for salty fatty foods ($r = 0.20$; $p = 0.0027$), and the preference score for total salty foods ($r = 0.20$; $p = 0.003$). A negative correlation was observed between diastolic blood pressure and the preference score for salty fatty foods ($r = -0.27$; $p = 0.0049$) and the preference score for total salty foods ($r = -0.25$; $p = 0.0075$) in normotensive individuals. Preference scores for salty foods, salty fatty foods, and total salty foods were higher in hypertensive subjects compared to normotensive subjects. **Conclusions:** An association between blood pressure levels and salty food preference scores was observed, with significant differences between hypertensive and normotensive subjects.

Keywords: Salt; Blood pressure; Food preferences; Comparison; Scores.

Spent Coffee Grounds as a Functional Feed Ingredient for Broilers: Effects on Growth Performance and Carcass Yield

Fatima El Batoul Teniou [1], Moufida Aggoun [1], Cerine Yasmine Boulahlib[1], Lizia Arfaoui [2], Ouassim Beguiret [2], Abd El Matine Mallem [3], Rabah Arhab [4], Samira Becila-Hioual [1]

[1] *Research Laboratory in Food Sciences, Formulation Innovation Valorization and Artificial Intelligence (SAFIVIA), INATAA, Frères Mentouri University, Constantine 1, Route Ain EL-Bey, 25000, Constantine, Algeria.*

[2] *SARL NutriAliment Plus (N.A.P), Specialized in livestock and poultry feed manufacturing, productive farming, and industrial breeding. Ibn Badis Industrial Zone, Constantine, Algeria.*

[3] *Beguiret Veterinary Clinic, Aïn Smara, Constantine, Algeria.*

[4] *Laboratory of Natural Substances, Bioactive Molecules and Biotechnological Applications, Larbi Ben M'Hidi University, Oum El Bouaghi, Route de Constantine, 04000, Algeria*

ABSTRACT

Background: Spent coffee grounds (SCG), an abundant agri-food by-product, represent both an environmental challenge and potential resource rich in bioactive compounds (polyphenols and fibers). 1 This study is part of a circular economy approach aimed at upcycling this waste as an ingredient in poultry feed. **Aims:** The primary objective was to evaluate the impact of incorporating spent coffee grounds into

the diet of broiler chickens on their growth performance, health status, and carcass quality. **Methods:** A 48-day feeding trial was conducted using one hundred Cobb 500 broiler chickens, divided into two experimental groups (n = 50): a control group (C) receiving a standard diet and a group supplemented with spent coffee grounds (SCG). Monitoring included daily recording of mortality and health status, as well as weekly measurements of zootechnical parameters. Carcass yield was evaluated at slaughter. **Results:** Statistical analysis indicated that the incorporation of SCG had no significant effect on the mortality rate ($p > 0.05$) or the overall health status of the chickens, remaining comparable to the control group. However, growth was slightly slower in the SCG group, showing a live weight of 1756.4 g compared to 2228.5 g for the control group ($p < 0.01$). Despite this difference in weight, the SCG group exhibited a significantly improved carcass yield (85.36% vs. 80.85% for C; $p < 0.001$), as well as higher yields for offal and the brisket. Furthermore, a significant reduction in abdominal fat deposits ($p < 0.001$) was observed in animals receiving low levels of spent coffee grounds. **Conclusions:** This study confirms the potential of spent coffee grounds as a valuable resource in the poultry industry. Its incorporation offers pathways for reducing feed costs and contributes to sustainable by-product management. Although a slight decrease in growth was noted, the improvement in carcass yield and the reduction in abdominal fat are significant advantages.

Keywords: Agri-Food By-Product; Circular Economy; Spent Coffee Grounds; Broiler Chickens; Slaughter Yield.

Beyond the Folklore: *Thymus algeriensis* Exhibits Effective Antioxidant and Anti-iInflammatory Activity (*in vitro*)

Farah Baya Bourek [1], Messaoud Hachemi [2,3], Dounia Djellal [2], Safa Elhadjali [1,4], Imene Benzina [2,3], Leila Bechah [2], Leila Metlef [2]

[1] *Department of Food Biotechnology, Institute of Nutrition, Food and Agri-food Technologies (INATAA), University of Constantine 1, Algeria*

[2] *Faculty of natural and life sciences, University of Batna 2, Algeria*

[3] *Laboratory of Biodiversity, Biotechnology and Sustainable Development, University of Batna 2, Algeria*

[4] *Biotechnology and Food Quality Laboratory, Institute of Nutrition, Food and Agri-food Technologies (INATAA), University of Constantine 1, Algeria*

ABSTRACT

Background: Thymus is a large plant genus comprising up to 400 species of aromatic and medicinal herbs. One of the most common species of thyme found in North Africa is *Thymus algeriensis* (Boiss. & Reut.) (*Lamiaceae*). In traditional Algerian medicine, *T. algeriensis* is used as an astringent, expectorant, and healing agent, as well as a circulation stimulant. Infusions of the leaves and flowers are used to treat abdominal pain, wound infections, and food poisoning, as well as colds, thanks to their anti-inflammatory properties. In culinary traditions, *T. algeriensis* is used to flavor coffee, buttermilk, and tea. **Aims:** The aim of this study is to evaluate the antioxidant and anti-inflammatory activity of *T. algeriensis* from the Batna region of Algeria. **Methods:** Following botanical identification, the bioactive compounds were extracted by hydro-ethanolic maceration (80/20% ethanol/distilled water) for 24 hours. The polyphenol and flavonoid content were measured to evaluate the content of bioactive molecules. Antioxidant activity was determined in vitro using the DPPH and phosphomolybdenum tests. Anti-inflammatory activity was determined using the anti-hemolytic test. **Results:** The crude extract was rich in polyphenols (51.36 ± 0.002 µg AGE/mg extract) and flavonoids (35.659 ± 0.001 µg QE/mg extract). The extract demonstrated notable antioxidant activity (IC_{50} = 33.50 µg/mL), though seven times lower than that of the standard (IC_{50} = 4.80 µg/mL) ($p < 0.001$). The phosphomolybdenum assay indicated significant antioxidant capacity (1000 mg GAE/g). Anti-inflammatory testing revealed substantial in vitro anti-inflammatory activity, with a protection rate of 68.322% for the extract and 88.959% for the standard (diclofenac). **Conclusions:** *T. algeriensis* is a plant with health-promoting properties, making foods containing it functional. It is recommended that this plant be encouraged for culinary use and that traditional foods prepared from it be consumed.

Keywords: *Thymus Algeriensis*; Antioxidant Activity; Anti-Inflammatory Activity; Bioactive Compounds.

Valorization of Whey Proteins by Enzymatic Hydrolysis using Plant Extract: Enhancement of Functional and Antioxidant Activities

Ahlem Khangui, Nechoua Lina Khelassi, Dhia Eddine Bouafia, Halima Boughellout

Food Engineering Laboratory, Institute of Nutrition, Food and Agri-Food Technologies (INATAA) Constantine 1 University, Algeria

ABSTRACT

Background: Whey protein, a byproduct of cheese manufacturing, is rich in essential proteins and lactose. Because of its high BOD, if released into the environment without adequate treatment, it can cause serious ecological damage. **Aims:** In this study, we aim to add value to whey proteins by enzymatically hydrolyzing them using a plant extract-based enzyme and comparing its performance with commercial porcine pepsin. **Methods:** Whey protein concentrate, with 80% protein content, was hydrolyzed by plant extract and pepsin at two E/S ratios of 0.1% and 0.05%. The hydrolysates were stored at -20°C to evaluate their techno-functional properties and antioxidant activities via DPPH and ABTS radical scavenging assays at different hydrolysis times (0, 30, 360, and 1440 minutes). **Results:** Our results highlighted that hydrolysates produced from plant extract showed higher solubility and emulsifying capacity than those treated with pepsin. Antioxidant activity generally increased with time for all samples; plant extract hydrolysates showed a higher radical scavenging efficiency than pepsin hydrolysates after 1440 minutes, which was the longest time interval measured by DPPH, with the highest value of plant extract at 0.1% being 45.92% and that of pepsin at 0.1% being 38.90%. ABTS inhibition was constantly superior, with plant extract at 0.1% giving the highest inhibition of 86.75% and pepsin at 0.1% next with 83.12%. **Conclusions:** Thus, the results confirm that plant extract hydrolysates have better antioxidant ability than those treated with pepsin. Enzymatic hydrolysis of whey proteins by plant extract improves both functional and antioxidant properties. This concludes that plant extract is a good and sustainable biotechnological tool for the conversion of dairy byproducts into valuable ingredients for the food and nutraceutical industries.

Keywords: Whey; Plant; Hydrolysis; Antioxidant; Valorization.

Evaluation of the Antioxidant Activity of *Curcuma longa* Dry Extract: Toward Safer Natural Preservatives

Naima Hadjadj, Zakia Abdellaoui, Fateh Bougherra, Meriem Retimi, Rifka Mesdour, Mouhamadou I. Idrissa

Department of Food Sciences, Faculty of Natural and Life Sciences, Laboratory of Food Science, Technology and Sustainable Development. University of Blida 1, Algeria

ABSTRACT

Background: The growing use of chemical preservatives in the food industry raises concerns due to their toxic, carcinogenic, and allergenic effects. In this context, Curcuma longa appears as a promising natural source of antioxidant bioactive compounds. **Aims:** This work aims to evaluate the antioxidant activity of Curcuma longa crude non-volatile extract to propose it as a safer natural alternative. **Methods:** The non-volatile extract was obtained by solid–liquid extraction using ethanol. Total polyphenol content was determined using the Folin–Ciocalteu method, while flavonoid content was measured using the aluminium chloride ($AlCl_3$) method. Antioxidant activity was assessed through DPPH• and ABTS•+ radical-scavenging assays over a concentration range from 10 to 600 mg/L. **Results:** Ethanolic extraction yielded 5.93% of non-volatile extract. Antioxidant activities were dose-dependent. For DPPH•, the scavenging capacity ranged from 16.99% at 10 mg/L to 69.63% at 600 mg/L. For ABTS•+, activity increased from 29.51% at 12.25 mg/L to 94.66% at 600 mg/L. At this highest concentration, ABTS•+ activity exceeded that of the reference antioxidant BHT (86.35%), although BHT remained more potent at most other concentrations. These performances are attributed to the extract's richness in total polyphenols and flavonoids (192.6 GAE/g extract and 159.8 QE/g extract, respectively). **Conclusions:** The non-volatile extract of Curcuma longa shows noteworthy antioxidant potential, particularly at high concentrations, making it a promising natural alternative to chemical preservatives in both food and pharmaceutical applications.

Keywords: *Curcuma Longa*; Antioxidant Activity; DPPH; ABTS; Polyphenols.

Valorization of Olive Pomace through the Conversion of Extracted Hemicellulose into High Value-Added Biomolecules

Rim Tinhinen Maougal [1,2], Malika Barkat [3], Meriem Benamara [1]

[1] *BIOQUAL, INATAA, Université Constantine 1 freres MENTOURI, Constantine, Algeria*

[2] *GBBV Université Constantine 1 freres, Constantine, Algeria*

[3] *SAFIVIA INATAA, Université des Frères Mentouri de Constantine 1, Constantine, Algeria*

ABSTRACT

Background: Olive pomace, a major by-product of the Mediterranean olive oil industry, represents an abundant and under-exploited source of lignocellulosic biomass. This biomass, rich in hemicellulose, cellulose, and lignin, offers considerable potential for the recovery of these co-products. This opportunity paves the way for a new innovative sector combining sustainable development and value-added products, particularly in the field of food packaging. **Aims:** In this context, our research focused on the recovery of hemicelluloses, biopolymers naturally present in plant biomass. The goal was to evaluate the effectiveness of extraction techniques depending on the nature of the residues to transform this agro-industrial waste into a resource for technological and environmental progress. **Methods:** Three types of pomace were studied, obtained from traditional, two-phase, and three-phase extraction processes, respectively. Two extraction techniques were used to evaluate their effectiveness. The extracts obtained were then subjected to physicochemical analyses to determine their composition. **Results:** The findings indicated that alkaline extraction is the most efficient technique for procuring hemicellulose, and that pomace from the three-phase process generates the greatest returns. **Conclusions:** This innovative approach to olive pomace recovery combines the rational use of natural resources, improved product performance, and a contribution to health promotion, placing this agro-industrial waste at the forefront of technological and environmental progress.

Keywords: Olive Pomace; Valorization; Hemicellulose; Extraction; Lignocellulosic Biomass.

Effect of Medicinal Plant Extracts on Enriched Food Product Quality

Afaf Chebout [1,2], Siham Ydjedd [1,3], Makhlouf Chaalal [1,2]

[1] *SAFIVIA Laboratory, Institute of Nutrition, Food and Agri-Food Technologies (INATAA), University of Constantine 1 Mentouri Brothers, Algeria*

[2] *BIOQUAL Laboratory, Institute of Nutrition, Food and Agri-Food Technologies (INATAA), University of Constantine 1 Mentouri Brothers, Algeria*

[3] *Laboratory of Agri-Food Engineering (GENIAAL), Institute of Nutrition, Food and Agri-Food Technologies (INATAA), University of Constantine 1 Mentouri Brothers, Algeria*

ABSTRACT

Background: The incorporation of medicinal plants into food systems is a promising approach to improve food security and public health, particularly due to their content of bioactive compounds with nutritional and functional potential. **Aims:** This study investigated the formulation of biscuits enriched with CytisusvillosusPourr. leaf extracts and compared them with control formulations prepared either without additives or with a synthetic additive. **Methods:** The physicochemical properties of the biscuits, including moisture, pH, acidity, and °Brix, were evaluated. In addition, total polyphenol and flavonoid contents, as well as antioxidant activity (DPPH and FRAP assays), were assessed. All parameters were measured on the first day and after 15, 30, and 90 days of storage. **Results:** The results showed that the addition of CytisusvillosusPourr. extracts improved the physicochemical quality and antioxidant properties of the biscuits. Moisture, pH, acidity, and °Brix values remained consistent with biscuit preparation standards, although slight variations occurred during storage. In particular, biscuits enriched with plant extract exhibited higher levels of polyphenols and flavonoids and stronger antioxidant activity than the other formulations. During storage, a decrease in polyphenol, flavonoid, and antioxidant activity was observed; however, this decline was less pronounced in biscuits enriched with plant extract, highlighting the protective effect of the bioactive compounds. **Conclusions:** CytisusvillosusPourr. leaf extracts represent a promising natural additive for the development of functional cereal products,

offering improved nutritional and antioxidant properties while supporting the sustainable valorization of medicinal plants.

Keywords: *Cytisus villosus* Pourr; Biscuit; Enrichment; Antioxydants; Storage.

Optimization of Drying Methods (by Oven) and Kinetic Analysis of Jameed Cheese

Dhiya Eddine Bensaad [1], Hakima Araar [2], Anfel Mansri, Nada Serhani

[1] *Food Science Laboratory (LSA), Department of Food Engineering, Institute of Veterinary and Agricultural Sciences, University Batna 1 - Hadj Lakhdar, Algeria*

[2] *Translation Intercultural Communication Foreign Language Teaching – TICFLT, Department of English Language and Literature, Faculty Letters and Foreign Languages, University of Batna 2 – Mostefa Benboulaid, Algeria*

ABSTRACT

Background and Aims: This study investigates the effect of controlled oven drying on the physicochemical quality and drying kinetics of Jameed cheese produced from goat milk using traditional and modern techniques. **Methods:** Drying experiments were conducted at five temperatures (50, 60, 70, 80, and 90 °C), and the drying behavior was modeled using an exponential kinetic model. The results showed excellent performance of the model, with coefficients of determination ranging from R^2 = 0.92 to 0.99, confirming the suitability of first-order kinetics in describing moisture loss. **Results:** Physicochemical analyses revealed that Jameed exhibited an acidity level within the typical range for dried fermented cheese (pH 5.22–5.25), a high protein content of 32.63%, low fat content of 2.5%, and a high water-holding capacity (WAC = 122.22%), indicating excellent rehydration properties. Color measurements using the CIELAB system demonstrated that drying at moderate temperatures maintained both the natural lightness and yellowness of Jameed, while higher temperatures (80–90 °C) resulted in intensified redness due to Maillard reactions. Among the tested conditions, 50 °C provided the best balance between drying efficiency, color preservation, and retention of nutritional attributes, yielding a stable, high-quality final product. **Conclusions:** Overall, the findings highlight the importance of kinetic modeling and controlled thermal processing in optimizing the production of high-quality, shelf-stable Jameed cheese.

Keywords: Jameed; Oven Drying; Drying Kinetics; Water Hold Capacity; Thermal Processing.

Effect of Wheat Flour Type and Fermentation Agent on some Quality Characteristics of Bread

Abdallah Bouasla [1], Ibtihel Boubendir [2], Douaa Gharbi [2]

[1] *Laboratory of Agro-Food Engineering (GéniAAl), Institute of Nutrition, Food and Agri-Food Technologies (INATAA), Brothers Mentouri Constantine 1 University, Algeria*

[2] *Institute of Nutrition, Food and Agri-Food Technologies (INATAA), Brothers Mentouri Constantine 1 University, Algeria*

ABSTRACT

Aims: The objective of this work is to study the effect of flour type and fermentation agent type on some quality characteristics of bread. **Methods:** Four types of breads were made: two samples based on T55 wheat flour (one with yeast and the other with sourdough) and two samples based on T150 wheat flour (one with yeast and the other with sourdough). A technological characterization of the obtained breads was carried out by determining the specific volume (Vsp), the loss of weight during baking, the color of the crust and the crumb, alveolar characteristics of the crumb, and sensory attributes. **Results:** The results showed that the use of T150 flour in yeast bread-making significantly reduced Vsp (3.48 cm^3/g vs 2.81 cm^3/g) and alveoli circularity, while increasing their number (432 vs 535.5), and improving the crust color score (7.7), promoting better overall sensory acceptability (7.4). For sourdough bread-making, T150 flour decreased alveoli circularity and solidity, but increased their number (371 vs 425), which was accompanied by better sensory appreciation of color (7.1) and high overall sensory acceptability (7). Furthermore, the use of sourdough in bread-making based on T55 flour resulted in a decrease in Vsp (3.48 cm^3/g vs 2.68 cm^3/g), number of alveoli (425 vs 371), and overall sensory acceptability (6.03), as well as a lower sensory appreciation of color (6.33), despite an increase in the size and circularity of the alveoli. Finally, breads made from T150 flour, regardless of the fermentation agent, presented the best characteristics, particularly in terms of Vsp, alveolar structure, and overall sensory acceptability.

Keywords: Bread-Making; T55 Wheat Flour; T150 Wheat Flour; Yeast; Sourdough.

Impact of Carbon Source and Ethanol Stress on Lipid Production and Fatty acid Profile of *Yarrowia lipolytica* L2

Doria Naila Bouchedja [1], Amina Laribi [1], Bartłomiej Zieniuk [2]

[1] *Laboratory of Food Sciences, Formulation, Innovation, Valorization & Artificial Intelligence (SAFIVIA) Biomass Production Modeling & Enzyme Valorization Team. Institute of Nutrition and AgrI-Food Technologies (INATAA), University Constantine 1 – Frères Mentouri, Algeria*

[2] *Department of Chemistry, Institute of Food Sciences, Warsaw University of Life Sciences-SGGW, Poland*

ABSTRACT

Background: *Yarrowia lipolytica* is a promising microbial yeast for lipid production from agro-industrial residues. This study highlights the potential of *Y. lipolytica* for the valorization of agro-industrial waste and the production of quality microbial lipids under controlled stress conditions. **Aims:** This study evaluates the effect of substrate and ethanol stress on lipogenesis and the fatty acid composition of strain L2. **Methods:** Cultures were grown in two media: olive mill wastewater (OMW) and waste frying oil (WFO), supplemented with 0%, 3%, 5%, and 7% ethanol (v/v). The fatty acid composition of the cellular lipids was determined after 96 hours of incubation. **Results:** The results show that the lipid profile is strongly modulated by the substrate type and ethanol concentration. In the OMW medium, oleic acid (C18:1) is predominant (40–49%), while palmitic (C16:0) and palmitoleic (C16:1) acids decrease with ethanol, indicating membrane adaptation. The total proportion of SFA gradually decreases, while MUFAs increase, suggesting a mechanism to maintain lipid fluidity. In the WFO medium, C18:1 and C18:2 increase with ethanol, while certain rare fatty acids disappear at ≥ 5% ethanol. **Conclusions:** The observed lipid adaptation reflects metabolic adjustments specific to each substrate. These observations indicate that olive mill wastewater is a more favorable substrate for producing lipids rich in unsaturated fatty

acids. Exposure to moderate ethanol concentrations promotes lipid reorganization, while high concentrations (7%) lead to the inhibition of lipogenesis.

Keywords: *Yarrowia lipolytica* L2; Ethanol Stress; Lipid Production; Fatty Acid Profile; Metabolic Reprogramming.

Valorization of Dairy Whey through the Development of Functional High-Protein Gummies

Soumeya Bencharif-Betina [1,2], Sakina Bechkri [2], Ismahane Redjal[3], Hadeel Benhalilou, Bouchra Aissani, Gamra Abbabsa

[1] *Department of food biotechnology, Laboratory of Food Biotechnology and Quality, Institute of Nutrition, Food and Agro-Food Technologies (INATAA), University of Constantine 1 – Frères Mentouri, Algeria*

[2] *Laboratory of Biochemistry, Genetics and Plant Biotechnology, University of Constantine 1 – Frères Mentouri, Algeria*

[3] *Research and Development Department, Production Unit Numidia GIPLait*

ABSTRACT

Background: Dairy whey is a nutrient-rich by-product that is often underutilized. Its valorization in functional foods offers a sustainable approach aligned with clean-label and health-focused trends. **Aims:** This project aims to valorize dairy whey—both in its liquid and freeze-dried forms—through the development of innovative 2-g functional gummies enriched with natural pigments. **Methods:** Sterilized liquid whey and lyophilized whey were incorporated into two optimized formulations, using beetroot extract to provide a natural red color and curcumin to achieve a yellow hue. These clean-label colorants were selected to enhance consumer appeal while maintaining a health-oriented formulation. Nutritional profiling, based on experimental assays and standardized compositional tables, was performed. A hedonic sensory evaluation was conducted with consumer panelists to assess appearance, texture, flavor, and overall acceptability. **Results:** Nutritional profiling indicated that the gummies provide 18–22% proteins, 60–65% carbohydrates, and less than 2% lipids, depending on the proportion and physical state of the whey used. This composition confirms the potential of whey as an accessible, nutrient-dense ingredient suitable for functional confectionery products. The results of hedonic sensory evaluation revealed a marked preference for gummies made with liquid sterilized whey, achieving 86% acceptance, compared to only 15% for the freeze-dried whey version. Panelists attributed the lower acceptance of the lyophilized formulation to its stronger milky taste and more pronounced dairy odor, which were perceived as undesirable in a sweet gummy matrix. **Conclusions:** The findings highlight the technical and sensory advantages of using liquid whey over its freeze-dried counterpart. This work demonstrates a viable, sustainable, and innovative pathway to valorize dairy by-products while generating added-value functional foods aligned with circular economy principles and current trends in healthy confectionery.

Keywords: Whey Valorization, Functional Gummies, Protein Enrichment, Natural Colorants; Food Innovation.

A Natural Strategy for Food Safety: Controlling Aflatoxigenic Fungi from Poultry Feed Using *Cymbopogon schoenanthus* Essential Oil

Amani Semmari[1], Azzedine Abdi[1], Karima Bouti[1], Faiza Baali[2], Nadjette Djemouai[1,2], Atika Meklat[1], Salim Mokrane[1]

[1] *Laboratoire de Biologie des Systèmes Microbiens (LBSM), Ecole Normale Supérieure de Kouba, Algiers, Algeria*

[2] *Département de Biologie, Faculté des Sciences de la Nature et de la Vie et Sciences de la Terre, Université de Ghardaia, Algeria*

ABSTRACT

Background: Aflatoxigenic fungi, particularly *Aspergillus flavus* and *A. parasiticus*, contaminate poultry feed and produce highly toxic aflatoxins, posing serious risks to animal health and food safety. Conventional fungicides are often limited by low efficacy and potential toxicity, creating a need for natural alternatives. Essential oils are eco-friendly agents with strong antifungal properties. This study explores the effectiveness of *Cymbopogon schoenanthus* (L.) Spreng essential oil (EO) against aflatoxigenic fungi isolated from Algerian poultry feed. **Methods:** The EO was extracted from the aerial parts of the plant by hydrodistillation and subsequently characterized by gas chromatography–mass spectrometry (GC–MS) to identify its bioactive constituents. Fungal strains were isolated from poultry feed and identified based on morphological and biochemical characteristics. The antifungal activity of *C. schoenanthus* (L.) Spreng EO against 30 selected aflatoxigenic isolates of Aspergillus section Flavi was assessed using the disc diffusion and broth macrodilution assays, while the broth microdilution method was employed to determine the minimum inhibitory concentrations (MICs). **Results:** Results showed that *C. schoenanthus* (L.) Spreng EO exhibited significant antifungal effects, with inhibition zones ranging from 15.33 ± 0.57 mm to 27.33 ± 0.57 mm among aflatoxigenic fungal isolates and inhibition percentages varying between 46.82% and 89.94%. MIC values of the EO against the aflatoxigenic isolates were determined using the broth microdilution method with resazurin as an indicator and ranged from 3.12 ± 0.00 to 12.5 ± 0.00 mg/mL, depending on the strain. GC–MS analysis revealed the presence of major bioactive compounds, including β-eudesmol (11.35%) and α-elemol (10.84%), which are known for their antifungal properties. **Conclusions:** *Cymbopogon schoenanthus (L.)* Spreng essential oil exhibited strong in vitro antifungal activity against aflatoxigenic fungi isolated from poultry feed, highlighting its potential as a natural, eco-friendly alternative to synthetic fungicides for controlling mycotoxin contamination and enhancing feed safety.

Keywords: Aflatoxigenic Fungi; Poultry Feed; Antifungal; Essential Oils.

Formulation of a Lentisk Oil-Based Spread Margarine Added with Argan Oil as an Antioxidant

Anis Chikhoune[1,2], Manessa Boudjettou[1], Ahlem Benhamdi[1,2], Brahim Zeroual[3], Khellaf Aliane[3], Samir Hadjal[3]

[1] *Departement du Second Cycle, École Supérieure des Sciences de l'Aliment et des Industries Agroalimentaires (ESSAIA), Alger, Algérie*

[2] *Equipe PVNTA, Laboratoire ALIMENTS, École Supérieure des Sciences de l'Aliment et des Industries Agroalimentaires (ESSAIA), Alger, Algérie*

[3] *Département Recherche et Développement, Cevital spa, Bejaia, Algérie*

ABSTRACT

Background: In response to the growing demand for more natural food products, the agri-food industries are exploring new plant-based sources with interesting nutritional and functional properties. Lentisk (*Pistacia lentiscus*) oil, rich in bioactive compounds, represents a promising alternative. **Aims:** This study focused on the formulation of two spreadable margarines made from crude and refined lentisk oil, enriched with argan oil used as a natural antioxidant. **Results:** The results showed that the margarine formulated with crude oil exhibited a higher peroxide value (1.7 meq O_2/kg) compared to the reference margarine (0.27 meq O_2/kg) and the one made with refined oil (0 meq O_2/kg). The Rancimat test revealed good oxidative stability, especially for the margarine made with refined oil (23.10 h), followed by the reference (19.31 h) and the crude oil-based margarine (14.72 h). The melting point also varied, with the highest value observed in the crude oil margarine (39.03 °C). Other parameters, such as moisture, pH, acidity, and salt content, complied with internal regulatory standards. **Conclusions:** The use of refined lentisk oil resulted in a margarine with superior oxidative stability and overall quality compared to the crude oil formulation. These findings highlight lentisk oil, particularly in its refined form, as a promising natural ingredient for developing stable, plant-based margarine alternatives enriched with bioactive compounds.

Keywords: Margarine, Lentisk Oil; Argan Oil; Refining; Extraction; Oxidative Stability.

Advancing Food Science through Artificial Intelligence

Nousseiba Guidoum

GENIAAL Laboratory, Nutrition, Food and Agri-Food Technologies Institute (INATAA), Mentouri Brothers University - Constantine 1, Algeria

ABSTRACT

Background: Artificial Intelligence (AI) has emerged as a transformative technology in food sciences, offering advanced analytical and predictive capabilities that exceed conventional approaches in quality control, safety assessment, and process optimization. However, despite rapid progress, existing research remains fragmented across domains, with limited integration of AI methods into the biological, chemical, and environmental specificities of food systems. **Aims:** To synthesize recent advances in artificial intelligence, particularly machine learning, deep learning, and computer vision, across the food value chain, and to identify key challenges and future research opportunities for their effective and responsible adoption. **Methods:** A narrative review of recent peer-reviewed literature was conducted, focusing on AI applications in primary production, food processing, food safety, and nutrition. Relevant studies were analyzed to identify major application trends, methodological approaches, and persistent limitations in the field. **Results:** The review highlights that AI-driven models support precision agriculture through yield prediction, plant disease detection, and optimization of irrigation and nutrient management using multisource data. In food processing, AI enables real-time monitoring of physicochemical parameters, automated process control, and quality assurance through computer vision and hyperspectral imaging. In food safety, machine learning-based predictive microbiology improves the forecasting of microbial growth, shelf life, and contamination risks under dynamic conditions, supporting proactive food safety management. In nutrition and consumer sciences, AI facilitates personalized dietary recommendations and the analysis of large-scale nutritional and omics datasets, advancing the development of functional and health-oriented foods. **Conclusions:** Despite its significant potential, the adoption of AI in food sciences is constrained by challenges related to data quality and standardization, model interpretability, algorithmic bias, cybersecurity, and regulatory gaps. Addressing these issues requires interdisciplinary collaboration, the application of FAIR data principles, explainable AI approaches, and robust governance frameworks. Overall, AI represents a key driver for the development of sustainable, safe, and consumer-centric food systems.

Keywords: Artificial Intelligence; Precision Agriculture; Food Processing; Food Safety and Quality; Predictive Microbiology.

Application of Machine Learning for Early Detection of Pathogens in Processed Cheese: A Case Study from Numidia Dairy Unit

Selsabil Tadjere, Samira Becila Hioual

Department of Food Technology, Institute of Nutrition, Food, and Agro-Food Technologies (INATAA), University of Constantine 1 Frères Mentouri (UC1FM), Algeria

ABSTRACT

Background: Safety in processed cheese remains a challenge in the dairy industry due to the potential survival of pathogens like Salmonella spp., Escherichia coli, and Listeria monocytogenes, which led to reported illnesses in about 1,400 people in Europe between 2016 and 2021. **Aims:** This study proposes machine learning models to estimate the level of pathogen presence in processed cheese based on physicochemical properties (pH, fat content, and moisture content), as well as microbiological properties from Algeria's Numidia Dairy Unit and a large survey in Canada. **Methods:** In 2025, during an internship, real-time analysis of samples using standard plating methods revealed potential contamination and helped build a comprehensive database for model construction. Four methods - Random Forest (RF), Support Vector Machine (SVM), Logistic Regression (LR), and Gradient Boosting (GB) - were tested for model performance after hyperparameter adjustment and 10-fold cross-validation. **Results:** The Random Forest (RF) model achieved the highest accuracy (97.2%) and precision (96.8%), along with superior sensitivity (97.5%) and F1-score (97.1%) compared to the other models. This performance is attributed to its efficiency in capturing nonlinear relationships among different microorganisms. The results were further supported by recursive feature importance analysis, which highlighted the combined influence of pH and storage temperature in the RF model. Confusion matrices and receiver operating characteristic (ROC) curves demonstrated stronger discriminatory power for RF, with an area under the curve (AUC) of 0.99, enabling early warning detection despite temporal variations. **Conclusions:** These findings suggest that artificial intelligence can be effectively applied to dairy product quality control, providing faster and more accurate analysis than conventional culture-based methods. The proposed system can be integrated into embedded devices such as Raspberry Pi to address limitations in industrial data and enhance quality monitoring of processed cheese products throughout the supply chain.

Keywords: Machine Learning; Pathogen Detection; Processed Cheese; Random Forest; Dairy Safety.

Comparison of ANN and ANFIS Models for Predicting the Drying Kinetics of Fruit Slices in a Microwave Oven and Characterization of Dried Products

Abla Bousselma [1], Sara Mechaala [2], Halima Boughellout [1], Adiba Benahmed Djilali [3]

[1] *Agro-Food Engineering Laboratory (GENIAAL), Food Process Engineering, Biodiversity and Agro-Environment Team, INATAA, Frères Mentouri University Constantine, 1 (UFC 1), Constantine, Algeria*

[2] *Department of Animal Biology, Faculty of Natural and Life Sciences, University of Frères Mentouri - Constantine 1, RouteAïn El Bey, 25000 Constantine, Algeria*

[2] *Department of Microbiology and Biochemistry, Faculty of Natural and Life Sciences, University of Batna 2, Algeria*

[3] *Faculty of Biological and Agricultural Sciences Mouloud Mammeri University of Tizi-Ouzou, Algeria*

ABSTRACT

Background: Fruits and vegetables contain a large amount of water, and their high water content contributes to their preservation and extends their shelf life. In this work, the microwave drying method was used, relying on heat transfer by radiation. The drying process poses a difficult control problem because it is nonlinear and complex. To reduce chemical waste, time, and operating costs while achieving objectives, modeling and artificial intelligence (AI) are considered the best solutions for selecting the most appropriate drying model and optimal working conditions for product processing. **Aims:** The aim of this study was to analyze drying behavior and adjust mathematical models, Artificial Neural Networks (ANNs), and Adaptive Neuro-fuzzy Systems (ANFIS) to predict the drying kinetics of fruit layers. The products obtained were analyzed to determine their chromatic properties, total sugar content, polyphenol and flavonoid content, and antioxidant activity. **Methods:** Fruit slices were dried in a microwave oven at powers ranging from 200 to 800 W, and their drying kinetics were monitored until constant weight, then adjusted by 20 mathematical models, ANN, and ANFIS. The dried products were characterized by colorimetric properties, sugar content, polyphenols, flavonoids, and antioxidant activity. **Results:** Results showed that the ANN model, with an R^2 of 0.9991, provided a more accurate prediction of drying kinetics compared to mathematical modeling and ANFIS. Radiation drying significantly affected ($p < 0.05$) the *L*, a, b**, and saturation values of dried layers. Increasing microwave power from 200 to 800 W decreased total sugar content and antioxidant activity compared to fresh fruit, while polyphenols and flavonoids increased. **Conclusions:** In conclusion, ANN accurately modeled drying kinetics and is therefore an excellent tool for estimating drying time and moisture content, outperforming 20 mathematical and ANFIS models, and facilitating manufacturing and production processes in industrial units.

Keywords: Artificial Neural Networks; Adaptive Neuro-Fuzzy Systems; Drying Kinetics; Antioxidant Activity; Mathematical Modeling.

Food Quality 4.0: Advancing a New Era through Innovative Technologies

Mohamed Ghellam [1], Ayşegül Beşir Özgeçen[2]

[1] *Food Science Laboratory (LSA), Department of Food Engineering, ISVSA, University of Batna1, Algeria*

[2] *Department of Food Engineering, Engineering Faculty, Ondokuz Mayis University, Samsun, Turkiye*

ABSTRACT

Background: The food sector is among the industries that have undergone considerable transformation and development with the advent of the Fourth Industrial Revolution (Industry 4.0). The evolution of food processing and control technologies is therefore a key factor in improving food quality and safety. **Aims:** This review presents Food Quality 4.0 and the main technologies that make it possible. It explains the role of artificial intelligence, the Internet of Things, robotics, and other technologies in improving food processing. **Methods:** The integration of intelligent quality control, new analytical techniques, and traceability provides essential data on the manufacturing process. **Results:** These data prevent fraud and anticipate non-compliant products. These new technologies and the transparency of the production process strengthen consumer safety and trust in food products. The implementation of Food Quality 4.0 therefore offers the opportunity to eliminate the risks inherent in traditional industries. It represents a successful transition from traditional to new concepts. **Conclusions:** Despite the challenges and prerequisites for its implementation, this transition is a real asset and contributes sustainably to the industrial, economic, social and environmental development of the sector.

Keywords: Food Quality 4.0; Safety; Smart Control; Artificial Intelligence; Novel Technologies.

III. Poster Communications Abstracts

Influence of Modern Eating Habits on the Rising Prevalence of Metabolic Diseases among Algerian Youth

Hadda Arab [1], Sabrina Rabehi [1], Sassia Sellaoui [1], Said Dekhinat [2]

[1] *Environment, Health and Animal Production Laboratory, Institute of Veterinary Sciences and Agricultural Sciences, Veterinary Department, University of Batna 1, Batna, Algeria*

[2] *Institute of Veterinary Sciences and Agricultural Sciences, Agricultural, Department, University of Batna 1, Batna, Algeria*

ABSTRACT

Background: Over the past two decades, Algeria has experienced a rapid and profound nutrition transition driven by urbanization, changing lifestyles, and the growing accessibility of industrialized food products. These changes have led to a significant shift in eating behaviors among adolescents and young adults. Diets that once centered on traditional Mediterranean staples such as legumes, whole grains, fruits, and vegetables are increasingly being replaced by fast foods, sugar-sweetened beverages, and calorie-dense snacks. As a consequence, metabolic diseases particularly obesity, type 2 diabetes, and metabolic syndrome are rising at an alarming rate in the young

population. **Aims:** This review synthesizes recent research examining how modern dietary patterns influence metabolic health among Algerian youth. **Results:** The findings indicate that unhealthy eating habits are shaped not only by increased access to processed foods but also by sedentary lifestyles, peer and social influences, and the pervasive marketing of unhealthy products. These factors collectively contribute to rising rates of poor dietary choices and metabolic disturbances in adolescents and young adults. **Conclusions:** Overall, this review highlights the urgent need for comprehensive and culturally tailored public health strategies to address the rising burden of metabolic diseases among Algeria's younger generations. Effective action will require coordinated efforts to promote healthier dietary behaviors, improve food environments, and implement early preventive interventions that are sensitive to the social and cultural context in which adolescents live.

Keywords: Nutrition Transition; Algerian Population; Metabolic Diseases; Adolescents and Young Adults; Eating Habits.

Study of the Effect of Age and Body Weight Status on the Knowledge of Hygiene-Dietary Measures Adapted to Diabetic Patients in Constantine

Ouassila Allam [1], Hayet Oulamara [1], Omayma Boudjelthia [1], Rihem KhouloudDaoud [1], Nassim Nouri [2]

[1] *Laboratoire de Nutrition et Technologie Alimentaire (LNTA) Institut de la Nutrition de l'Alimentation et des Technologies Agro-Alimentaires (INATAA), Université des frères Mentouri Constantine 1, Algérie*

[2] *Laboratoire des maladies métaboliques (IRMM), service d'endocrinologie, Université Salah Boubnider Constantine 3, Algérie*

ABSTRACT

Background: Effective diabetes management depends on a solid understanding of the recommended hygienic and dietary measures (HDM) for diabetic patients. **Aims:** This study aims to evaluate the effect of age and weight status on knowledge of these measures in a diabetic population in Constantine. **Methods:** The study population included 234 adult diabetics (type 1 and 2) followed at CHU-Constantine. Age (in years) and duration of diabetes (in months) were recorded. Weight (kg), height (cm), and waist circumference (cm) were measured. Body mass index (BMI) was calculated. Knowledge of HDM was assessed using a questionnaire adapted to the population and based on validated questionnaires. A knowledge score was calculated, with low knowledge defined as a score ≤ 40 and moderate knowledge as > 40. Statistical analysis was performed using SPSS25. **Results:** The mean age of our population was 50.96 ± 15.08 years. The mean BMI was 30.62 ± 5.90 kg/m², and the mean waist circumference was 102.52 ± 14.27 cm. Overweight individuals represented 84.8% of the population, including 52.10% with obesity. According to weight status, the mean HDM knowledge score was 40.91 ± 11.74 points, with a maximum score of 63 points. A total of 39.8% of subjects had a low level of knowledge of HDM. The overall HDM knowledge score decreased with increasing age (p = 0.0001), diabetes duration (p = 0.05), and BMI (p = 0.02). Diabetics over 70 years had the lowest HDM knowledge scores (23.76 ± 13.91 points). No significant differences were found between weight groups and HDM knowledge levels. **Conclusions:** The level of knowledge of recommended HDM in our population is influenced by age and partially by weight status. Tailored nutritional education for elderly individuals is necessary to help them better manage their disease.

Keywords: Diabetes; Age; Body Weight Status; Hygienic-Dietary Measures.

Adolescent Overweight and Obesity: Public Health Implications and Modern Prevention Strategies

Mourad Zoghlami, Hanifa Babanna

Faculty of Natural and Life Sciences, Moustapha Stambouli University of Mascara, Algeria

ABSTRACT

Background: Overweight and obesity among adolescents represent growing public health challenges, particularly in regions experiencing rapid lifestyle shifts. **Aims:** This cross-sectional descriptive study assessed the nutritional status of secondary-school adolescents in the district of Touggourt and examined lifestyle-related factors associated with excess weight. **Methods:** Conducted during the 2018/2019 academic year, the study included 744 adolescents aged 14–18 years (53% girls; mean age 17.21 ± 1.06 years). Data collection involved a structured questionnaire addressing dietary habits, physical activity, sedentary behaviors, and sleep duration, alongside both self-reported and measured anthropometric parameters. Nutritional status was evaluated using the International Obesity Task Force (IOTF) and WHO 2007 reference standards. **Results:** Findings revealed that adolescents tended to overestimate their height and underestimate their weight, leading to a consistent underestimation of body mass index (BMI). Thus, only measured anthropometric values were considered reliable. According to IOTF criteria, the prevalence of overweight and obesity was 8.26% and 3.32%, respectively, whereas WHO 2007 standards showed higher rates of 18.14% and 5.64%. Across both classification systems, girls were significantly more affected (p = 0.001). Skipping breakfast and frequent snacking were identified as major behaviors likely contributing to excess weight. **Conclusions:** The study underscores the importance of implementing innovative and evidence-based public health strategies to address adolescent overweight and obesity in Touggourt. Modern approaches may include integrating digital health tools and mobile-based nutrition education, employing advanced body composition assessment technologies such as bioelectrical impedance analysis, and utilizing artificial intelligence and big-data-driven models to enhance risk prediction and guide targeted interventions. Strengthening school-based nutritional programs, promoting physical activity, and establishing local public health policies remain essential to reducing the burden of adolescent obesity and fostering long-term health.

Keywords: Adolescents; Overweight & Obesity; Bioelectrical Impedance Analysis; Artificial Intelligence; Touggourt.

Technological and Nutritional Potential of Carob in Fermented Dairy Matrices

Dihia Babouri [1], Nabila Brahmi [1], Asma Boudria [1], Nada Bouguriou [1,2], Sabine Chabane [1]

[1] *Laboratoire de Biomathématiques, Biophysique, Biochimie et Scientométrie, Faculté des Sciences de la Nature et de la Vie, Université de Bejaia, Algeria*

[2] *Laboratoire INATAA, Constantine, Algeria*

ABSTRACT

Background: Carob (*Ceratonia siliqua L.*), a typical Mediterranean species, is well known for its pods rich in sugars, dietary fibers, and

phenolic compounds. Due to its nutritional and functional value, it represents a natural ingredient of growing interest in the food industry. **Aims:** The aim of this study was to evaluate the incorporation of carob powder and carob syrup (concentrated to 70 °Brix) into an experimental yogurt and to investigate their impact on its physicochemical characteristics. **Methods:** A preliminary physicochemical and phytochemical analysis showed that carob powder has moderate moisture, high fiber content, and significant levels of phenolic compounds, confirming its potential as a source of bioactive substances. The syrup, on the other hand, was characterized by its high concentration of soluble sugars, giving it strong sweetening power and suitable density for dairy formulations. Three yogurt formulations were prepared: a control without incorporation, E1 (3% powder, 9% syrup), and E2 (1% powder, 15% syrup). **Results:** The results revealed that the control had an acidity of 73 ± 1, a °Brix of 18.0 ± 0.1, and a viscosity of 3500 ± 100 mPa·s. In comparison, formulation E1 showed an acidity of 103.5 ±1.5, a °Brix of 28.1 ± 0.1, and a high viscosity (18.800 ± 100 mPa·s), reflecting the combined effect of powder and syrup on texture and density. Formulation E2 presented intermediate values with an acidity of 98 ± 1, a °Brix of 21.5 ± 0.5, and a viscosity of 16.720 ± 120 mPa·s. These findings demonstrate that carob incorporation significantly improves yogurt characteristics by increasing its nutritional value, sugar density, and textural stability. **Conclusions:** The powder/syrup combination thus appears as a promising approach for the development of innovative dairy products that are both healthy and aligned with consumer expectations.

Keywords: Carob Powder (*Ceratonia siliqua*); Carob Syrup; Yogurt; Physicochemical Analysis; Phytochemical Analysis.

Assessment of the Nutritional Status of Patients Undergoing Cardiac Surgery in Constantine

Samah Babouri [1], Rahma Cheima Boumakh [1], Abdennour Merazka [2]

[1] *INATAA – Université Frères Mentouri Constantine 1, Constantine, Algeria*
[2] *INATAA – Université Frères Mentouri Constantine 1, Constantine, Algeria*

ABSTRACT

Aims: This study was conducted at the EHS Djeghri Mokhtar in Constantine with the aim of assessing the nutritional status of patients undergoing cardiac surgery, both before and after the intervention, and identifying associated risk factors. **Methods:** To achieve this, several tools were used: 24-hour dietary recall, questionnaire, NRI (for patients under 65 years), GNRI and MNA (for patients aged 65 and over), as well as serum albumin and CRP measurements. **Results:** The results revealed a deterioration in nutritional status postoperatively, characterized by a significant decrease in caloric and protein intake, along with a reduction in serum albumin levels. The MNA score showed that 68% of patients aged 65 and over were already at risk of malnutrition before surgery. Although frequently used, serum albumin is not a specific marker of malnutrition in surgical settings, but rather an indicator of morbidity and mortality, whose relevance is enhanced when combined with indices such as GNRI or NRI. The main factors associated with this nutritional decline were: advanced age, female sex, comorbidities (hypertension, diabetes), low educational level, and certain types of surgical procedures. **Conclusions:** This study highlights the need for prolonged nutritional follow-up, particularly in at-risk patients, using more sensitive markers such as prealbumin and regular monitoring of nutritional intake.

Keywords: Cardiac Surgery; Nutritional Status; Malnutrition Markers; Risk Factors.

Dietary History and Health Status of Children Aged 3–5 in Skikda (2023–2024)

Loubna Bechiri [1,2], Hanane Kadi [2,3], Ikram Bouldjadj [2,3], Hayet Oulamara [2]

[1] *Département Des Sciences Agronomiques, Faculté Des Sciences, Université du 20 Août 1955, Skikda, Algeria*
[2] *Laboratoire de Recherche Alimentation, Nutrition et Santé (ALNUTS). Université Rabah BITAT, Constantine 3, Algeria*
[3] *Institut de la Nutrition, de l'Alimentation et des Technologies Agro-Alimentaires (INATAA), Université Frères Mentouri, Constantine 1 (UFMC1), Algeria*

ABSTRACT

Background: Knowledge of children's dietary history since birth is important for protecting against certain diseases that may appear at later stages of child growth. **Aims:** To describe the dietary history and health status of children aged 3 to 5 years in Skikda. **Methods:** A cross-sectional survey was conducted in a nursery located in the western part of the municipality of Skikda (Algeria) between 2023 and 2024, using an adapted version of the WHO (2004) standard questionnaire. Data were collected from mothers through interviews and included information on breastfeeding, age of food introduction, and questions related to the children's health status. The study involved 104 children (54 boys) aged 3 to 5 years. **Results:** At birth, 4.8% were born prematurely, 2.8% had normal birth weight, and 92.3% had low birth weight. During the first three months after birth, 19.2% were exclusively breastfed, 16.3% received artificial or predominant breastfeeding, and 48.0% received mixed feeding. The age of food introduction was 4 months for 29.8% of children, 5 months for 34.6%, and 6 months for 31.7%. Regarding health status, 30% of the children were affected by certain conditions such as anemia, respiratory allergies, asthma, speech disorders (pronunciation difficulties and delayed speech), overweight, and obesity. The consumption of dietary supplements (iron, zinc, and vitamin C) was observed in 11.5% of the children. **Conclusions**: In conclusion, the diverse dietary backgrounds and significant prevalence of health conditions among children in Skikda emphasize the importance of documenting early nutritional history to better manage and protect child health during growth.

Keywords: Dietary History; Children (3–5 years); Nutrition; Health; Skikda.

Obesity and Food Reactivity: Power of Food Scale (PFS) Based Behavioral Evidence

Yassira Khadidja Benabdelmalek, Afaf Mezdoud, Hayet Oulamara, Nora Bahchachi

Department of Human Nutrition, Laboratory of Nutrition and Food Technologies (LNTA), Institute of Nutrition, Food and Agri-Food Technologies (INATAA), University Constantine 1, Constantine, Algeria.

ABSTRACT

Background: Food reactivity, as measured by the Power of Food Scale (PFS), is an important factor in eating behavior. It refers to the psychological and physiological sensitivity to environmental food cues that promote overeating and weight gain. **Aims:** This study aims to

evaluate the relationship between food reactivity and eating behaviors in obese adults. **Methods:** This cross-sectional study is part of a longitudinal follow-up. A survey was conducted among 45 adult women with a Body Mass Index (BMI) ≥ 30 kg/m². Food reactivity was assessed using the Power of Food Scale score. Eating behavior was assessed using questions about meal frequency and timing, snacking, and triggers for food intake. Participants were asked to keep a food diary to estimate their nutritional intake and consumption of palatable foods. Weight, height, and BMI represent the anthropometric parameters. Statistical analyses were performed using IBM SPSS Statistics 20. **Results:** The mean weight of the population was 97.63 ± 9.71 kg, and the mean BMI was 32.63 ± 2.01 kg/m². The mean caloric intake was 2,192.24 ± 561.93 kcal/day. The average PFS score was 2.87 ± 0.80, indicating moderate responsiveness to appetizing food stimuli within the sample. The averages obtained for the three sub-dimensions of the PFS were 2.61 ± 1.09 for available food, 2.98 ± 0.13 for palatable food, and 3.71 ± 0.68 for present food. Food reactivity was significantly correlated with snacking frequency (p = 0.008), emotional hunger (p = 0.013), and total caloric intake (p = 0.01). However, no significant association was observed between the PFS score and BMI (p > 0.05). **Conclusions:** High food reactivity is a key factor in unfavorable eating behaviors in obese adults. These results highlight the relevance of integrating a psychological approach targeting food reactivity into obesity management programs.

Keywords: Obesity; Food Reactivity; Eating Behavior; Power of Food Scale; Palatability.

Anti-Waste Practices of Bread in Households

Lynda Benatallah-Yagoubi [1,2], Linda Bendadda [1], Meryem Zeraoula [1], Rabiâa Karoune [1,2], Hanane Kadi [1,2], Ikram Bouldjadj[1,2]

[1] *Institute of Food, Nutrition and Agri-Food Technologies (INATAA), University Constantine 1 Frères Mentouri, Algeria*

[2] *Research Laboratory of Food, Nutrition and Health (ALNUTS), University Constantine 3 Salah Boubnider, Algeria*

ABSTRACT

Background: In Algeria, more than 900 million baguettes of bread are discarded every year. However, wasted bread can be recovered and reused in various culinary preparations. **Aims:** The aim of this study was to know household behaviors regarding leftover bread. **Methods:** A descriptive cross-sectional survey was conducted among 200 households in the Ichemoul area (Batna, Algeria). Data were collected using a structured questionnaire focusing on bread consumption habits, quantity of leftover bread, and its subsequent use. Interviews were conducted with household food managers, and the data were analyzed using Epi Info software. **Results:** The results showed that 94% of the surveyed households consume bread, with 34% reporting a consumption frequency of three to four days per week and 18% consuming bread daily. According to respondents, more than 60% of households purchase between two and four baguettes of bread per day. Leftover bread was reported on a daily basis by 64% of households and occasionally by 34%; 30% indicated having leftover bread corresponding to half a baguette. More than 88% of households reported that they don't discard leftover bread. Leftover bread is mainly reused by preserving it for subsequent meals (56%), transforming it into breadcrumbs (43%), or toasting it (3.1%). Other culinary uses include the preparation of mini pizzas (2.7%), Khobz El Bey (3.2%), Sfiria (3.7%), and French toast (4.7%). Additionally, in 34.5% of cases, leftover bread is used for animal feeding. It was also observed that 27% of households do not consume the crumb of bread; among them, only 8% discard it, while the majority redirect it to animal feed. **Conclusions:** The widespread adoption of various bread waste reduction practices at the household level. Nevertheless, these practices should be reinforced through targeted awareness and education campaigns in order to further minimize bread waste.

Keywords: Bread; Food Waste; Eating Behavior; Anti-Waste Practices.

Impact of Tomato By-Product Incorporation on Selected Properties of Extruded Gluten Free Pasta

Hind Benchettah [1], Abdallah Bouasla [1], Agnieszka Wójtowicz [2], Leila Benatallah [1]

[1] *Laboratory of Agro-Food Engineering (GéniAAl), Institute of Nutrition, Food and Agro-Food Technologies (INATAA), Brothers Mentouri Constantine 1 University, Constantine, Algeria*

[2] *Department of Thermal Technology and Food Process Engineering, University of Life Sciences in Lublin, Poland*

ABSTRACT

Background: Tomato by-product (TBP) is a nutrient-rich by-product that could enhance the nutritional value of gluten-free pasta and support sustainable waste reduction. **Aims:** This study investigated selected quality properties of gluten-free rice pasta fortified with different amounts of TBP (0, 7.5, and 10%). The goal was to evaluate how TBP affects the physical and mechanical characteristics of the final product. **Methods:** Gluten-free pasta was made using a single screw extruder EXP-45-32 (Zamak Mercator, Skawina, Poland). Cooking quality (cooking loss and water absorption capacity), textural properties (hardness and firmness), and specific mechanical energy were evaluated. **Results:** The results showed that the increase of incorporation level increased significantly (p<0.05) cooking loss (8.35–14.47%), WAC (116.12–131.52%), and specific mechanical energy (0.11–0.72 kWh/kg) and decreased both hardness (5.68–13.07 N) and firmness (318.5–401.25 N). **Conclusions:** TBP can successfully be used (less than 7.5%) in nutritionally valuable pasta formulations. The processing parameter optimization may allow the application of TBP in the production of gluten-free pasta fortification. This highlights a viable path for using food industry by-products to create functional, gluten-free foods.

Keywords: Extrusion-Cooking; Tomato By-Product; Gluten Free Pasta; Textural Properties; Cooking Quality.

Combined Effects of Dietary Intake and Obesity on Left Ventricular Remodeling

Aya Benhedouga [1], Abdenour Bounihi [1], Hamza Saidi [1], Ines Gouaref [1], Rezzoug Adlane [2], Sofiane Ghemri [2], Elhadj Ahmed Koceir [1]

[1] *Team of Bioenergetics and Intermediate Metabolism, Laboratory of Biology and Physiology of Organisms, Faculty of Biological Sciences, University of Science and Technology Houari Boumediene, Algiers, Algeria*

[2] *Cardiology Department, EHS Dr Mohand Maouche Amokrane, Algiers, Algeria*

ABSTRACT

Background: Left ventricular remodeling is a common complication of arterial hypertension and is influenced not only by hemodynamic factors but also by nutritional determinants. Dietary intake and

nutritional status, particularly obesity, may contribute to structural alterations of the left ventricle. **Aims:** This study aims to assess the combined effects of dietary intake and Body Mass Index (BMI) on echocardiographic parameters in hypertensive patients. **Methods:** A cross-sectional study was conducted among 152 adult's hypertensive patients (mean age: 64.71±9.21 years; mean BMI: 29.23 ± 4.61 kg/m²). Dietary intake was assessed using a 24-hour dietary recall. Echocardiographic measurements, including Left Ventricular Mass index (LVMi) and diastolic filling parameters, were performed according to international guidelines. **Results:** Higher sodium intake, total caloric intake, and saturated fat intake were significantly associated with an increased LVMi, indicating adverse concentric ventricular remodeling. Patients with higher LVMi also exhibited significantly higher BMI values. Conversely, greater fiber intake was observed among individuals with lower LVMi. Dietary factors and excess body weight appear to be major determinants of left ventricular remodeling in hypertensive patients. **Conclusions:** These findings highlight the importance of integrating targeted nutritional strategies in the management of left ventricular hypertrophy.

Keywords: Hypertension; Fiber, Energy; LVMI; Nutrition.

Nutritional Status and Quality of Life in Algerian Hemodialysis Patients: A Cross-Sectional Study

Adel Bensalem, Afef Mezdoud, Imène Belkis Djerrah,Selma Khelfhoum, Manel Khelifi, Hayet Oulamara

Laboratory of Nutrition and Food Technology (LNTA), Institute of Nutrition, Food, and Agro-Food Technologies (INATAA) – University of Constantine 1 Frères Mentouri, Constantine, 25000, Algeria

ABSTRACT

Background: Malnutrition is a prevalent and multifactorial condition among chronic hemodialysis patients and is closely linked to inflammation, morbidity, and reduced quality of life (QoL). In Algeria, data on nutritional status and its association with QOL remain scarce. **Aims:** This study aimed to assess nutritional status, dietary intake, inflammation, and their relationship with QoL in chronic hemodialysis patients. **Methods:** A multicenter cross-sectional study was conducted among 164 chronic hemodialysis patients recruited from four Algerian dialysis units. Collected data included anthropometry, 24-hour dietary recall, biological markers (albumin, CRP), and the Nutritional Risk Index (NRI). QoL was evaluated using the validated KDQOL-SF™ questionnaire. Associations between nutritional indicators, inflammation, dialysis adequacy (Kt/V), and QoL domains were analyzed. **Results:** More than 70% of patients showed body weight instability over the preceding three months. Underweight affected 16% of participants, while a double nutritional burden (underweight and overweight) was particularly evident among women. Malnutrition prevalence, based on the NRI, reached 25%. Dietary intake was inadequate in most patients: 87.8% consumed <1.2 g/kg/day of protein and 89% < 35 kcal/kg/day. Mean serum albumin was normal, though severe hypoalbuminemia (< 30 g/L) occurred. Elevated CRP levels (mean 18 mg/L) suggested chronic inflammation. The NRI correlated positively with dietary intake, body weight, and BMI. QoL impairment was reported in 64% of patients, especially women, who exhibited higher pain, emotional limitations, and psychosocial distress. QoL scores were positively associated with Kt/V, serum albumin, and creatinine, whereas age, comorbidities, and inflammation were significant negative determinants. **Conclusions:** Malnutrition, inflammation, and reduced QoL are highly prevalent among Algerian hemodialysis patients. These findings underscore the need for individualized, multidisciplinary nutritional management and longitudinal studies to evaluate targeted interventions.

Keywords: Hemodialysis; Nutritional Status; Malnutrition; Inflammation; Quality of Life.

Performance of Body Mass Index in Assessing Nutritional Status Compared with Fat Mass Index in Non-Obese Older Adults with Diabetes

Khadidja Bessaid [1], Lylia Djenas [1], Wafa Bounames [1], Djamila Meskine [1], Malha Azzouz [1]

[1] Laboratory of Endocrinology and Metabolism, Faculty of Medicine, University of Algiers, Algiers, Algeria

ABSTRACT

Background: Body Mass Index (BMI) is widely used to assess nutritional status, yet it has important limitations in older adults, particularly regarding body composition changes. Fat Mass Index (FMI), defined as fat mass measured by dual-energy X-ray absorptiometry (DEXA) divided by height², may offer a more accurate assessment of adiposity in this population. **Aims:** To evaluate the diagnostic performance of BMI compared with FMI (reference method) in classifying the nutritional status of non-obese older adults with diabetes. **Methods:** A cross-sectional study was conducted among 252 diabetic patients aged ≥ 60 years. Nutritional status was categorized into four groups (undernutrition, normal weight, overweight, obesity) according to BMI and FMI. BMI performance metrics were assessed using FMI as the gold standard: sensitivity, specificity, Positive Predictive Value (PPV), and Negative Predictive Value (NPV). **Results:** BMI detected no cases of obesity (0 %), while FMI identified 13.9 %. Normal weight was overestimated by BMI (37.3 % vs 21.4 % with FMI). Overweight classifications were similar (60.7 % vs 61.1 %). For undernutrition, BMI identified 1.19 % compared with 1.6 % by FMI. BMI showed high sensitivity for overweight detection (99.35 %) but moderate specificity (62.8 %). The PPV was 81.4 % and the NPV 98.3 %. **Conclusions:** In non-obese older adults with diabetes, BMI efficiently screens for overweight but markedly underestimates obesity and overestimates normal weight. FMI provides a more accurate evaluation of nutritional status, supporting its use in this vulnerable population.

Keywords: Nutritional Status; Body Mass Index; Fat Mass Index; Dual-Energy X Ray Absorptiometry; Type 2 Diabetes.

Validity of the Mini Nutritional Assessment Screening Tool for Detecting Malnutrition in Older Adults with Diabetes

Khadidja Bessaid, Lylia Djenas, Wafa Bounames, Djamila Meskine, Malha Azzouz

Laboratory of Endocrinology and Metabolism, Faculty of Medicine, University of Algiers, Algiers, Algeria

ABSTRACT

Background: As life expectancy increases, type 2 diabetes is increasingly associated with age-related complications, among which, nutritional disorders hold a central position. Early detection of malnutrition in older adults with diabetes is a public health priority, yet available evidence remains limited. The Mini Nutritional

Assessment (MNA) is a validated tool including a rapid screening form and a full version, the latter being considered the diagnostic reference. **Aims:** To evaluate the validity of the MNA screening tool in assessing the nutritional status of older adults with diabetes, compared with the full MNA. **Methods:** A cross-sectional study included 252 diabetic patients aged ≥60 years. Nutritional status was assessed using both the MNA screening tool and the full MNA. Participants were classified into three categories: normal nutritional status, risk of malnutrition, and confirmed malnutrition. The validity of the MNA screening tool was analyzed in terms of sensitivity, specificity, and predictive values, using the full MNA as the gold standard. **Results:** According to the MNA screening tool, 53.2% of patients had normal nutritional status, 40.9% were at risk of malnutrition, and 6% had confirmed malnutrition. Based on the full MNA, the proportions were 59.9%, 34.9%, and 5.2%, respectively. A statistically significant difference was found between the two classifications ($p < 0.001$). The MNA screening tool demonstrated a sensitivity of 86.1%, a specificity of 79.5%, a positive predictive value of 73.7%, and a negative predictive value of 89.6% for detecting malnutrition or risk of malnutrition. **Conclusions:** Nutritional disorders are common among older adults with diabetes, with more than 40% being malnourished or at risk. The MNA screening tool shows good validity compared with the full MNA and represents a simple, rapid, and relevant instrument for malnutrition screening in clinical practice.

Keywords: Mini Nutritional Assessment; Malnutrition Screening; Older Adults; Type 2 Diabetes; Nutritional Assessment.

Multivariate Analysis of the Milk Quality Prediction Dataset

Melissa Bouchoul, Malika Chikhi

Department of Mathematic, Mentouri Constantine 1 University, Constantine, Algeria.

ABSTRACT

Background: Guaranteeing an adequate level of milk quality is crucial, especially for populations with higher nutritional vulnerability such as children and elderly individuals. These groups require milk that meets strict safety and quality standards to minimize risks associated with contamination or compositional defects. **Aims**: In this context, this study investigates the multivariate structure of the Milk Quality Prediction dataset through the application of Principal Component Analysis (PCA), with the objective of identifying the key physicochemical and sensory attributes that drive milk quality differentiation. The dataset comprises eight variables: pH, temperature, taste, odor, fat content, turbidity, color, and grade. Prior to analysis, all variables were centered and scaled to ensure comparability. **Results:** The projection of the observations into the factorial plane reveals well-defined clusters corresponding to distinct grade levels, demonstrating the discriminative capacity of both physicochemical and sensory variables. **Conclusions:** Overall, the findings highlight the relevance of PCA as a robust exploratory technique for dimensionality reduction, pattern recognition, and the identification of dominant factors influencing milk quality within dairy datasets.

Keywords: Principal Component Analysis; Multivariate Analysis; Milk Quality; Physicochemical Properties; Quality Classification.

Dietary Diversity Score is Positively Associated with Height-For-Age in 24-Months-Old Algerian Children

Boulazib Selma [1,2], Kadi Hanane [1,2,3], Kouachi Mohamed Zineddine [4], Benatallah Leila [1,2]

[1] *Institute of Nutrition, Food and Agri-Food Technologies (INATAA), Constantine 1 – Mentouri Brothers University, Constantine, Algeria*

[2] *Food Engineering Laboratory (GENIAAL), Institute of Nutrition, Food and Agri-Food Technologies (INATAA), Constantine, Algeria*

[3] *Food, Nutrition and Health Laboratory (ALNUTS), Constantine 3 University-Salah Boubnider, Constantine, Algeria*

[4] *Faculty of Medicine, Constantine 3 University-Salah Boubnider, Constantine, Algeria*

ABSTRACT

Background: A diverse diet from early life is essential to ensure adequate intake of required nutrients and several studies had linked it to better health outcomes. The complexity of measuring the quality of children's diets and evaluating its relationship to child's growth has been reduced by the use of simple indicators. **Aims:** the aim of this study is to assess the dietary diversity score (DDS) and to examine its association with nutritional status of children aged 24 months in eastern Algeria. **Methods:** a cross-sectional survey was carried out between January and December 2022, among 140 mother-child pairs attending vaccination centers of the Municipality of El-Khroub, eastern Algeria. A structured questionnaire was used to collect data on sociodemographic characteristics and anthropometric measurements of the child. Dietary diversity was assessed through a single 24-hour recall. Statistical analysis was performed using IBM SPSS version 26. The association between child anthropometric indices (LAZ, WHZ and WAZ) and DDS were examined through binary logistic regression and multiple linear regression models. Significance was fixed at $p < 0.05$. **Results:** the mean DDS of the sample was 3.99 ±1.11 and 70.71% child did not achieve the minimum dietary diversity. The prevalence of stunting, wasting and overweight were 4.29%, 2.14% and 5.71% successively. A significant association was found between DDS an HAZ ($p = 0.02$; r = 0.168), but there was no significant association neither between DDS and WHZ ($p = 0.46$), nor for DDS and WAZ ($p = 0.43$). **Conclusions:** Awareness program on dietary diversity should be implemented to educate parents of its importance for their children's health.

Keywords: Dietary Diversity; Score; Nutritional Status; Children; Algeria.

Phenotypic Characterization and Identification of *Salmonella spp.* Strains Isolated from Chicken in the Adrar Region

Majda Bousseta [1], Khawla Zahra Hadef [2], Sarra Henouda [1]

[1] *Department of Natural and Life Sciences, Laboratory of Saharan Natural Resources (LRNS), Ahmed Draia University, Adrar, Algeria*

[2] *Laboratory of Food, Biomedical and Environmental Microbiology (LAMAABE), University Abou Bekr Belkaid, Tlemcen, Algeria*

ABSTRACT

Background: Salmonella infections represent a major public health challenge as one of the principal agents of human gastroenteritis, causing millions of foodborne illness cases annually and contributing significantly to morbidity and mortality worldwide; their impact is particularly severe in developing countries where hygiene and food preservation are often inadequate, and they remain a leading source of contamination and microbiological non-compliance in the agri-food

industry, generating both considerable economic losses and serious risks to public health. **Aims:** This study aims to phenotypically characterize and identify Salmonella spp. strains isolated from raw chicken samples collected from various retail points in the Adrar region, Southern Algeria. **Methods:** A total of 30 chicken samples were collected and analyzed in accordance with the recommendations of ISO 6579 – 1:2017, which outlines the procedures for the detection of Salmonella spp., including pre-enrichment, selective enrichment, isolation, and identification of the recovered strains. Bacterial isolation was carried out using two selective media. Typical Salmonella spp. colonies appeared on Xylose Lysine Deoxycholate (XLD) agar as pink colonies with a black center, while on Hektoen Enteric Agar (HEA) they appeared greenish-blue to green with a black center. These suspected colonies were subcultured on nutrient agar, where they formed round, smooth, convex, light beige colonies with regular edges. The confirmation of isolates was performed using standard biochemical tests (oxidase, catalase, TSI, mannitol motility and citrate), supplemented by the API 20E system for more precise identification. **Results:** Among the 30 samples analyzed 14 isolates were identified and confirmed as Salmonella spp., yielding a positivity rate of 46.7%. **Conclusions:** Salmonella spp. were prevalent in local chicken meat, indicating significant foodborne and public health risks. These results highlight the need for improved hygiene and microbiological control in poultry production, with phenotypic analysis serving as a key preliminary step before molecular strain typing and genetic diversity assessment.

Keywords: *Salmonella spp*; Poultry; Phenotypic Characterization; Food Safety; Adrar.

Hospital Malnutrition Among Patients with Non-Communicable Diseases in Algeria: Assessment, Prevalence, Risk Factors, Screening Tools, and Quality of Hospital Meals

Fatima Zohra Boutata [1,2], Meriem Bencharif [3], Ibrahim Sersar [3,4]
[1]*Département des Sciences Agronomiques, Faculté des Sciences, Université 20 Août 1955 Skikda 21000, Algérie.*
[2] *Laboratoire de Nutrition et Technologies Alimentaires (LNTA), Université Frères Mentouri Constantine 1(UFMC1), Constantine, Algeria*
[3] *Institut de la Nutrition, de l'Alimentation et des Technologies Agro-Alimentaires (INATAA), Laboratoire de Nutrition et Technologies Alimentaires (LNTA), Université Frères Mentouri Constantine 1, Constantine, Algeria*
[4] *Laboratoire d'Alimentation, Nutrition et Santé (ALNUTS), Université Salah Boubnider Constantine 3, Constantine, Algeria*

ABSTRACT
Background: Non-Communicable Diseases (NCDs) are a major cause of hospitalization and are often worsened by malnutrition, leading to increased morbidity, mortality, and healthcare costs. **Aims:** This study aimed to determine the prevalence and risk factors of hospital malnutrition in Algeria, to analyze meals served and consumed, and to identify the most appropriate nutritional screening tool. **Methods:** A cross-sectional study was conducted on 105 adult patients hospitalized for NCDs in Skikda between 15 November and 10 December 2020. Data were collected through face-to-face interviews, including nutritional assessment using MST, MUST, BBT, and SNAQ, compared to the reference tool (SGA). Dietary intake was estimated using Ciqual food composition tables, and hospital meals were analyzed. Data processing was performed with Excel, Epi-Info, and SPSS. **Results:** The mean age of patients was 58.21 ± 13.69 years. The prevalence of malnutrition according to SGA was 44.76%, with an average hospital stay of 4.14 ± 7.69 days. The prevalence of malnutrition risk varied across screening tools: MUST 52.38%, MST 22.86%, with MUST showing the highest sensitivity. Most of the food consumed came from patients themselves (78.09%), while only 3.81% was provided by the hospital nutrition service. Only 24.76% of patients met 100% of their energy requirements, and 13.33% met ≥ 75% of their protein needs, with severe deficiencies in vitamins and minerals. Hospital meals provided on average 9759 ± 1111.6 kJ/day, 106 ± 9.2 g of protein, 65 ± 20.5 g of fat, and 326 ± 39.3 g of carbohydrates, indicating macronutrient imbalance and insufficient healthy fats and micronutrients due to the absence of inadequacy of certain food groups. **Conclusions:** Hospital malnutrition is common in Algeria. Improving nutritional intake and using appropriate screening tools are essential for optimizing the care of hospitalized patients.

Keywords: NCDs; Hospitalization; Hospital Meal; Malnutrition; SGA.

Study of the Release Kinetics and the Digestibility of Encapsulated and Non-Encapsulated Carotenoids from Seaweeds

Makhlouf Chaalal [1,2], Siham Ydjedd [1,3], Afaf Chebout [2], Sylia Amrane [4], Houyem Melazem [1], Nourhene Sakhri [1]
[1] *Laboratoire SAFIVIA,*
[2]*Laboratoire BIOQUAL,*
[3]*Laboratoire GENIAAL, Institut de la Nutrition, de l'Alimentation et des Technologies Agro-Alimentaires (INATAA), Université Constantine 1 Frères Mentouri, Constantine, Algeria*
[4]*Laboratoire de Biochimie Appliquée, Faculté des Sciences de la Nature et de la Vie, Université de Bejaia, Algeria*

ABSTRACT
Background: Carotenoids from marine algae are widely recognized for their strong antioxidant and anti-inflammatory properties, yet their stability and bioavailability are often limited during digestion. Encapsulation has emerged as an effective strategy to protect these sensitive compounds and improve their delivery to the intestinal tract, where their absorption and biological activities are most relevant. **Aims:** This study evaluated the encapsulated and non-encapsulated carotenoids of brown seaweed (*Fucus vesiculosus*) extracts, as well as their antioxidant and anti-inflammatory activities during in vitro gastrointestinal digestion. Carotenoid content was quantified, and the antioxidant (DPPH radical scavenging), reducing (ferric reducing power), and anti-inflammatory activities were assessed before and during the different phases of digestion. The release kinetics of encapsulated carotenoids were also examined. **Results:** The results show that before digestion, non-encapsulated extracts had a higher carotenoid content (4.52 mg/100 g) compared to encapsulated ones (3.20 mg/100 g). However, during the intestinal phase, bioaccessibility was higher for the encapsulated extracts (3.8 mg/100 g), due to a targeted release of compounds facilitated by the alkaline pH. The release kinetics displayed a progressive pattern according to pH, peaking at 5.2 mg/100 g at pH 7. Encapsulated extracts retained significant antioxidant and anti-inflammatory activities, particularly during the salivary and intestinal phases. In the gastric environment, the low release observed indicated good carotenoid stability, protecting them from degradation. Correlation analysis revealed strong relationships between carotenoid content and biological activities,

especially for encapsulated extracts in the intestinal phase. **Conclusions:** The results confirm the relevance of alginate-based encapsulation in protecting carotenoids, enhancing their intestinal release, and boosting their bioactive effects. Overall, these findings highlight the nutritional relevance of encapsulated carotenoids from Fucus vesiculosus, demonstrating that encapsulation enhances their stability, intestinal bioaccessibility, and functional health benefits, thereby increasing their potential as valuable marine-derived nutritional compounds.

Keywords: Seaweed; Carotenoids; Digestibly; Biological Activity; Release Kinetics.

Dietary Fibers and type 2 Diabetes Management: A Study in a Population of Diabetic Women

Hiba Chadli , Ouassila Allam

Institut de la Nutrition, de l'Alimentation et des Technologies Agro-Alimentaires (INATAA). University of Constantine 1, Algeria

ABSTRACT

Aims: The main objective of this study was to assess the impact of dietary fiber intake on glycemic control in 250 adult women with T2DM attending the Belle Vue diabetes center - Constantine. **Methods:** Using a detailed questionnaire, we evaluated participant's sociodemographic profiles, eating habits, fiber knowledge, and lifestyle, alongside their blood glucose, HbA1c, and lipid profiles. **Results:** Findings revealed that most participants were obese (BMI = 30.1 ± 4.8), had poor glycemic control (HbA1c = 7.7 ± 1.24%), and low fiber intake (11.55 ± 5.24 g/day), far below international recommendations. While dietary diversity was moderate, overall food quality was poor, characterized by high intake of high-glycemic index foods and low consumption of fiber- rich foods. The majority of participants lacked knowledge of fiber's role in diabetes management and had never heard of the glycemic index or load. Although statistical differences between fiber intake and glycemic control were not significant, trends suggest that participants with better glycemic control consumed slightly more fiber and engaged more in physical activity. **Conclusions:** This study highlights the need for nutrition education and fiber-focused dietary interventions to improve glycemic outcomes among Algerian diabetic patients.

Keywords: Type 2 Diabetes Mellitus; Dietary Fiber; Glycemic Control; HbA1c; Nutritional Awareness.

From Traditional Remedy to Evidence-Based Therapy: Lemon Balm in Diabetes Care

Nedjla Derbal [1], Zineb Bouamrane [1], Hakima Belattar [1], Soumia Bouzidi [1], Abdelfettah Gherib [2]

[1] *Laboratory of Natural Sciences and Materials, Abdelhafid Boussouf University, Mila, Algeria*

[2] *Centre de Recherche en Biotechnologies- CRBT- Constantine, Algeria*

ABSTRACT

Background: Diabetes mellitus represents a significant global health challenge, affecting nearly 5% of the world's population. Type 2 diabetes constitutes the most prevalent form, accounting for over 90% of cases, and is characterized by persistent hyperglycemia resulting from disruptions in glucose metabolism and insulin secretion and function. Recent research in type 2 diabetes management has increasingly focused on exploring plant-derived compounds with demonstrated hypoglycemic and lipid-lowering properties. This has led to growing scientific interest in herbal extracts, particularly due to their antioxidant and hypolipidemic activities. Lemon balm (*Melissa officinalis* L) is a widely recognized medicinal plant utilized globally in perfumery, cosmetics, and food products. Traditional applications include its use as a mild sedative, antispasmodic, and antimicrobial agent. The leaves contain numerous bioactive compounds, notably polyphenols such as rosmarinic acid, trimeric compounds, and various flavonoids. **Aims:** *In vivo* investigations evaluated the hypoglycemic capacity of *Melissa officinalis* L. extracts in both normoglycemic and hyperglycemic rabbit models. **Methods:** A control group (n=3) received 1 mL/kg distilled water, while a reference group (n=3) was administered 500 mg/kg BW of Glucophage. Diabetes was induced through glucose overload 30 minutes' post-administration of distilled water, plant extracts, and Glucophage. All substances were administered orally. **Results:** The findings demonstrate that *M. officinalis* L. possesses significant anti-diabetic potential, substantiating its traditional use in diabetes management. **Conclusions:** The results provide scientific validation for its ethnobotanical application in glycemic control.

Keywords: Hypoglycemic Activity; Cultivated Plants; Hydroethanolic Extract; Anti-Diabetic Effect.

Development of a Novel Gluten Free Cookie Enriched with Prickly Pear Peel: Physical, Textural, Densory, and Antioxidant Characteristics

Ahlem Dib [1], Agnieszka Wojtowicz [2], Leila Benatallah [1]

[1] *Université des Frères Mentouri Constantine 1 , Technologies Agro-Alimentaires, , INATAA, Constantine, Algeria*

[2] *Department of Thermal Technology and Food Process Engineering, University of Life Sciences in Lublin, Gł˛eboka 31, 20-612 Lublin, Poland*

ABSTRACT

Background: Prickly pear peel is rich in bioactive compounds and dietary fibre, making it a valuable biomass for nutraceutical and bakery applications. **Aims:** This study investigates the potential of substituting rice flour (RF) with prickly Pear Peel Powder (PPP) at levels of 2.5–15 % to produce a gluten free nutritionally healthy cookies. **Methods:** The enriched gluten free cookies were characterized by physical, textural, antioxidant, chemical composition, sensory, and microbiological properties. **Results:** The enrichment of gluten-free cookies with prickly pear powder significantly improved their quality, as 10% enrichment yielded a higher spread ratio (14.10) and increased hardness compared to rice flour controls, while chromatographic analysis (HPLC-ESI-MS/MS) revealed a diverse profile of phenolic acids with total free phenolic acids and polyphenols rising alongside additive content; antioxidant activity correlated positively with prickly pear addition, and insoluble fiber content increased markedly from 2.17 g/100 g in controls to 11.87 g/100 g at 15% enrichment; sensory evaluation showed greater appreciation for enriched cookies, especially those made with peels, which scored highest in taste, color, texture, and overall acceptability, and storage studies demonstrated that prickly pear powder extended shelf life to 9 days compared to 5 days for controls, acting as a natural preservative. **Conclusions:** Our research has shown that our innovative cookies with the addition of prickly pear peel can become a source of bioactive compounds indispensable for human health.

Keywords: Gluten-Free Cookies; Pricky Pear; Functional Food; Textural Properties; Antioxidant Activity.

Assessment of Dietary Diversity and Body Composition in Young Adults from Algiers

Lylia Djenas [1,2], Khadidja Bessaid [2,3], Samia Neggazi [1], Wafaa Bounames [2], Rime Fissah[1], Aya Benhedouga [4], Malha Azzouz [2,3]

[1] *Cellular and Molecular Pathophysiology Team, Laboratory of Biology and Physiology of Organisms, USTHB, Algiers, Algeria*

[2] *Laboratory of Endocrinology and Metabolism (LEM), University of Algiers 1, Algiers, Algeria*

[3] *Department of Endocrinology and Diabetology, Bologhine Ibn Ziri Public Hospital (EPH BOLOGHINE Ibn Ziri), Algiers, Algeria*

[4] *Bioenergetics and Intermediate Metabolism Team, USTHB, Algiers, Algeria*

ABSTRACT

Background: Dietary diversity is recognized as a major determinant of overall nutritional profile and can be assessed using the Dietary Diversity Score (DDS). However, its relationship with body composition remains poorly explored in North African populations. **Aims:** The aim of this study was to assess dietary diversity in young Algerian adults and to explore its association with body composition. **Methods:** This is a descriptive cross-sectional study conducted in 142 young adults. Collected data included anthropometric measurements, body composition assessed by bioelectrical impedance analysis (InBody S10), and a dietary survey allowing the calculation of a DDS. Sex-related differences and associations between variables were analyzed using appropriate statistical tests. **Results:** The mean age of participants was 22.46 ± 2.68 years. Mean body weight was 70.93 ± 16.50 kg and was significantly higher in men (78.13 ± 17.17 kg) than in women (65.19 ± 12.89 kg) ($p < 0.05$). A notable prevalence of overweight and obesity was observed, affecting 17.9% of men and 18.6% of women. Mean fat mass was 19.04 ± 11.10 kg and was significantly higher in women ($p < 0.001$). The mean Dietary Diversity Score (DDS) was 2.73 ± 1.29, with no significant difference between sexes ($p = 0.62$). Among participants, 45.4% had a low DDS, 48.2% a moderate DDS, and only 6.4% a high DDS. Participants with a low DDS had higher fat mass ($p = 0.024$), suggesting that low dietary diversity may be associated with a less favorable adiposity profile. In contrast, no significant association was observed between DDS and muscle mass ($p = 0.127$). **Conclusions:** These results indicate that a low DDS was associated with higher fat mass, suggesting a less favorable adiposity profile in the context of poorly diversified diets. This underscores, from early adulthood, the importance of promoting a varied and higher-quality diet.

Keywords: Dietary Survey; Dietary Diversity Score; Body Composition; Fat Mass; Adiposity Profile.

Prevalence of Hepatic Steatosis and Risk of Advanced Fibrosis in Obese Patients with Type 2 Diabetes

Lylia Djenas [1,2], Samia Neggazi [1], Khadidja Bessaid [2,3], Wafaa Bounames [2], Rime Fissah[1], Souhila Aouichat [1], Nadjiba Hamlat [1], Malha Azzouz [2,3]

[1] *Cellular and Molecular Pathophysiology Team, Laboratory of Biology and Physiology of Organisms, USTHB, Algiers, Algeria*

[2] *Laboratory of Endocrinology and Metabolism (LEM), University of Algiers 1, Algiers, Algeria*

[3] *Department of Endocrinology and Diabetology, Bologhine Ibn Ziri Public Hospital (EPH Bologhine Ibn Ziri), Algiers, Algeria*

ABSTRACT

Background: Metabolic dysfunction–associated steatotic liver disease is common in obesity and type 2 diabetes, increases fibrosis risk, and can be screened using simple non-invasive anthropometric and biochemical scores. **Aims:** The aim of this study was to assess, in obese patients with type 2 diabetes, the prevalence of hepatic steatosis and advanced fibrosis using the Fatty Liver Index (FLI) and the FIB-4 score, and to explore their relationships with anthropometric parameters. **Methods:** A descriptive cross-sectional study was conducted in 101 obese patients with type 2 diabetes (93 women, 8 men) followed in the diabetology department of EPH Bologhine. Collected data included anthropometric measurements and liver tests (transaminases, GGT, platelets), allowing calculation of FLI and FIB-4. **Results:** The mean age of patients was 55.3 ± 9.5 years and mean body weight 93.7 ± 14.1 kg, with a mean BMI of 36.7 ± 5.2 kg/m². Moderate obesity was the most frequent category (42.6%), followed by severe obesity (33.7%) and morbid obesity (22.8%). Mean AST, ALT and GGT levels were 24.06 ± 12.11 IU/L, 18.43 ± 14.65 IU/L and 33.31 ± 58.10 IU/L, respectively. Mean FLI was 82.0 ± 21.16, and mean FIB-4 was 23.82 ± 24.36. Probable hepatic steatosis (FLI ≥ 60) was present in 67.3% of patients, and 65.3% were classified as having probable advanced fibrosis according to FIB-4. FLI was positively correlated with waist circumference ($r = 0.42$; $p < 0.001$), BMI ($r = 0.27$; $p = 0.017$) and transaminases (AST: $r = 0.23$; $p = 0.041$; ALT: $r = 0.24$; $p = 0.039$). By contrast, FIB-4 was not significantly associated with weight, BMI or waist circumference. **Conclusions:** The high prevalence of steatosis and advanced fibrosis highlights the need for routine non-invasive liver screening and early multidisciplinary metabolic management in obese patients with type 2 diabetes to prevent fibrosis progression.

Keywords: Obesity; Diabetes type 2; MASLD; Liver fibrosis; Non-invasive scores.

Biotechnological Approches to Combat Antimicrobial Resistance in the Food Chain: A One Health Perspective

Fatima Zahra Ati [1], Abdelaziz Touati [2], Hamid Nouri [3], Nawel Boucherba [4]

[1] *Division of Biology and Food Chemistry, Research Center for Agri-Food Technologies, Abderrahmane Mira University of Bejaia, , Algeria*

[2] *Laboratory of Microbial Ecology, Faculty of Natural and Life Sciences, Abderrahmane MiraUniversity of Bejaia, Algeria*

[3] *Department of Biotechnology, Faculty of Natural and Life Sciences, Abderrahmane Mira University of Bejaia, Algeria*

[4] *Director, Research Center for Agri-Food Technologies, Abderrahmane Mira University of Bejaia, Algeria*

ABSTRACT

Background: Antimicrobial resistance (AMR) is a growing global threat to food safety and public health. The excessive use of antibiotics in agriculture and food processing promotes the spread of resistant microorganisms throughout the food chain. **Aims:** This work highlights innovative biotechnological approaches designed to control AMR within the One Health framework. **Methods:** This study utilized

a comprehensive systematic literature review following the One Health framework to evaluate biotechnological interventions against AMR in the food chain. **Results:** Promising solutions include the use of probiotics, bacteriophages, antimicrobial peptides, and biosensors for rapid detection and targeted control of resistant strains. **Conclusions:** These strategies provide sustainable and eco-friendly alternatives to conventional antimicrobials and contribute to building a safer and more resilient food system.

Keywords: Antimicrobial Resistance; Biotechnology; Food Chain; One Health; Food Safety.

The Impact of Breakfast Habits on Academic Performance: A Case study with High School Seniors in Batna, Algeria

Zineb Ferroudj [1], Hadda Krarcha [2,3], M. Mellaoui [4]

[1] *Institute of Veterinary and Agricultural Sciences, Department of Food Technology, University of Batna 1, Batna, Algeria*

[2] *LRPRIM Laboratory, Department of Physics, Faculty of Material Sciences, University of Batna1, Batna, Algeria*

[3] *Earth Sciences & Universe Institute, University Mostepha Benboulaid, Fesdis Batna 2. Algeria*

[4] *Faculty of Medicine, University Mostepha Benboulaid, Fesdis Batna 2, Algeria*

ABSTRACT

Background: Numerous studies highlight the close link between dietary habits and essential brain functions such as cognition, memory, attention, and emotional regulation. The main source of energy after the overnight fast, breakfast provides glucose as well as the macro- and micronutrients necessary for optimal mental performance throughout the school day. **Aims:** In this case study, we conducted an analytical survey among high school seniors in Batna, Algeria, to assess their breakfast habits and their perception of their academic performance. **Methods:** A structured questionnaire allowed us to assess the composition of their breakfast, their lifestyle-related behaviors, and their daily cognitive indicators. **Results:** The results revealed that a significant percentage of students regularly skip breakfast, while many consume nutritionally inadequate morning meals. A significant number of participants also reported early morning fatigue, suggesting a direct link between skipping breakfast/poor nutrition and decreased morning alertness.These factors can limit the availability of glucose for the brain, disrupt neurotransmitter synthesis, and contribute to stress, mood swings, reduced attention span and decreased school engagement, particularly during morning classes. **Conclusions:** Based on these results, this research offers practical recommendations aimed at improving the quality of students' breakfasts, as a general health strategy that can promote cognitive development, emotional stability, and academic success.

Keywords: Food; Mental health; Academic performance; Dietary quality.

Impact of Curcumin Supplementation on Anthropometric Parameters, Glucose Homeostasis and Atherogenic Indices (CRI-I and AIP) in Rats Fed a Cafeteria Diet

Rime Fissah, Abdelhamid Sahraoui, Sihem Berdja, Lylia Djenas, Sarah Merzouga, Nadjiba Hamlat

Cellular and Molecular Physiopathology Team, Laboratory of Biology and Physiology of Organisms (LBPO), Faculty of Biological Sciences (FSB), University of Sciences and Technology Houari Boumediene (USTHB), Algiers, Algeria

ABSTRACT

Background: Obesity induced by modern "cafeteria" diets is characterized by visceral adiposity and severe metabolic disruptions. Finding nutritional strategies targeting both central adiposity and cardiovascular risk is a priority. **Aims:** This study evaluates the effect of curcumin supplementation on anthropometric parameters, glycemic regulation, and atherogenic risk indices in obese rats. **Methods:** Rats were subjected to a hypercaloric cafeteria diet to induce obesity (4 mouths) , then treated with curcumin for 6 weeks. Nutritional evaluation included Body Mass Index (BMI) and abdominal circumference. Carbohydrate metabolism was explored via fasting glycemia, glucose tolerance (GTT), and insulin sensitivity (ITT) tests. Cardiovascular risk was specifically estimated by the Castelli Risk Index I (CRI-I) and the Atherogenic Index of Plasma (AIP). **Results:** The cafeteria diet induced a significant increase in BMI and abdominal circumference, indicating central obesity, associated with hyperglycemia and insulin resistance. Curcumin supplementation resulted in: (1) a significant reduction in adiposity, marked by decreased BMI and waist circumference; (2) improved glucose homeostasis, with normalized glycemia, enhanced glucose tolerance, and restored insulin sensitivity; and (3) a correction of the lipid profile translated by a significant decrease ($p < 0.05$) in atherogenic indices CRI-I and AIP. **Conclusions:** Curcumin exhibits pleiotropic benefits against cafeteria diet-induced alterations. By simultaneously reducing abdominal obesity, improving metabolic flexibility, and lowering atherogenic risk indices (CRI-I, AIP), these results support its potential as a nutraceutical agent in the management of metabolic syndrome.

Keywords: Cafeteria Diet; Curcumin; Abdominal Obesity; Insulin Resistance; Atherogenic Indices.

Elevated Oxidative Stress and Hepatic Dysfunction Characterize the Clinical Profile of Celiac Disease

Hadria Grar [1,2], Wafaa Dib [2,3], Wahiba Rached [1], Bouchra Boughanem [1], Wissem Bouchelil [1], Aicha Boukricha [2], Hanane Gourine [2], Hanane Kaddouri [2], Omar Kheroua [2], Samia Addou [2], Djamel Saidi [4]

[1] *University of Mostaganem Abdelhamid Ibn Badis, Faculty of Natural and Life Sciences, Department of Biology, Mostaganem, Algeria*

[2] *University Oran 1 Ahmed Ben Bella, Faculty of Natural and Life Sciences, Department of Biology, Laboratory of Physiology of Nutrition and Food Safety, Oran, Algeria*

[3] *University of Science and Technology USTO, Faculty of Natural and Life Sciences, Department of Biology, Oran, Algeria*

[4] *Higher School of Biological Sciences of Oran, BP 1042 Saim Mohamed, Oran, Algeria*

ABSTRACT

Background: Celiac disease is a chronic autoimmune disorder triggered by the ingestion of gluten in genetically predisposed individuals. By promoting cellular injury, oxidative stress may be a factor in the onset of celiac disease and may affect its long-term outcomes. The understanding that oxidative stress is a key modifier of

celiac disease opens up potential avenues for adjunct therapies. **Aims:** This study aimed to characterize the epidemiological, biochemical, and oxidative stress profiles in celiac disease patients. **Methods:** In a 45-day prospective study, we enrolled 27 biopsy-confirmed celiac patients from Mostaganem. Data collection included a questionnaire and analysis of biochemical parameters. Oxidative stress was assessed by measuring lipid peroxidation via the Thiobarbituric Acid Reactive Substances (TBARS) assay. **Results:** Results indicated a female predominance, alongside anemia, hyperbilirubinemia, elevated liver transaminases, and a marked inflammatory state. Critically, patients exhibited a significant increase in oxidative stress, as measured by elevated malondialdehyde (MDA). **Conclusions:** Celiac disease is associated with a distinct profile including hepatic abnormalities and a significant increase in systemic oxidative stress.

Keywords: Celiac Disease; Oxidative Stress; Lipid Peroxidation; Liver Transaminases.

Bacteriological Water Quality in Livestock Farming: A Critical Association Between Public Health and Food Safety

Hammouche Dalila, Mouss Abdelhak Karim

Faculty of Nature and Life Sciences and Earth Sciences, Department of Agricultural Sciences, Djilali Bounaama University. Road to Theniet El Had, Khemis Miliana - Ain Defla, Algeria

ABSTRACT

Background: The rapid rise in birth rates, especially in emerging countries, is driving greater demand for animal products, positioning broiler chicken farming as a key source of affordable protein and projected to become the world's most consumed meat by 2050; however, sustaining high production relies on intensified farming systems, which pose significant hygiene challenges—particularly concerning water quality—thus threatening food safety and public health. **Aims:** This study is part of this general context and aims to assess the bacteriological quality of drinking water and its potential impacts on public health and food safety. **Methods:** The experiment was conducted on a broiler chicken farm in Algeria. Drinking water samples were taken four times, at weekly intervals, throughout the supply chain, from the collection point to the drinking troughs. **Results:** Bacteriological analyses revealed the presence of total coliforms (142.10 ± 7.85 x 100 mL^{-1}) and fecal coliforms (22.13 ± 3.08 x 100 mL^{-1}), as well as detectable levels of *Escherichia coli* (13.44 ± 2.01 x 100 mL^{-1}) and fecal streptococci (5.71 ± 0.78 x 100mL^{-1}). The presence of fecal coliforms and *Escherichia coli* increases the risk of introducing enteropathogenic agents such as Salmonella, noroviruses, and other pathogenic bacteria that can cause gastroenteritis in humans. In addition, fecal streptococci could be associated with increased risks of infection. Furthermore, the deterioration in water quality had an impact on the main production indicators and resulted in a decrease in the average weight of the birds (2231.55 ± 354.29 $g.s^{-1}$) and an increase in mortality (7.00%). **Conclusions:** The results indicate the necessity for consistent monitoring of drinking water quality, the adoption of proper hygiene and biosecurity measures, and the implementation of sustainable management strategies to mitigate microbial load. Such measures are essential to enhance food safety and prevent the spread of antibiotic-resistant pathogens, a major global public health issue.

Keywords: Water; Bacteriological Quality; Livestock Farming; Public Health; Food Safety.

Hepatic Steatosis and Sugar Consumption

Hanane Kadi [1,2], Nedjla Nourani [2], Abderrahmane Kitouni [2], Rabiâa Karoune [1,2], Lynda Yagoubi-Benatallah [1,2], Ikram Bouldjadj[1,2]

[1] *Laboratoire Alimentation, Nutrition et Santé (ALNUTS), université Salah Boubnider UC3, Algeria*

[2] *Institut de la Nutrition de l'Alimentation et des Technologies Agro-Alimentaires (INATAA), Université des frères Mentouri Constantine 1, Constantine, Algeria*

ABSTRACT

Background and Aims: Non-alcoholic fatty liver disease (NAFLD), also known as "fatty liver disease," represents a major public health concern today due to its prevalence and the potential severity of its complications. In Algeria, a notable increase in this pathology has been observed, directly linked to the nutritional transition of recent decades. This study aims to evaluate the factors associated with the occurrence of NAFLD among an adult population residing in the wilaya of Constantine. **Methods:** A dietary survey and anthropometric measurements were conducted on a sample of 101 adult patients with NAFLD in the wilaya of Constantine. Data collection focused on nutritional habits, physical activity levels, and body mass index (BMI) to identify lifestyle correlations. **Results:** The average age of the patients was 47.27 ± 12.02 years, with a majority aged between 40 and 59 years. The study population was predominantly female and from a middle socio-economic background. Over half of the patients were overweight (55.45%), and nearly 20% suffered from moderate to severe obesity. Most cases presented a mild form of steatosis. Nutritionally, sugar consumption was frequent, while fruit intake was moderate. Physical activity was insufficient in nearly 80% of patients, and approximately half reported snacking between meals. **Conclusions:** These results highlight the need for targeted interventions focusing on modifying dietary habits and increasing physical activity. A comprehensive and multidisciplinary management approach is essential to prevent progression toward more severe forms of the disease.

Keywords: Non-Alcoholic Fatty Liver Disease; Survey; Diet; Adult.

Physicochemical and Microbiological Analysis of the Spoilage of Two Types of Dairy Creams

Maya Kechid [1,2], Rym Tinhinene Maougal [1,2]

[1] *Genectic, Biochimical and Plant Biotechnology Laboratory (GBBV), Constantine 1, Frères Mentouri University. Constantine, Algeria*

[2] *Biotechnology and Food Quality Laboratory (BIOQUAL). Institute of Nutrition, Food Science and Agri-Food Technologies (INATAA), Constantine 1, Frères Mentouri University. Constantine, Algeria*

ABSTRACT

Background: Each food product has a specific shelf life, ranging from a few days to several months, depending on its nature. Dairy products, in particular, are known for their rapid spoilage due to their high nutrient content, which makes them a favourable substrate for microbial contamination. **Aims:** In this context, we focused on the spoilage dynamics of two types of dairy creams differing in composition, in order to monitor the progression of their deterioration after first opening, under recommended refrigerated storage

conditions. **Methods:** To carry out this study, we performed both physicochemical and microbiological analyses on the two creams, tracking changes in their physicochemical and microbiological parameters over 15-day period. This investigation allowed us to determine the post-opening consumption period for each cream. **Results:** Our results showed that after opening, both creams became increasingly acidic throughout the analysis period, accompanied by a decrease in fat content. This increase in acidity and reduction in fat are attributed to microbial activities that affect the two creams differently. We also observed the development of several microbial populations over the study period, with distinct spoilage patterns between the two dairy creams. **Conclusions**: The study concludes that product composition significantly dictates spoilage rates, highlighting the need for specific consumption timeframes to maintain food safety after opening.

Keywords: Dairy Cream; Preservation; Alteration; Physicochemical Analyses; Contaminating Microorganisms.

Efficacy and Toxicological Implications of Decontaminants Applied to Bovine Carcasses: A Global Meta-Analysis

Amel Kerbouche [1], Lynda Abdellaoui [1,2], Mohammed Tahar Boubezari [3]

[1] *Laboratoire de recherche HASAQ, Ecole Nationale Supérieure Vétérinaire d'Alger, Algeria*

[2] *Université Saad Dahleb Blida1, Algeria*

[3] *Laboratoire de Biotechnologie, Environnement et Santé. Faculté des Sciences de la Nature et de la Vie, Université de Jijel, Algeria*

ABSTRACT

Background: This meta-analysis evaluates the effectiveness of major chemical and physical carcass decontamination methods (lactic acid, peracetic acid, hot water, and chlorine) and examines their toxicological implications for food safety and public health. **Aims:** To evaluate effectiveness and examine toxicological implications of specific decontamination methods. **Methods:** A systematic literature search was conducted in PubMed, Scopus, and Web of Science covering the period from 1990 to 2025. Eligible studies included in-plant intervention trials and regulatory assessment reports. Pooled effect sizes were estimated using random-effects models (DerSimonian–Laird). **Results:** Overall, hot water and peracetic acid treatments achieved the highest weighted reductions in microbial contamination across carcasses. Lactic acid demonstrated moderate but consistent antimicrobial efficacy, whereas chlorine-based interventions showed comparatively lower effectiveness and raised concerns related to the formation of potentially harmful disinfection by-products (DBPs). Substantial heterogeneity was observed among studies, particularly those evaluating chemical decontaminants, reflecting variations in treatment conditions, carcass types, and target microorganisms. **Conclusions:** In conclusion, carcass decontamination interventions significantly reduce microbial loads and contribute to improved food safety. However, the selection of decontamination strategies should not rely solely on antimicrobial performance but must also consider toxicological risks and consumer health protection to ensure sustainable and safe meat production systems.

Keywords: Carcasses; Decontamination; Lactic Acid; Food Toxicology; Food Safety.

Content Microbiological Quality Assessment of Charlotte Cakes Marketed in Djelfa (Algeria)

Oumaima Ilham Kidar, Abelkader Bensid

Department of Agricultural and Veterinary Sciences, Faculty of Natural and Life Sciences, Ziane Achour University of Djelfa, Djelfa, Algeria

ABSTRACT

Background: Charlotte cakes, widely consumed cream-based pastries in Algeria, are highly susceptible to microbial contamination due to their moisture content, nutrient-rich composition, and frequent manual handling; inadequate hygiene during preparation, storage, or distribution can promote bacterial growth and increase foodborne illness risks, making microbiological quality assessment essential to identify hazards and safeguard consumer health. **Aims:** This study aims to assess the microbiological quality of Charlotte cakes marketed in the commune of Djelfa (Algeria) and to determine their compliance with Algerian microbiological standards for cream-based pastries. It also seeks to identify hygiene-related factors contributing to contamination. **Methods:** Twelve Charlotte cake samples representing four varieties (chocolate, lemon, strawberry, and caramel; three samples each) were collected from local pastry shops. Microbiological analyses targeted three indicator groups: total aerobic mesophilic count (TAMC), thermotolerant coliforms, and coagulase-positive *Staphylococcus* spp. (mainly *Staphylococcus aureus*). All microbiological procedures, including sample homogenization, serial dilutions, selective plating, incubation conditions, and enumeration, were performed according to ISO standard methods. **Results:** Results were expressed as $\log_{10}$ CFU/g and compared with established microbiological criteria for cream-based pastries. Most samples exhibited microbial loads exceeding acceptable limits for all tested indicators. Total aerobic mesophilic count (TAMC) values ranged from 5.4 to 6.0 $\log_{10}$ CFU/g, reflecting substantial environmental contamination. Thermotolerant coliform levels (4.5–5.2 $\log_{10}$ CFU/g) suggested inadequate sanitation or possible fecal contamination. Coagulase-positive *Staphylococcus* spp. ranged from 3.7 to 4.9 $\log_{10}$ CFU/g, indicating poor personal hygiene and improper handling practices. Altogether, the results highlighted major shortcomings in hygiene, temperature control, and overall food handling conditions. **Conclusions:** Charlotte cakes sold in Djelfa exhibited worrying microbiological contamination, with most samples not meeting safety standards; improving their safety requires stricter Good Manufacturing Practices (GMP), adoption of HACCP systems, rigorous temperature control, and enhanced hygiene training for pastry workers to reduce foodborne illness risks.

Keywords: Charlotte Cakes; Microbiological Quality; Indicator Groups; Hygiene; Djelfa.

Prevalence, Virulence Profiles and Antibioticrresistance of Avian and Human *Salmonella* Isolates: Implications for Food Safety and Public Health

Amira Kout [1], Radia Boufermes [1], Rachid Elgroud [2], Douadi Khelifi [3], Binay Baris [4], Hadjira Berredjem [1]
[1] *Département de Biochimie, Université Badji Mokhtar – Annaba, Algeria*
[2] *Institut des sciences vétérinaires, Université Frères Mentouri – ConstantinE, Algeria*
[3] *Laboratoire de Biotechnologie, Université technique de gebze – Turquie*
[4] *Ecole Nationale Supérieur de Biotechnologie, Université Saleh Boubendir – Constantine, Algeria*

ABSTRACT
Background: *Salmonella* ranks among the main agents responsible for foodborne illnesses and represents a major threat to both human and animal health. Contamination of poultry products constitutes an important route of transmission, often facilitated by inadequate hygiene practices along the food production chain. The emergence of multidrug-resistant (MDR) strains further increases this risk by limiting therapeutic options and enhancing the likelihood of large-scale dissemination. **Aims:** In this study, 25 *Salmonella* strains of human and avian origin (isolated from chicken offal and wings sold in markets) were collected and characterized in the regions of Annaba and Constantine. **Methods:** Their identification was performed using microbiological and biochemical approaches. **Results:** The investigation allowed the identification of several serotypes, as well as specific virulence genes detected by PCR. In parallel, the susceptibility of these isolates to 15 antibiotics was assessed, revealing a notable prevalence of multidrug resistance. These findings highlight the importance of continuous microbiological and molecular surveillance of *Salmonella* circulating in both human and avian sectors. **Conclusions:** They also emphasize the need to strengthen biosecurity measures, good manufacturing practices, and strict implementation of HACCP to limit the spread of resistant strains. Integrating microbiological, toxicological, and epidemiological data is essential to improving food safety and protecting public health.

Keywords*: Salmonella Spp.*; Food Safety; Antimicrobial Resistance; Virulence Genes; Public Health.

Biogenic Amines in Traditional and Industrial Foods of Animal Origin: Toxicological Impact and Preventive Approaches

Lynda Mezali [1], Siham Nouichi [2]
[1] *École nationale supérieure vétérinaire Rabie Bouchama, Algiers, Algeria*
[2] *Institut des sciences de la nature et de la vie, université Abdelhafidh Boussouf, Mila, Algeria*

ABSTRACT
Background: Biogenic amines (histamine, tyramine, putrescine, cadaverine) are nitrogenous compounds formed mainly by microbial decarboxylation of amino acids and occur naturally in many animal-derived foods, especially fermented, aged, or protein-rich products such as cheeses, fermented meats, fish, and fermented milk. **Aims:** Although low concentrations of BAs are physiologically tolerated, elevated levels constitute an emerging chemical hazard capable of triggering adverse toxicological effects. Histamine is well known for causing scombroid poisoning, typically associated with inadequate refrigeration of fish, while tyramine may induce hypertensive crises, migraines and various neurological disturbances. Putrescine and cadaverine potentiate histamine toxicity and contribute to spoilage, off-odours and the overall deterioration of food quality. **Methods:** The accumulation of biogenic amines in food is influenced by raw material quality, hygiene, storage temperature, fermentation conditions, and decarboxylase-positive microorganisms, while technological factors such as pH, salt concentration, oxygen levels, and aging duration also play a role; advanced analytical methods like HPLC and LC-MS/MS have improved their detection and monitoring in complex food matrices, strengthening risk assessment and regulatory control. **Results:** Preventive strategies rely on an integrated food safety approach encompassing strict temperature control, rapid chilling of fishery products, the adoption of good hygienic practices, and the use of starter cultures lacking decarboxylase activity in fermented foods. Additional measures include raw material selection, hurdle technology, improved packaging systems, and the implementation of rapid or continuous monitoring methods to detect early BA formation. Establishing regulatory limits and harmonized surveillance systems remains essential to reduce consumer exposure. **Conclusions:** Biogenic amines represent a notable but preventable toxicological risk in foods of animal origin, and their accumulation can be effectively reduced through stronger monitoring systems and targeted microbiological and technological interventions along the food chain, thereby improving food safety, prolonging shelf life, and protecting public health.

Keywords: Biogenic Amines; Animal-Origin Foods; Toxicological Risk; Food and Public Health; Preventive Strategies.

The Moderating Effect of Health Attitudes on How Convenience and Social Enjoyment Influence Fast-Food Purchase Intention

Charef Eddine Moumen
Institute of Nutrition, Food, and Agri-Food Technologies, Constantine 1 University, Constantine, Algeria

ABSTRACT
Background: The fast-food industry continues to thrive by prioritizing consumer convenience and social experiences, even as public health awareness increases. This creates a complex decision-making environment where utilitarian and hedonic motivations often compete with health-related attitudes in shaping purchase intentions. **Aims:** The aim of this study is to determine if health-related attitudes alter consumers' intention to purchase fast food when convenience or social enjoyment are present. To address this, a conceptual model was developed and tested using a quantitative methodology. **Methods**: Data were collected via an online questionnaire from a sample of 446 consumers and analyzed using Structural Equation Modeling (SEM). **Results:** The results revealed that both convenience and social enjoyment demonstrated a significant and positive direct effect on fast-food purchase intention, reaffirming their critical role as primary motivators. Contrary to expectations, neither health concerns nor perceived unhealthiness significantly moderated these relationships. This indicates that the strength of the relationship between convenience/social enjoyment and purchase intention does not meaningfully change based on a consumer's level of health consciousness or their belief that fast food is unhealthy. **Conclusions:** The study contributes on consumption trade-offs, by highlighting the limited role of health concerns in hedonic or utilitarian consumption contexts and calls for integration of situational factors into health-behavior frameworks. Practically, for policymakers and health promoters, traditional health messages may be insufficient. Interventions should therefore couple information with structural

changes such as improving availability of convenient and healthier options to meaningfully shift choices.

Keywords: Health Attitudes; Social Enjoyment; Convenience; Purchase Intention.

Water Contamination and the Quality of Table Eggs: Microbiological Challenges for Public Health

Abdelhak Karim Mouss, Dalila Hammouche
Faculty of Nature and Life Sciences and Earth Sciences, Department of Agricultural Sciences, Djilali Bounaama University. Khemis Miliana, Algeria

ABSTRACT

Background: Rising birth rates and improved incomes, especially in emerging countries, are driving demand for animal protein, with intensive poultry farming—meat and eggs—playing a central role. Eggs provide affordable, high-quality protein that supports food security and combats malnutrition. However, the intensive model, concentrating large numbers of birds in confined spaces, raises concerns for animal welfare and public health, as poor hygiene can compromise treatments, inactivate vaccines, spread disease, and reduce production performance, ultimately threatening food safety. **Aims:** In view of all these considerations, the study focused on monitoring the quality of drinking water for laying hens in Algeria. **Methods:** Water samples were taken throughout the feed chain and bacteriological analyses were carried out. **Results:** The results revealed the presence of total coliforms (100.66±3.28/100ml) and fecal coliforms (10.79 ± 1.69 x 100 mL^{-1}), as well as *Escherichia coli* (6.64 ± 0.28 x 100 mL^{-1}) and *Fecal streptococci* (2.20 ± 0.69 x 100 mL^{-1}). In terms of production indicators, egg weight was severely impacted (56.66 ± 3.69 g), as was the vitality of the flock (7.79%). **Conclusions:** The results of this research draw attention to the danger to public health posed by the presence of these pathogens, which can become vectors of disease. In addition, the decline in performance destabilizes the entire production sector, thereby jeopardizing food security. Finally, measures should be taken in terms of hygiene, biosecurity, and disinfection to guarantee the health of the population while ensuring the sustainability of the activity.

Keywords: Water; Eggs; Bacteriological Quality; Public Health; Food Safety.

From Farm to Fork: Conceptual Modeling of Contamination Pathways and the Role of Livestock Building Hygiene in Food Safety

Inas Remmache, Lila Ferhat, Radia Bouhamed
Food Hygiene and Quality Assurance System Research Laboratory (HASAQ), Higher National Veterinary School Rabie-BOUCHAMA. Isaad Abbes Street, Oued Smar-Algiers. Algeria.

ABSTRACT

Background: The quality and safety of animal-derived foods result from a set of complex interactions that begin well before the processing stages. Among these determinants, livestock building hygiene plays a central role, influencing animal health, microbial contamination of products, and ultimately the safety of foods intended for consumption. **Aims:** This work proposes the development of an integrative conceptual model "from farm to fork," linking the farming environment to the quality of animal-derived products. **Methods:** The model describes the main contamination pathways and provides a systematic framework for identifying critical points along the food chain to ensure product safety. A conceptual modeling approach was applied based on scientific articles, epidemiological reports, and national and international surveillance data. Environmental sources, transfer mechanisms, and critical points were systematically identified from published studies. Risk factors related to housing conditions, the rearing environment, and management practices were considered. Data on bacterial prevalence at different stages of the food chain were integrated to strengthen the model. This approach allowed for a comprehensive understanding of potential contamination pathways and the control of critical points. **Results:** Five major contamination sources representing critical points to be monitored were identified: bedding, manure, water, air/dust, and animal surfaces. Data reported in the literature show that poor hygiene in livestock buildings increases bacterial loads in products. Proper bedding management, ventilation, equipment disinfection, udder preparation, strict cold-chain control, and staff training can significantly reduce contamination risks. **Conclusions:** This conceptual model highlights the central role of livestock building hygiene in contamination dynamics throughout the food chain and offers a systemic view of the relationships between farming practices and food safety. It constitutes a relevant tool for reducing microbiological risks and protecting public health.

Keywords: Food Safety; Microbial Contamination; Livestock Hygiene; Conceptual Model.

Contribution to the Study of the Impact of Olive Variety on the Physicochemical Quality of Olive Oils from Eastern Algeria

Hadjer Sabeg, Nora Benrachou
Functional and Evolutionary Ecology Laboratory – Faculty of Natural and Life Sciences – Department of Agronomic Sciences – Chadli Bendjedid University, El Tarf, Algeria

ABSTRACT

Background: The quality of olive oil depends on various factors, including the olive variety, fat content, and extraction process. **Aims:** This study aims to evaluate the impact of these factors on key quality parameters of olive oil, such as extraction yield, acidity index, and peroxide value. **Methods:** Four olive varieties (Schemlal, Sigoise, Rougette, and Oleaster) were subjected to extraction across eight (08) sampling sites. The main effects, interactions, and relationships among the variables were assessed using statistical analyses. **Results:** The fat content of the Schemlal, Rougette, and Sigoise varieties was relatively high (40%–45%), whereas that of the Oleaster variety exhibited lower values (25–28%).The acidity index varied considerably among varieties: Oleaster showed the highest values (7.5–8.5), followed by Sigoise (2.5–3.0), whereas Schemlal and Rougette presented lower values (0.8–1.7). Regarding the peroxide value, Oleaster showed the highest levels (15–18). These results highlight the importance of adjusting the extraction process for each variety to optimize the quality and yield of olive oil, especially for the first cluster. Conversely, the Oleaster variety, with its unique chemical characteristics, requires particular attention due to its lower yield. Moreover, the Schemlal variety offers a good balance between extraction yield and fat content, making it an attractive option for producers seeking a compromise. **Conclusions:** Overall, this study provides valuable information to guide producers in selecting olive varieties and extraction methods

according to their production and quality goals. The impact of these factors on the organoleptic properties and long-term stability of olive oil could be explored in future research.

Keywords: Olive Variety; Olive Oil; Quality; Extraction.

Investigation of the Antioxidant and Anti-Inflammatory Activities of Walnut (*Juglans regia*) Extracts from Eastern Algeria for Potential Nutraceutical Applications Targeting Neurological Health

Ghada Senane , Sameha Merzoug, Medlamine Toumi
Functional and Evolutionary Ecology Laboratory - Chadli Bendjedid University El-Tarf, Algeria

ABSTRACT

Background: Juglans regia (walnut), a member of the Juglandaceae family, encompasses taxa of significant ecological and medicinal relevance. This species was selected for our study within the framework of an ongoing initiative to valorize Algeria's rich botanical heritage. Particular emphasis is placed on its potential applications in the nutraceutical and biomedical fields, with promising prospects for targeted nutritional strategies designed for specific population groups, notably individuals affected by neurological disorders. **Aims:** The aim of this work was to examine the chemical constituents and biologically active molecules of walnut in order to gain deeper insight into its therapeutic potential and biological effectiveness. **Methods:** The plant material was extracted using a hydroethanolic mixture (70:30, v/v). The resulting extract underwent qualitative screening and quantitative determination of total polyphenols, flavonoids, and tannins. Antioxidant capacity was assessed through ABTS and CUPRAC assays, while anti-inflammatory activity was evaluated using a complementary bioassay. **Results:** The hydroethanolic extract exhibited the following levels of phenolic compounds: 75.45 mg GAE/g DM for total polyphenols, 4.17 mg QE g^{-1} DM for flavonoids, and 5.52 mg CE g^{-1} DM for condensed tannins. Antioxidant evaluation showed an IC_{50} of 17.03 mg mL^{-1} using the ABTS method and a value of 20.95 ± 0.38 mg mL^{-1} in the CUPRAC assay. Additionally, the extract displayed a marked anti-inflammatory activity over 1.68 ± 0.02 µg/ml. **Conclusions:** Overall, the findings indicate that Juglans regia represents a valuable natural source of phenolic compounds with significant antioxidant and anti-inflammatory effects. These properties support its potential use in the development of natural therapeutic agents aimed at mitigating oxidative stress and inflammation-related conditions.

Keywords: *Juglans regia*; Antioxidant Activity; Medicinal Plants; Phytochemistry; Valorization.

Prevalence of Celiac Disease and the Study of Adherence to the Gluten-Free Diet Among Schoolchildren in Constantine

Nedjla Silini [1], Fatima Zohra Boutata [2,3], Leila Benatallah[1], Hamida Mahroug[3], Hayat Bourekoua[3]
[1] *Laboratory of Food Engineering, Institute of Nutrition, Food and Agro-Food Technologies (INATAA) Université Constantine 1, Algeria*
[2] *Department des sciences agronomiques, faculté des sciences, université de 20 aout 1955 Skikda, Algeria*
[3] *Laboratoire de nutrition et de technologies des aliments LNTA, Institut de la nutrition, de l'alimentation et des technologies agroalimentaires, INATAA, Université Constantine 1, Constantine, Algeria*

ABSTRACT

Background: Celiac disease is a significant pediatric health concern that requires a strict, lifelong gluten-free diet to prevent developmental complications and ensure long-term health. However, the effectiveness of this treatment is often hindered by socio-economic barriers and the limited organoleptic appeal of gluten-free substitutes, making clinical and nutritional monitoring essential. **Aims:** The study aims to estimate celiac disease prevalence in schoolchildren in Constantine municipality, describe their clinical and nutritional profiles, and assess adherence to a gluten-free diet, including difficulties and food preferences. **Methods:** A cross-sectional study was conducted involving a sample of 4,053 pupils aged from 5 to 11 years, recruited from several primary schools. A structured questionnaire was used to collect clinical, nutritional, demographic, and familial data. Statistical analyses were conducted using Epi Info. **Results:** The observed prevalence was 0.98% (40 confirmed cases). The mean age of the children was 8.11 ± 1.48 years (SD). The gender distribution was balanced (21 girls, 19 boys), showing no significant difference. The dominant clinical presentation was abdominal pain (70%, n=28); anorexia (67.5%, n = 27); followed by tiredness (62.5% n = 25); and transit disorders (50% n = 20). The adherence to the gluten-free diet after diagnosis showed notable variability. The main reported difficulties were: the high cost of gluten-free products (77.14%), limited availability in stores (48.57%), and a lack of dietary diversity (51.43%). **Conclusions**: Despite this, the majority of children reported rapid improvement in symptoms after a few weeks on the diet. Preference analysis confirmed the predominance of gluten-free cereal substitutes (bread, pasta) as essential for maintaining basic eating habits. Indulgent foods like chocolate, cakes, and pastries followed gluten-free cereal substitutes. Significant variability in individual choices regarding taste and texture shows that organoleptic acceptability limits long-term adherence to the gluten-free diet.

Keywords: Prevalence; Celiac Disease; Gluten-Free Diet; Schoolchildren; Adherence.

Microbiological Quality and Public Health Risk Assessment of Raw Milk Sold in Informal Markets in Constantine, Algeria

Ikram Soltani [1], Samia Djeffel [2]
[1] *Chadli Benjedid University of El Tarf, Algeria*
[2] *Institute of Veterinary Sciences, Algeria*

ABSTRACT

Background: The consumption of unpasteurized raw milk poses a significant health risk due to the potential presence of pathogenic microorganisms. **Aims:** This study was conducted to assess the microbiological quality and safety of raw milk sold in local markets in the province of Constantine, Algeria. **Methods:** A total of 20 samples of raw cow's milk were collected and analyzed. Standard

microbiological methods were used. **Results:** The results showed that 53% of the samples exceeded the acceptable limits for aerobic mesophilic flora (more than 10^5 CFU mL^{-1}), indicating poor milking and storage hygiene. Escherichia coli was detected in 42% of the samples, while *Staphylococcus aureus* and *Listeria monocytogenes* were isolated in 18% and 7% of cases, respectively. **Conclusions:** These results highlight the high level of microbial contamination in raw milk, which can lead to foodborne infections in consumers. Strict hygiene measures are essential during milking, refrigeration, and marketing of raw milk. To improve milk safety and protect public health, it is also necessary to raise awareness among producers and implement regular veterinary controls.

Keywords: Raw Milk; Constantine; Food Safety; *E. Coli*; One Health.

Health Risks of Food Additives used in the Manufacture of Yogurts and Fermented Milks

Ouarda Aissaoui Zitoun [1], Romaissa Taibi [2], Soundes Tioiche [2]
[1] *Laboratoire du Génie Agro-Alimentaire (GENIAAL), Institut de la Nutrition, de l'Alimentation et des Technologies Agro-Alimentaires (INATAA), Université Frères Mentouri, Constantine, Algeria*
[2] *Institut de Nutrition, de l'Alimentation et de Technologie Alimentaires (INATAA), Université Frères Mentouri, Constantine, Algeria*

ABSTRACT
Background and Aims: Yogurts and fermented milks have become essential foods for all population groups—children, adults, the elderly, and individuals with specific needs. They provide proteins, calcium, and beneficial lactic acid bacteria, including probiotics, which improve lactose digestion, strengthen the gut microbiota, and support bone and immune health. However, industrial production of these products involves the use of numerous food additives. This study investigates the local market for yogurt-type dairy products to identify the categories of additives listed on labels and assess their health impact on consumers. **Methods:** Twenty-one products from different brands were analyzed. The methodology focused on identifying the categories of additives listed on product labels and evaluating their distribution and toxicological potential based on established safety profiles. **Results:** Only 9.5% of products were labeled as yogurt; the rest were flavored fermented milks. Seven categories of additives were identified, mainly flavorings (81%), thickeners (76.2%), and gelling agents (47.62%). Colorants appeared in 47.62% of products, followed by acidity regulators (33.3%) and stabilizers (14.3%). Toxicologically, colorants are of particular concern; seven were identified (SIN 124, 122, 129, 141, 150, 160, and 202). Azo dyes (SIN 124, 122, 129) are often linked to behavioral disorders in children (hyperactivity), allergies, and possible carcinogenicity. Common thickeners (SIN 1442, 1440, 1422, 1423, 1412, and 1447) may alter gut microbiota composition, increase intestinal permeability, and promote low-grade inflammation. **Conclusions:** Overall, the analysis revealed a predominance of flavored industrial products heavily reliant on additives, raising toxicological concerns, particularly regarding azo dyes and modified thickeners with potential intestinal health effects.

Keywords: Fermented Milks; Yogurt; Food Additives; Toxicity; Health.

Assessment of Nutritional Status of Patients with Multiple Sclerosis

Fouzia Tebbani , Imen Nour Elhouda Allaoua, Hayet Oulamara
Institute of Nutrition, Food and Food Technologies (INATAA), Laboratory of Nutrition and Food Technologies (LNTA), Constantine 1 University, Algeria

ABSTRACT
Background: Multiple sclerosis (MS) is a chronic, inflammatory neurological disease that primarily affects young adults, with a female predominance. **Aims:** The objective of this study was to assess the nutritional status of patients with MS. **Methods:** A descriptive, cross-sectional study was conducted among 136 MS patients followed in the Constantine region. Data were collected using a structured questionnaire covering sociodemographic characteristics, nutritional status (anthropometric measurements), eating habits (meal frequency, snacking, water consumption, cooking methods), and lifestyle (physical activity, sleep, smoking). Nutritional intakes were assessed using food composition tables and compared to the ANCs. Statistics were performed using Statview™ and SPSS software. **Results:** The significance threshold was set at 0.05. The relapsing-remitting form was the most common (81.6%) form, followed by the secondary progressive form (14.7%) and the primary progressive form (3.7%). The average BMI was 25.0 ± 5.2 kg/m², with 44.0% of patients overweight or obese. Energy intake was insufficient (1538.4 ± 714.3 kcal/day). Fiber, calcium, magnesium, vitamins D and E were below recommended intakes. 41.9% of patients frequently skipped meals and snacking was common (89.7%), mostly on sugary foods. Water consumption was low for 71.0% of patients and 59.6% did not practice any physical activity. The average sleep duration was 6.6 ± 1.7 h/d. Sleep quality was considered good in only 37.5% of patients. A percentage of 8.8% of patients consumed tobacco and 33.1% of them lived with a male smoker. **Conclusions:** This study highlights a widespread dietary imbalance, poor lifestyle habits, and a lack of nutritional support among MS patients. An individualized nutritional approach, integrated into multidisciplinary care, is essential to improve quality of life, prevent comorbidities and slow disease progression.

Keywords: Multiple Sclerosis; Nutritional Status; Eating Habits; Nutritional Intake; Lifestyle.

Phytochemistry and Pharmacological Activities of the Ethanolic Extract of *Malva sp.* from Algeria

Lamia Zehani [1,2], Amina Sahli [3], Anfel Bouali [3], Rania Zerimech [2], Nassima Boubekri [1,2], Chawki Bensouici [4], Amel Amrani [1,2], Ramdane Seghiri [2]
[1] *Département de Biologie Animale, Faculté des Sciences de la Nature et de la Vie, Université Frères Mentouri Constantine1, Constantine, Algeria*
[2] *Unité de Recherche Valorisation des Ressources Naturelles, Molécules Bioactives, Analyses Physicochimiques et Biologiques (VARENBIOMOL), Université Frères Mentouri Constantine 1, Algeria*
[3] *Département de Biochimie, Biologie Moléculaire et Cellulaire, Faculté des Sciences de la Nature et de la Vie, Université Frères Mentouri Constantine1, Constantine, Algeria*
[4] *Centre de Recherche en Biotechnologie (CRBt), Constantine, 25100, Algeria*

ABSTRACT
Background: The genus *Malva* (Mallow) belongs to the Malvaceae family and is commonly known as cheeseweed. Malva leaves are used to treat various ailments. Rich in bioactive molecules, its leaves exhibit multiple physiological activities. **Aims:** The current research aimed to verify the phytochemistry and *in vitro* pharmacological activities of the ethanolic extract of *Malva sp*. **Methods:** Antioxidant properties of this

plant were assessed using different methods: 2,2-diphenyl-1-picrylhydrazyl (DPPH), 2,2′-casino-bis (3-ethylbenzothiazoline)-6-sulfonate (ABTS), O-phenanthroline and FRAP assays. Total bioactive contents were determined with a spectrophotometric method. Additionally, *in vitro* and *in vivo* anti-inflammatory and antidiabetic activities. Dermatoprotective effect was estimated by sun protection factor (SPF) assays. **Results:** he ethanolic extract of *Malva sp.* demonstrated high levels of phenolics (509.20 ± 8.59 µg GAE/mg), flavonoids (392.13 ± 9.13 QE/mg), and flavonols (86.13 ± 1.57 QE/mg), confirming its richness in bioactive compounds. It showed strong antioxidant capacity with effective radical scavenging on DPPH and ABTS, notable reducing activity in both phenanthroline and FRAP assays, and superior α-amylase inhibition compared to acarbose. The extract also exhibited dermatoprotective and anti-inflammatory effects, achieving 76.81% inhibition of protein denaturation at 500 µg/mL. In vivo, oral administration at 200 and 400 mg/kg significantly reduced blood glucose levels by 65% and 72% after 6 hours, while acute toxicity tests up to 2000 mg/kg revealed no adverse effects, highlighting its therapeutic potential and safety. **Conclusions:** As a result, the findings of our work justify their application in traditional phytotherapy.

Keywords: *Malva sp.*; Bioactive Contents; Antioxidant; Dermatoprotective; Anti-Diabetic; Anti-Inflammatory.

Relationship Between Dietary Vitamin K Intake and the Stability of the Anticoagulant Effect in Patients on Acenocoumarol

Naziha Zenati [1], Méghit Boumediène Khaled [1], Abdelmalek Bouzid [2]

[1] *Department of Biology, Djillali Liabes University of Sidi Bel Abbes, Laboratoire de Nutrition, Pathologie, Agro-Biotechnologie & Santé, Sidi-Bel-Abbes, Algeria*

[2] *Faculté de Médecine, Université d'Alger 1, Algeria*

ABSTRACT

Background: Acenocoumarol (Sintrom®) is an oral vitamin K antagonistwidely prescribed for the prevention and treatment of thromboembolic disorders. Among the factors influencing treatment response variability is nutritional status, particularly dietary vitamin K intake. This study aimed to evaluate the influence of a controlled vitamin K dietary intake on nutritional balance and anticoagulant stability in patients treated with acenocoumarol and to propose an adapted dietary model. **Patients and Methods:** A six-month observational study (September 2023 – February 2024) was conducted at the Cardiac Surgery Department of the University Hospital (EHU) of Oran, involving 123 patients (age range: 19–60 years). Clinical and nutritional data were collected via a questionnaire, including a clinical examination and a quantitative dietary survey. Corresponding INR values were extracted from medical records. Statistical analysis was performed using GraphPad Prism and Nutrisurvey software. **Results:** The majority of patients presented INR values within the recommended therapeutic range (2–3). Two distinct trends were identified: patients adhering to a consistent; moderate vitamin Kintake demonstratedstable INR values (2–3). In contrast, patients with high or regularconsumption of vitamin K-rich food exhibited lower INR values (< 2), indicating a reduced anticoagulant effect. **Conclusions:** A regular and moderate dietaryintake of vitamin K is associated with greater INR stability and improved control of acenocoumarol's anticoagulant effect. These findings suggest that a complete exclusion of vitamin Kis not necessary. Instead, maintaining a consistent and balanced dietary vitamin K is essential for minimizing fluctuations in therapeutic efficacyand achieving optimal anticoagulation management.

Keywords: Vitamin K; Dietary Intake; Acenocoumarol; INR Stability; Anticoagulation.

A Barley-Based Yoghurt-Like Product

Faiza Adoui , Chahinez Benelouezzane, Ameni Harkati, Dounya Abdi, Rania Belabed

Institut de la Nutrition, de l'alimentation et des technologies Agroalimentaires (INATAA), Frères Mentouri University Constantine, Algeria

ABSTRACT

Background: Currently, barley is attracting increasingly more attention from the agri-food industry, particularly in the development of functional products rich in β-glucans. **Aims:** The aim of the present work is to contribute to the diversification of barley consumption patterns by studying the feasibility of creating new food preparations from this cereal: a barley-based yoghurt-like product. **Methods:** To develop the product, a 10% solution of barley flour in water heated to 80°C is clarified by filtration. A quantity of whole milk powder (4% w/v) is added to this solution. The preparation is inoculated with thermophilic lactic ferments at 0.08% (v/w) and fermented for 6 h (40–45°C). A physicochemical and sensory characterization of the product was carried out. **Results:** Physicochemical analyses indicate that barley flour is a significant source of dietary fiber, with a content of 10.15%, including 4.3% β-glucans. The prepared barley extract is characterized by a significant β-glucans -glucan content (2.9%), a pH of 6.87, and a viscosity of 3.8 mPa·s, with protein and carbohydrate contents of 0.81% and 5%, respectively.The pH and acidity of the yoghurt-like fermented product developed from barley are 4.3 and 86.61, respectively. The pH values are comparable to those of the yoghurt control, but the acidity is lower. Significant differences were noted for the majority of sensory criteria between the barley-based yoghurt-like product and the control, specifically regarding consistency and flavor. **Conclusions:** For better product acceptance, optimization of organoleptic quality through purification of the barley extract and the addition of natural additives to the product should be considered.

Keywords: Barley; *β*-Glucans; Yoghurt-Like Product; Characterization.

Regional Variability in Algerian Honey: Insights into its Functional and Health-Beneficial Attributes

Rania Agabi [1], Hafida Bouncer-Merzouk [1], Nabil Kadri [1,2], Rim Salhi [1], Roukia Bouizar [1], Abel Zenati [1], Nadia Amessis-Ouchemoukh [1]

[1] *Laboratory of Biomathematics, Biophysics, Biochemistry, and Scientometrics, Department of Food Sciences, A. Mira University, Targa Ouzemmour, Bejaia, Algeria*

[2] *Department of Biological Sciences, Faculty of Natural and Life Sciences and Earth Sciences, University of Bouira, Drissi Yahia Street, Bouira, Algeria*

ABSTRACT

Background: Honey is increasingly recognized as a functional food due to its rich bioactive composition and health-promoting properties. These functional attributes, particularly antioxidant capacity, are influenced by factors such as botanical origin, bee species, and geographical conditions. **Aims:** This study investigates the functional quality of two Algerian honey samples from Guelma and Bejaia by assessing their bioactive and nutritional profiles. The goal is to provide insights into their value as functional foods and support their potential use in promoting human health and wellness. **Methods:** The analysis involved assessing key physicochemical indicators, including moisture, pH, electrical conductivity, protein, proline, and hydroxymethylfurfural (HMF). Additionally, total phenolic and flavonoid contents were measured. Antioxidant activities were evaluated using DPPH and ABTS assays to determine the potential contribution of these honeys to health protection. **Results:** The study compares the bioactive and nutritional profiles of the two regional honeys (Guelma and Bejaia) based on the physicochemical indicators and antioxidant assays mentioned above. **Conclusions:** This work provides insights into the value of Algerian honeys as functional foods. The findings support their potential application in promoting human health and wellness based on their rich bioactive composition.

Keywords: Algerian Honey; Functional Foods; Physicochemical Properties; Phenolic Compounds; Antioxidant Activity.

Antioxidant and Nutritional Potential of Algerian Bee Pollen as a Functional Food

Rania Agabi [1], Hafida Bouncer-Merzouk [1], Nabil Kadri [1,2], Rim Salhi [1], Roukia Bouizar [1], Abel Zenati [1], Nadia Amessis-Ouchemoukh [1]

[1] *Laboratory of Biomathematics, Biophysics, Biochemistry, and Scientometrics, Department of Food Sciences, A. Mira University, Targa Ouzemmour, Bejaia, Algeria*

[2] *Department of Biological Sciences, Faculty of Natural and Life Sciences and Earth Sciences, University of Bouira, Drissi Yahia Street, Bouira, Algeria*

ABSTRACT

Background: Bee pollen is widely regarded as a functional food due to its rich nutrient profile and bioactive compounds. **Aims:** This study examines the physicochemical, phytochemical, and nutritional properties of Algerian bee pollen collected from different regions, focusing on its antioxidant potential and relevance to human health. **Methods**: Moisture, pH, and ash content were analyzed to assess quality and stability, while nutritional analysis was conducted to confirm levels of proteins, carbohydrates, and lipids. Total phenolic and flavonoid contents were quantified, and antioxidant activity was measured using IC50 values. **Results**: Nutritional analysis confirmed high levels of proteins, carbohydrates, and lipids. Total phenolic content (TPC) ranged approximately from 17.10 ± 0.30 mg GAE/g to 24.60 ± 0.10 mg GAE/g, and flavonoid content (TFC) from 5.80 ± 0.70 mg QE/g to 12.60 ± 0.95 mg QE/g. These bioactive compounds contribute to notable antioxidant activity, with IC50 values ranging between 0.20 mg/mL and 0.37 mg mL^{-1}. **Conclusions:** The findings support the potential of Algerian bee pollen as a health-promoting ingredient in functional foods, highlighting the value of regional and botanical diversity.

Keywords: Bee Pollen; Functional Foods; Antioxidant Activity; Phenolic Compounds; Nutritional Quality.

The Effect of Gastrointestinal Digestion on the Radical Scavenging and Albumin Protection Properties of Isolated Camel Milk αs-Casein: *in vitro* Investigation

Saliha Si Ahmed-Zenia, Dalila Almi-Sebbane, Abdelkader Ali Belkacem, Manel Ait Ahmed; Smail Oukil

Department of Biological and Agronomic Sciences, University of Mouloud Memmeri (UMMTO), Laboratory of Analytical Biochemistry and Biotechnologies, Tizi Ouzou, Algeria

ABSTRACT

Background: Camel milk is a vital ingredient for food innovation and advanced nutrition, with its αs-caseins holding significant potential as a source of bioactive compounds. **Aims:** This study aimed to isolate these proteins and evaluate the antioxidant activity of peptides released during a simulated gastrointestinal digestion. **Methods:** Using a simplified ion exchange chromatography method, αs-caseins were purified on batch-wise DEAE-Cellulose and then evaluated by Sodium Dodecyl Sulfate-Polyacrylamide Gel Electrophoresis (SDS-PAGE). The isolated αs-caseins was subjected to a two-stage *in vitro* enzymatic digestion model with pepsin (gastric) and pancreatin (intestinal). The degree of hydrolysis was measured for each stage. The radical scavenging capacity and albumin protection of the resulting hydrolysates were subsequently measured using 2,2-diphenyl-1-picrylhydrazyl (DPPH) and heat-induced ovalbumin denaturation assays. **Results:** The intestinal digestion phase with pancreatin achieved the highest degree of hydrolysis (78.39 ± 1.25%), indicating extensive protein breakdown ($p < 0.05$). Critically, these enzymatic hydrolysis byproducts correspondingly showed the highest activities across all assays ($p < 0.05$), demonstrating an increase in DPPH scavenging activity from 18.96% in native αs-caseins to 22.61 ± 0.57% and 29.69 ± 1.99% in gastric and intestinal hydrolysates, respectively. Furthermore, a dramatic increase in ovalbumin protection activity was observed, rising from 14.03 ± 0.45% to 71.45 ± 0.35% and 71.17 ± 0.71%. **Conclusions:** This research confirms that camel milk αs-caseins are a rich precursor to potential antioxidant and anti-inflammatory peptides that are efficiently liberated during the intestinal phase of digestion. This highlights their high bioavailability and provides a robust scientific basis for their incorporation into next-generation functional foods and nutraceuticals, positioning them as high-value ingredients for the modern food industry.

Keywords: Camel Milk; αs-Caseins; Gastrointestinal Digestion; Antioxidant Activity; Bioactive Peptides.

Metabolic Regulatory Effects of *Lepidium sativum* in Hyperglycemia and Dyslipidemia: A Review of Preclinical Rodent Studies

Meriem Arafa , Hithem Bougherara, Said Boukhechem
Gestion de la Santé et Productions Animales Research Laboratory, Institut des Sciences Vétérinaires El-Khroub, Université Frères Mentouri Constantine 1, Constantine 25000, Algeria

ABSTRACT

Background: Metabolic syndrome, characterized by hyperglycemia, insulin resistance, and dyslipidemia, represents a major global health challenge due to its rising prevalence and strong association with cardiovascular diseases. Amid growing interest in complementary therapeutic strategies, garden cress (*Lepidium sativum*) has emerged as a promising medicinal plant. Its seeds, rich in polyphenols, flavonoids, and antioxidant compounds, are increasingly studied for their potential metabolic benefits. **Aims:** This review aims to evaluate the current preclinical evidence regarding the role of *Lepidium sativum* in managing hyperglycemia and dyslipidemia, focusing on its potential metabolic and lipid-modulating effects. **Methods:** The review was developed through a systematic search of PubMed, Web of Science, and Google Scholar, covering studies published from 2010 to the present. Search terms included "*Lepidium sativum*", "metabolic syndrome", "hyperglycemia", "dyslipidemia", and "polyphenols". Approximately ten relevant preclinical studies—primarily using rodent models—were selected based on their investigation of metabolic and lipid-modulating effects. **Results:** Supplementation with *L. sativum* seeds consistently resulted in significant improvements in glucose homeostasis. Reported effects include reduced fasting blood glucose, improved glucose tolerance, and enhanced insulin sensitivity. These outcomes are linked to the plant's antioxidant capacity, modulation of oxidative stress, stimulation of peripheral glucose uptake, and regulation of hepatic glucose production. Regarding lipid metabolism, animal studies highlight consistent reductions in total cholesterol, triglycerides, and LDL, alongside increases in HDL levels. These improvements suggest a protective effect against dyslipidemia and atherogenic progression, likely due to polyphenols limiting lipid peroxidation and modulating metabolic enzymes. **Conclusions:** Current preclinical evidence supports the promising role of *Lepidium sativum* in managing hyperglycemia and dyslipidemia. However, further research is required to determine optimal dosing, isolate active compounds, clarify mechanisms of action, and validate these effects in human clinical trials. Continued experimental work will be essential to advance its therapeutic development.

Keywords: *Lepidium sativum*; Metabolic Syndrome; Hyperglycemia; Dyslipidemia; Preclinical Research.

Effect of natural sourdough fermentation on bread's nutritional profile

Nesrine Azizi, Nesrine Madani, Ourida Aissaoui
Research Laboratory in Food Technology and Humain Nutrition, Department of food technology, National Higher School of Agronomy, Algiers, Algeria

ABSTRACT

Background: Natural sourdough, a veritable microbial ecosystem of cereals, can generate bioactive compounds that are beneficial to human health, thereby improving the nutritional quality and digestibility of bread. **Aims:** The purpose of this study is to compare the nutritional quality of bread made with natural sourdough to that of bread fermented with baker's yeast. **Methods:** The sourdough was prepared using water and T80 flour, refreshed daily for a week until it reached maturity. The mature sourdough was then incorporated into the bread-making process at a rate of 30%. A control bread was also made from the same flour, using baker's yeast at a rate of 2%. The analyses of total protein, lipids, and sugars were performed using the Kjeldahl, Soxhlet, and Dubois methods, respectively. **Results:** The corresponding levels in the sourdough bread (6.13, 1.45, and 0.63%, respectively) were slightly lower than those in the control bread (6.46, 2.73, and 1.03%, respectively). This decrease can be explained by various biochemical mechanisms linked to the microbial activity of sourdough, particularly that of lactic acid bacteria. These bacteria produce enzymes such as lipases and proteases, which are responsible for the partial hydrolysis of proteins, thereby improving their digestibility. **Conclusions:** In natural sourdough, naturally occurring sugars are consumed as energy substrates during fermentation, leading to the formation of short-chain fatty acids and postbiotic compounds, which are known for their beneficial effects on intestinal health. This process enhances the overall functional value and digestibility of the final product compared to bread made with baker's yeast.

Keywords: Sourdough; Bread; Lactic Acid Bacteria; Enzyme; Nutritional Quality.

Exploring the Antioxidant Capacity of *Centaurea sp.* Ethanolic Extract: A Multi-Method *in vitro* Investigation

Chourouk Babouche [1], Fatima Zohra Sebihi [1], Samira Bouhalit [1], Amel Moussaoui [2], Rayen Bouaita [1], Amina Hamzaoui [1], Nesrine Marhoune [3]
[1] *Departement of Molecular and Cellular Biology, Laboratory of Biotechnology, water, Environement and Health, University of Abbes Lagherour Khenchela, Algeria*
[2] *Université Echahid Echikh Larbi de Tébessi, Faculté des Sciences de la Nature et de la Vie, Tebessa, Algeria*
[3] *Departement of biochemistry and Molecular and cellular Biology, Faculty of Natural and Life Sciences, Mentouri brother's University 1. Biology and Environment Laboratory, Algeria*

ABSTRACT

Background: Oxidative stress plays a major role in the development of several chronic diseases, encouraging the search for natural antioxidant sources such as medicinal plant extracts. **Aims:** This study aimed to investigate the *in vitro* antioxidant capacity of an ethanolic extract of *Centaurea* sp., obtained by maceration. **Methods**: Antioxidant activity was evaluated using five different assays: DPPH, ABTS, CUPRAC, GOR, and the o-Phenanthroline assay. Results were expressed as IC_{50} values (µg/mL) and reported as mean±SD. The reproducibility was assessed using the coefficient of variation. **Results:** The extract demonstrated notable antioxidant potential in most tests, with 121.29 ± 18.21 µg mL^{-1} (DPPH), 641.17 ± 10.58 µg mL^{-1} (ABTS), 78.08 ± 4.54 µg mL^{-1} (CUPRAC), and 211.83 ± 82.57 µg mL^{-1} (Phenanthroline). No significant antioxidant activity was detected with the GOR assay. The coefficient of variation ranged from low to moderate, indicating acceptable reproducibility. **Conclusions:** These results highlight the antioxidant capacity of the ethanolic extract of *Centaurea* sp., particularly its strong activity in the CUPRAC and

DPPH assays. This suggests its potential use as a natural antioxidant source in functional food or nutraceutical applications. Further phytochemical investigation is recommended to identify the active compounds responsible for these effects.

Keywords: *Centaurea sp.;* Antioxidant Activity; Ethanolic Extract.

Analysis of the Fiber Composition of Three Agro-Industrial By-Products (Tomato Peels, Orange Peels, and Olive Pomace) for their Potential Use in Food Packaging

Malika Barkat [1], Rim Tinhinan[1], Maougal Fatima Zohra[2] Makhlouf Louiza Himed [3]

[1] *SAFIVIA Laboratory, Department of Biotechnology, INATAA, C1FM University, Constantine, Algeria*

[2] *SAFIVIA Laboratory, ENSB, Salah Boubnider C3 University*

[3] *BIOQUAL Laboratory, Department of Food Technology, INATAA, C1FM University, Constantine, Algeria*

ABSTRACT

Background and Aims: This study examined the fiber composition of three agri-food by-products (tomato peel, orange peel, and olive pomace) in view of their potential use in bio-based food packaging. The functional properties of such materials depend largely on the relative proportions of cellulose, hemicellulose, and lignin, which govern mechanical strength, rigidity, flexibility, film-forming capacity, and biodegradability. The objective was to characterize the fiber fractions of these by-products to evaluate their suitability for different bio-based material applications. **Methods:** Prior to analysis, samples were dried at 60 °C, ground to 1 mm, and stored in airtight containers. Crude fiber contents were determined using the Weende method, involving sequential acid (H_2SO_4, 1.25%) and alkali (NaOH, 1.25%) digestion, followed by filtration, drying at 105 °C, and ashing at 550 °C, in accordance with AOAC Method 978.10. NDF (Neutral Detergent Fiber) and ADF (Acid Detergent Fiber) fractions were quantified following the detergent-fiber procedures. **Results:** The results reveal marked differences among the three by-products: Tomato peel contained moderate fiber levels (13.32% crude fiber; 34.16% NDF; 25.07% ADF), indicative of a cell wall enriched in cellulose and pectin. Olive pomace exhibited the highest lignocellulosic content (24.12% crude fiber; 51.71% NDF; 42.13% ADF), confirming its rigid and highly lignified structure and orange peel showed comparatively low fiber values (11.08% crude fiber; 21.42% NDF; 16.12% ADF). **Conclusions:** Overall, the moderate cellulose content and higher soluble fiber proportions of tomato and orange peels make them suitable candidates for film- and bioplastic-forming applications, whereas the high lignin and cellulose content of olive pomace favors its use in rigid bio-composite materials.

Keywords: By-Products; Crude Fiber; Cellulose; Hemicellulose; Lignin.

Probiotic Therapy for Parkinson's Disease

Anis Bektache , Wissal Lassed, Ratil Rekik

ENSB Constantine, Algeria

ABSTRACT

Background: Parkinson's disease remains a significant challenge, requiring more effective ways to manage symptoms and slow progression. Traditional treatments often face issues with fluctuating drug levels. This project proposes a gut-based therapeutic approach by utilizing a genetically engineered probiotic to provide a continuous, natural supply of dopamine precursors directly within the human intestine. **Aims:** The primary objective of this project is to develop a synbiotic system (a combination of a probiotic and a prebiotic) using an engineered spore-forming microorganism, *Bacillus licheniformis*, to produce L-DOPA—the direct precursor of dopamine—inside the gastrointestinal tract. **Methods:** The bacterium *Bacillus licheniformis* was selected due to its established safety profile and resilience as a commercial probiotic. To enable L-DOPA production, the strain was modified by introducing an inducible plasmid, pMA5-hpaBC, which carries the genes necessary to convert tyrosine into L-DOPA. Gene expression is controlled by the rhaPBAD promoter, which is activated by L-rhamnose, allowing for precise control over production levels. The system is supported by a specific prebiotic medium containing lactose, sucrose, essential minerals, and tetracycline to maintain plasmid selection. **Results:** Based on a review of experimental data, optimized fermentation conditions were identified as 37°C, pH [6.3–6.5], and 180 rpm with a 3% inoculum. After approximately 120 hours of incubation, the strain produced measurable quantities of L-DOPA, as confirmed by HPLC analysis. While experiments reached high tyrosine levels (up to 1500 mg L^{-1}), the data suggests that further optimization is required to maximize yield. Following fermentation, the biomass is harvested, stabilized, and formulated with the prebiotic to enhance intestinal colonization. **Conclusions:** This strategy offers a promising, innovative path toward a gut-based treatment for Parkinson's disease. Future work will focus on refining the administration method—specifically, whether to provide a single combined capsule or to colonize the intestine first before introducing the prebiotic treatment.

Keywords: Parkinson's Disease; L-DOPA Biosynthesis; Engineered Probiotics; Synbiotic System; Gut-Brain Axis.

Effect of the Addition of Local Dates on the Properties of a Fermented Yogurt

Rym Nouria Benamara [1,2], Ouardia Ouldali [1,3], Khaled Smail [4], Fatima Meriah [1,5], Kada Ibri [1], Amina Medjahedine [1], Saadia Medjahedine [1], Yousra Chekkai [4], Chaimaa Chennoufi [4]

[1] *Department of Biology, Faculty of Natural and Life Sciences, Mustapha Stambouli University, Mascara, Algeria*

[2] *Laboratory of Microbiology Applied to Agrifood and Environmental (LAMAABE), Faculty of SNV/STU, University of Tlemcen, Algeria*

[3] *Laboratory of Geomatics, Ecology and Environment, Mustapha Stambouli University, Mascara, Algeria*

[4] *Department of Computer Science, Faculty of Exact Sciences, Mustapha Stambouli University, Mascara, Algeria*

[5] *Research Laboratory on Biological Systems and Geomatics, Faculty of Nature and Life Sciences, University of Mascara, Algeria*

ABSTRACT

Background: In a context of growing demand for healthy and naturally sourced dairy products, this study focused on the development of a fermented yogurt enriched with three local varieties of Algerian dates: Degla Baïda, Hmira, and Tinacer (Gurbai). **Aims:** The aim of this study was to evaluate the impact of adding dates at different concentrations on the physicochemical, microbiological, and sensory characteristics of set yogurt, in comparison to a control sample without

dates. **Methods:** The experimental protocol involved the preparation of a set yogurt control and several enriched variants incorporating three Algerian date varieties (Degla Baïda, Hmira, and Tinacer) at various concentrations. The impact of these additions was evaluated through a multi-faceted analytical approach. Physicochemical analysis focused on determining pH, titratable acidity, dry matter, ash content, and the concentration of sugars, proteins, and lipids. Microbiological safety and quality were assessed by monitoring total mesophilic aerobic flora, total coliforms, *Escherichia coli*, *Salmonella spp.*, *Staphylococcus aureus*, and the presence of yeasts and molds. Finally, a sensory evaluation was conducted to measure consumer perception regarding taste, texture, flavor, odor, and smoothness. **Results:** The results showed that date enrichment improved the overall nutritional value and technological properties of the yogurt. The addition of dates promoted the growth of lactic acid bacteria, contributing to more efficient fermentation. Furthermore, the enriched yogurts exhibited a firmer texture and higher sensory acceptability, largely due to the natural sweetness and fruity aromas characteristic of the specific date varieties used. **Conclusions:** This study highlights the importance of leveraging local and underutilized resources in the formulation of innovative products while meeting nutritional, sensory, and sustainability requirements. These findings pave the way for a new generation of yogurts tailored to the preferences of Algerian consumers and the evolving expectations of the modern agri-food market.

Keywords: Yogurt; Algerian Dates; Degla Baïda; Hmira; Tinacer.

Isolation and Maldi-Tof Characterization of Lactic Acid Bacteria from Algerian Fermented Foods: Towards Functional Probiotics

Keltoum Bendida [1], Mohamed Merzoug [1], Hadjer Soumia Bouderbala [1], Chaimaà Naila Brakna [1], Marwa Aireche [1], Yasmine Saidi [1], Zohra Yasmine Zater [1], Soheir Bouzidi [1], Ilhem Hammadi Amaria [1], Charaf Eddine[2] Boukerzaza, Djamel Saidi [1]

[1] *Genomics Technology Platform, Higher School of Biological Sciences of Oran, Algeria*

[2] *University of Constantine 1, Mentouri Brothers, Constantine, Algeria*

ABSTRACT

Background: Traditional Algerian foods represent a rich and diverse microbial reservoir, still largely unexplored, with strong potential as functional foods. In this study, several natural and fermented matrices were systematically investigated to isolate lactic acid bacteria with biotechnological and probiotic properties. **Aims:** This approach provides a local bioinformatic framework for the rational selection of strains with high probiotic potential. This initial proteomic screening provides a strategic biological resource for research focused on the intestinal microbiota and human health, enabling the prioritization of isolates for subsequent genomic analyses and evaluation of their capacity to beneficially modulate the gut microbiota. **Methods:** Isolation was performed from a variety of sources, followed by morphological characterization using microscopy and identification by MALDI-TOF mass spectrometry, revealing a diversity of genera and strains recognized for their functional and potential probiotic properties. **Results:** The generated protein spectra were used as biological fingerprints, allowing, through multivariate analyses (clustering, discriminant peak identification), the comparison of proteomic diversity among isolates and the identification of clusters associated with their food origin. **Conclusions:** These results highlight the potential of traditional Algerian foods as a source of probiotics and functional foods aimed at promoting intestinal health.

Keywords: Lactic Acid Bacteria; Traditional Algerian Foods; Probiotic Potential; MALDI-TOF MS; Proteomics.

Antioxidant Characteristics of the Seed Oil from Two Pumpkin Species: *Cucurbita pepo* and *Cucurbita maxima*

Radhia Benlacheheb [1], Wafa Bourenane[1], Amel Guerdouh[1], Makhlouf Chaalal [2]

[1] *Laboratoire Bioqual, Institut de Nutrition d'Alimentation et des Technologies Agro-Alimentaires (INATAA), Université Frères Mentouri Constantine 1, Algeria*

[2] *Laboratory of Food Sciences, Formulation, Innovation, Valorization, and Artificial Intelligence (SAFIVIA), INATAA, University Constantine 1 Frères Mentouri. Algeria*

ABSTRACT

Background: Pumpkin seeds are produced in large quantities and are considered co-products that can be valorized due to their high oil content. This oil is mainly used for therapeutic purposes. Its richness in bioactive compounds gives it several properties that make it beneficial for prostate health. **Aims:** The aim of our study was to determine the content of bioactive compounds in the seed oil of two *Cucurbita* species cultivated in Algeria (*Cucurbita pepo* and *Cucurbita maxima*). **Methods:** The study focused on the seed oils of *Cucurbita pepo* and *Cucurbita maxima* cultivated in Algeria. Antioxidant activity was measured using spectrophotometric analysis of the oils against DPPH• and ABTS•+radicals. The correlation between total polyphenol content and antioxidant activity was also analyzed. **Results:** As a result, the oil analysis revealed that the phenolic compound contents were 67.36 ± 4.44 mg GAE/100 g and 71.80 ± 5.17 mg GAE/100 g for *Cucurbita pepo* and *Cucurbita maxima*, respectively. The oil extracted from *Cucurbita maxima* showed a significantly higher flavonoid content (25.58 ± 0.64 mg QE/100 g) compared to the oil extracted from *Cucurbita pepo* (22.76 ± 0.58 mg EQ/100g). The carotenoid content ranged from 1.52 ± 0.009 mg/100g in the oil extracted from *Cucurbita pepo* to 1.71 ± 0.01 mg/100g in *Cucurbita maxima*. The antioxidant activity of the oils against the DPPH• radical showed an inhibition of 24.85% for *Cucurbita pepo* and 25.17% for *Cucurbita maxima*. Meanwhile, the methanolic extract of *Cucurbita maxima* seed oil exhibited the highest inhibition percentage (94.49%) against the ABTS•+ radical compared to *Cucurbita pepo*. A positive correlation was recorded between the total polyphenol content of the oils and their antioxidant activity. **Conclusions:** Overall, this study indicates that the seed oil of the examined *Cucurbita* species possesses significant nutritional and bioactive potential that deserves to be further explored.

Keywords: Pumpkin Seed Oil; Antioxidant Activity; *Cucurbita pepo*; *Cucurbita maxima*; Phenolic Compounds.

Antioxidant Properties of Gluten-Free Pasta Enriched with By-Products of Tomatoes and Linseed Cakes

Amel Betrouche [1], Souad Boulemkahel [2], Leila Benatallah [2], Alyssa Hidalgo [3]

[1] *Food Engineering Laboratory, Institute of Nutrition, Food and Agri-Food Technologies (GéniAAl-INATAA), University Frères Mentouri Constantine 1(UFMC1), Algeria*

[2] *Food Engineering Laboratory, Institute of Nutrition, Food and Agri-Food Technologies (GéniAAl-INATAA), University Frères Mentouri Constantine 1(UFMC1), Algeria*

[3] *Department of Food, Environmental and Nutritional Sciences (DeFENS), University of Milan, Italy*

ABSTRACT

Background: The development of nutritious gluten-free products remains a challenge in food science. This study explores the use of agricultural side-streams to enhance the nutritional profile of gluten-free pasta based on rice and fava beans. **Aims:** The objective of this research was to valorize tomato by-products and linseed (flaxseed) cakes at 10% and 15% inclusion levels in the formulation of gluten-free pasta. Additionally, the study aimed to evaluate the impact of these vegetable by-products on the antioxidant properties of the final product. **Methods:** Gluten-free pasta was manufactured using a base of rice and fava bean flour. Experimental batches were enriched with 10% and 15% tomato by-products and linseed meal. The nutritional traits analyzed included tocols, carotenoids, and phenolic compounds (quantified via HPLC), as well as total antioxidant activity. **Results:** The addition of tomato by-products and linseed meal significantly improved tocol concentrations; however, no significant effect on carotenoid content was observed. While the increase in free soluble polyphenols was proportional to the enrichment percentage for both by-products, bound insoluble polyphenols were notably higher in the linseed-enriched pasta. Furthermore, antioxidant activity was significantly higher in samples containing linseed cakes ($p < 0.05$). **Conclusions:** The incorporation of tomato and linseed by-products significantly increases the concentration of bioactive compounds—particularly polyphenols—and enhances antioxidant activity. These findings suggest that such by-products are effective functional ingredients for improving the health benefits of gluten-free pasta.

Keywords: Pasta; Tomato By-Products; Linseed Meal.

Sweet Potato Flour: A Nutritional, Gluten-Free Ingredient for Health Promotion and Food Security

Wassim Boufadene, Asma Boudria-Larachi, Nawel Adjeroud-Abdellatif

Département des Sciences Alimentaires, Faculté des Sciences Naturelles et de la Vie, Laboratoire de Biomathématiques, Biophysique, Biochimie et Scientométrie (L3BS), Université A. Mira de Béjaïa, Béjaïa, Algeria

ABSTRACT

Background: In a global context where food security and public health are priorities, the search for healthy, nutritious, and gluten-free food sources is essential. The sweet potato (*Ipomoea batatas* L.), an economical, widely available, and resilient crop, represents a sustainable and health-beneficial alternative for modern food systems. **Aims:** The objective of this study was to develop sweet potato flour and evaluate its nutritional, physicochemical, functional, and antioxidant properties. The research aims to explore the potential of this flour in the formulation of safe and functional food products. **Methods:** Analyses were conducted in accordance with standardized analytical protocols. Protein content was quantified using the Bradford method, while lipid content was determined via Soxhlet extraction. Moisture, carbohydrate levels, crude fiber, and functional properties were evaluated using standard methods. Total phenolic compound content was also measured to assess antioxidant potential. **Results:** The sweet potato flour showed a moisture content of 6.06 ± 0.63%, fat content of 0.44 ± 0.12%, moderate protein levels (5.29 ± 0.12%), and a high proportion of carbohydrates (82.99%). The crude fiber content was 3.36 ± 0.50%. Functional analysis revealed a water absorption capacity of 400.05 ± 0.8%, oil absorption of 90.67 ± 0.90%, and a swelling index of 7.36 (g/g). Furthermore, the flour exhibited a gelatinization temperature (Tp = 79.32°C) and a total phenolic content of (10.35 mg GAE/g). **Conclusions:** These results confirm that naturally gluten-free sweet potato flour is a promising ingredient for the development of healthy, nutritious, and sustainable food products. Its use could contribute significantly to the prevention of malnutrition and metabolic disorders.

Keywords: Sweet Potato Flour; Gluten-Free; Nutrition; Functional Properties; Antioxidant.

Cassava and Sweet Potato Peels: A Source of Antioxidants for Functional Foods

Wassim Boufadene, Asma Boudria-Larachi, Nawel Adjeroud-Abdellatif

Département des Sciences Alimentaires, Faculté des Sciences Naturelles et de la Vie, Laboratoire de Biomathématiques, Biophysique, Biochimie et Scientométrie (L3BS), Université A. Mira de Béjaïa, Béjaïa, Algeria

ABSTRACT

Background: The present study contributes to the valorization of peels from traditional local foods commonly consumed worldwide. Utilizing these side-streams represents a promising avenue for sustainable agriculture, waste reduction, and economic development, offering potential for integration into various food applications. **Aims:** The objective of this work was to evaluate the phytochemical composition and antioxidant activity of total phenolic extracts from the bark (peels) of two species: cassava and sweet potato. These starchy roots are significant dietary staples belonging to the tuber family. **Methods:** Extracts were obtained via cold maceration for 12 hours using an 80% methanol/water solvent. The content of phenolic compounds, flavonoids, and tannins was quantified using the Folin-Ciocalteu reagent, aluminum trichloride, and vanillin tests, respectively. Antioxidant efficacy was assessed using the 2,2'-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging method and the ABTS activity assay. Statistical significance was determined using ANOVA (one-way) and t-tests ($p < 0.05$). **Results:** Analysis of phenolic compounds revealed that *Ipomoea batatas* L. contained significantly high levels at 14.978 ± 0.034 mg GAE/g DW, compared to 12.065 ± 0.070 mg GAE/g DW for *Manihot esculenta*. Significant differences were also observed between the peels of the two plants regarding their flavonoid and tannin ratios ($p < 0.05$). In vitro evaluations of antioxidant power via DPPH and ABTS assays confirmed a significant difference in the antioxidant activity of the total extracts from the two species ($p < 0.05$). **Conclusions:** The results demonstrate the promising antioxidant properties of cassava and sweet potato peels.

These findings suggest that these by-products can be successfully repurposed in the fabrication of functional bioactive ingredients for diverse industrial purposes.

Keywords: Starchy Roots; Phenolic Compounds; Antioxidants; Functional Bioactive.

Development and Characterization of Traditional Durum Wheat *Waha* Couscous Enriched with Carob (*Ceratonia Siliqua* L.)

Nada Bougriou [1,2], Leila Benatallah [2], Aya Hamiou [1], Lyna Malak Kitouni [3], Nabila Brahmi-Chendouh [1]

[1] *Laboratory of Biomathematics, Biochemistry, Biophysics and Scientometrics L3BS, Department of Food Science, Faculty of Natural and Life Sciences, Abderrahmane Mira University of Bejaia, Bejaia, Algeria*

[2] *Laboratory of Food Engineering (GENIAAL), Department of Food Technology, Institute of Nutrition, Food and Agri-Food Technologies (INATAA), University of Mentouri Constantine 1, Constantine, Algeria.*

[3] *Institute of Nutrition, Food and Agri-Food Technologies (INATAA), University of Mentouri Constantine 1, Constantine, Algeria*

ABSTRACT

Background: Today, consumers are increasingly health-conscious and are seeking food alternatives that are both healthy and tasty. In Algerian culinary traditions, couscous is a staple, particularly the sweet variety known as Mesfouf, which is popular during Ramadan. Traditionally prepared with white sugar and raisins, this study proposes an innovative, revisited version where refined sugar is replaced by a natural, nutrient-dense alternative. **Aims:** This research aimed to valorize carob fruit, local resource rich in fiber, antioxidants, and minerals, by incorporating its powder into couscous made from Waha durum wheat semolina, evaluating the effects on both technological and nutraceutical quality. **Methods:** The evaluation involved a comparative analysis between carob-enriched couscous and an artisanal control. Physicochemical parameters (water and ash content, water and oil absorption capacity) and technological parameters (rolling efficiency, density, flow properties, and degree of disintegration) were measured. Additionally, phytochemical analyses were conducted to determine total polyphenol, flavonoid, and tannin contents, as well as antioxidant activity via DPPH and ABTS assays. Grain structure was also evaluated using imaging techniques. **Results:** The carob-enriched couscous showed a water content compliant with international standards (8.32 ± 0.01). A significant increase in water absorption capacity was observed compared to the control (3.37 ± 0.92 vs 2.33 ± 0.87). While the optimal cooking time was slightly higher than the control (3.24 ± 0.20 vs 2.77 ± 0.33 min), the degree of disintegration (4.22 ± 0.14) remained within standard limits. Notably, the antioxidant activity was approximately three times higher than that of the non-enriched sample. Imaging confirmed well-defined agglomeration and a regular grain structure. **Conclusions:** This study demonstrates that carob pulp powder is an effective natural and functional ingredient for couscous enrichment. The resulting product is innovative and nutrient-rich while maintaining the traditional characteristics and sensory qualities appreciated by consumers.

Keywords: Couscous; Enrichment; Carob Powder; *Ceratonia siliqua* L.; Antioxidant Activity.

Improving Yogurt's Nutritional and Sensory Profile with Some Plant Extracts

Ghania Bourzama [1], Saliha Djabali [2], Lilia Boussouf [3,4], Sarah Benouagueni [1,5], Khaoula Boudjaber [6]

[1] *Laboratory of Microbiology and Molecular biology, Badji Mokhtar Annaba-University, Annaba, Algeria*

[2] *Laboratory of Biotechnology and Food Quality (BIOQUAL), Institute of Nutrition, Food and Agro-Food Technologies (INATAA) University Brothers Mentouri Constantine 1, Algeria*

[3] *Mohammed Seddik Ben yahia University, Faculty of Nature and Life Sciences, Department of Applied Microbiology and Food Sciences, Jijel, Algeria*

[4] *University of Abderrahman Mira, Faculty of Nature and Life Sciences, Laboratory of Biomathematics, Biophysics, Biochemistry and Scientometry, Bejaia, Algeria*

[5] *Laboratory of Biochemistry and Applied Microbiology, Badji Mokhtar Annaba-University, Annaba. Algeria*

[6] *Laboratory of Biochemistry and Environmental Toxicology, Badji Mokhtar-Annaba University, Annaba, Algeria*

ABSTRACT

Background: Fruits and medicinal plants are increasingly utilized to enhance dairy products, attracting significant attention due to their diverse health benefits and functional properties. **Aims:** The present study aims to develop a functional yogurt by incorporating aqueous extracts of *Laurus nobilis* (bay leaves). The primary goal was to improve the physicochemical and functional qualities of the yogurt through the addition of these natural extracts. **Methods:** Aqueous extracts of *Laurus nobilis* were added to yogurt formulations at concentrations of 8%, 10%, and 12%. The samples were evaluated during refrigerated storage for various parameters, including bacterial growth (Lactic Acid Bacteria counts), pH, and titratable acidity (measured in degrees Dornic, °D). Functional quality was assessed via DPPH and FIC antioxidant assays, and sensory properties were determined using hedonic scoring. **Results:** The results showed that the inclusion of Laurus nobilis extract improved yogurt stability. At a 10% concentration, the yogurt exhibited a stable pH of 4.42. Titratable acidity was highest with 8% (100°D) after 14 days, but more stable at 10% (98°D). Lactic acid bacteria count remained high and stable with both 8% and 10% concentrations. The DPPH antioxidant test showed the highest activity at 12% (68.70%) compared to plain yogurt (18%) after 14 days, although the 10% concentration demonstrated more stable antioxidant levels during storage. A similar trend was observed in the FIC antioxidant assay. Sensory analysis revealed that yogurt with 10% *Laurus nobilis* extract received the highest score (9), compared to 12% (7.5) and the plain yogurt (6). **Conclusions:** These findings suggest that a 10% bay leaf extract can be a promising natural additive for the development of value-added, health-promoting dairy products.

Keywords: Antioxidant Activity; Functional Yogurt; *Laurus nobilis*; Sensory Evaluation; Storage.

Optimizing Polyphenol Bioaccessibility: Impact of Freeze-Drying on Chlorogenic Acid Stability in Vitelotte Potatoes

Nabila Brahmi-Chendouh [1], Roukia Bouizar [1], Nada Bougriou [1], Chadia Benmerad [1], Naoual Kheyar [2]

[1] *Laboratory of Biomathematics, Biochemistry, Biophysics and Scientometry, Faculty of Nature and Life Sciences, University of Bejaia, Bejaia, Algeria*

[2] *Laboratory of Plant Biotechnology and Ethnobotany, Faculty of Nature and Life Sciences, University of Bejaia, Bejaia, Algeria*

ABSTRACT

Background: Chlorogenic acids (CGAs) are widely recognized for their antioxidant and metabolic-modulating properties; however, their stability during digestion largely depends on the food matrix and processing conditions. **Aims:** In this study, a freeze-dried matrix of *Solanum tuberosum* L. cv. Vitelotte was utilized to assess the impact of lyophilization on CGA retention and controlled release. **Methods:** A standardized *in vitro* digestion model was combined with multi-analytical techniques (HPLC-UV-DAD, UHPLC-HRMS, UV-Vis spectroscopy) to evaluate the fate of CGAs during gastrointestinal transit. **Results:** The results demonstrate that lyophilization significantly enhances CGA stability by minimizing oxidative degradation and modulating their bioaccessibility through interactions with potato starch. Compared to fresh matrices, freeze-drying preserved the structural integrity of three major caffeoylquinic acid isomers, which remained chemically stable up to the intestinal phase. The protective effect of starch–polyphenol interactions likely contributed to a more controlled bioaccessibility, preventing abrupt losses in phenolic content. Unlike CGAs, anthocyanins exhibited lower bioaccessibility, confirming their pH-dependent instability. **Conclusions:** These findings underscore the importance of sample preparation methods in polyphenol bioaccessibility studies and highlight the potential of lyophilization as a strategy to optimize the nutritional value of CGA-rich functional foods.

Keywords: Chlorogenic Acids; UHPLC-HRMS; Metabolic-Modulating; Polyphenols.

Algerian Whole Wheat Sourdough: Technological Potential and Microbial Richness as an Alternative to Commercial Yeasts

Amel Chaibai, Amel Kouidri, Djamila Deffairi

University of Saad Dahleb Blida 1, Laboratory of Food Science, Technology, and Sustainable Development, Faculty of Natural and Life Sciences, Department of Food Science, Blida, Algeria.

ABSTRACT

Background: Natural sourdough fermentation holds a central place in Algerian food traditions, where it has been used for generations in the preparation of artisanal breads made from local flours, particularly whole wheat. This traditional knowledge is based on empirical practices passed down through families, characterized by the use of unrefined whole flours and specific refreshing methods adapted to the local context. **Aims:** This study aims to develop a natural sourdough from Algerian whole wheat flour. **Methods:** The physicochemical analyses performed on the whole wheat allowed the evaluation of environmental conditions and their influence on microbial development. The sourdough was developed by spontaneous fermentation of a flour/water mixture and then subjected to microbiological analyses. **Results:** The results showed values in accordance with food quality standards: moisture (9.21%), total ash (2.49%), titratable acidity (0.033%), proteins (13.75%), and total fibers (2.03%). These parameters indicate good stability of the sourdough and confirm its ability to ensure effective fermentation. The results revealed a diversity of microorganisms, including genera such as *Lactobacillus* and *Leuconostoc* among lactic acid bacteria, and *Pichia* among yeasts. This microbial flora illustrates the complexity of microbial interactions and their role in the production of organic acids and aromatic compounds. **Conclusions:** The results show that this natural sourdough possesses significant microbial richness and a high technological value, making it a sustainable and efficient alternative to commercial yeasts for bread making.

Keywords: Natural sourdough; Lactic acid bacteria; Yeasts; Whole wheat; Spontaneous fermentation.

Ensuring Excellence in Olive Oil: Physicochemical and Microbiological Profiling Based on International Standards

Wafaa Dib [1,2], Hadria Grar [2,3], Mohamed Elagag [1], Mohamed Elbachir Ghailes [1], Hanane Gourine [2], Djamel Saidi [2,4], Omar Kheroua [2], Samia Addou [2]

[1] *University of Science and Technology of Oran Mohamed BOUDIAF, Faculty of Natural and Life Sciences, Department of Biotechnology, Oran, Algeria*

[2] *Laboratory of Physiology of Nutrition and Food Safety, University of Oran 1 Ahmed Ben Bella, Faculty of Science of Nature and Life, Department of Biology, Oran, Algeria*

[3] *University of Mostaganem, Faculty of Science of Nature and Life, Department of Biology, Mostaganem, Algeria*

4 Ecole Supérieure en Sciences Biologiques d'Oran, ex-IAP, BP 1042 Saim Mohamed, Oran, Algeria

ABSTRACT

Background: Olive oil, an emblematic product of the Mediterranean region, is widely recognized for its nutritional qualities and health-promoting properties. This study addresses the issue of olive oil quality control through the analysis of physicochemical, microbiological, and organoleptic parameters to ensure a safe, stable product that complies with international standards. **Aims:** An initial survey was conducted to identify the most commonly consumed brands in the Sig (Mascara) region, from which three samples were selected. **Methods:** Physicochemical analyses (moisture and volatile matter content, density, refractive index, free acidity, maximum acid index, peroxide value) and microbiological analyses (coliforms, *E. coli*, yeasts, *Salmonella*, *Staphylococcus aureus*) were subsequently performed. The second, more application-oriented part of the study presents the results obtained from these samples, highlighting the impact of modern extraction and storage techniques (centrifugation and controlled-atmosphere storage) on the final quality of the oil. **Results:** The results show that all three samples were free of pathogenic bacterial contamination. Moreover, the measured physicochemical parameters made it possible to classify the oils according to the standards of the International Olive Council and the Codex Alimentarius, revealing characteristics consistent with virgin to extra-virgin olive oils. These findings reinforce the importance of rigorous microbiological monitoring to prevent potential contamination and to preserve the organoleptic qualities of the product. **Conclusions:** Finally, adherence to international standards emerges as essential for ensuring the safety, conformity, and competitiveness of olive oil in global markets.

Keywords: Olive Oil Quality; *Codex Alimentarius*; IOC Standards; Microbiological Safety; Physicochemical Analyses.

Assessment of Antimicrobial, Antioxidant Properties, and Acute Toxicity of Essential Oil Extracted from *Salvia chudaei*: An Endemic Species of the Central Sahara

Sabrina Dif [1], Mustapha Khali [2]
[1] *YAHIA Fares University of Medea, Faculty of sciences, Department of Natural Sciences and Life, Laboratory of Biotechnology and Valorization of Biological Resources, 26000 Medea Province, Algeria*
[2] *Blida University, Faculty of Nature and Life Sciences, Department of Biology, Laboratory of Protection and Valorisation of Agro-biological Resources, 1 BP 270 Blida 09000, Algeria*

ABSTRACT
Background: Plant extracts rich in natural antioxidants are increasingly investigated as safer substitutes for synthetic antioxidants, whose potential adverse health effects have become a growing concern. These bioactive compounds efficiently counteract oxidative processes and support the development of cleaner and health-oriented food products. Within this context, the present work focuses on the valorization of Algerian Saharan flora, particularly the endemic species *Salvia chudaei* Batt. & Trab. **Aims:** This study aims to assess the biological properties of *Salvia chudaei* essential oil, notably its antioxidant and antimicrobial activities, as well as its acute toxicity profile. **Methods:** The aerial parts of the plant were subjected to extraction by hydrodistillation using a Clevenger-type apparatus. The essential oil was analyzed by GC/MS. Antimicrobial activity was assessed against 16 microorganisms (12 bacterial strains, two yeasts, and two phytopathogenic fungal strains). Antioxidant potential was evaluated using the Diphenyl-picrylhydrazyl (DPPH) radical scavenging assay, β-carotene bleaching assay, and Ferric Reducing Antioxidant Power (FRAP) assay. Additionally, acute toxicity was tested via oral administration in mice at different concentrations. **Results:** GC/MS analysis revealed the presence of 26 compounds, with bornyl acetate (34.09%) and alpha-pinene (24.22%) identified as major constituents. The essential oil exhibited stronger activity against Gram-positive bacteria compared to Gram-negative, with marked sensitivity observed in the *Sarcina lutea* strain Ø = 38.25 ± 1.52 mm). The oil demonstrated a remarkable ability to neutralize various free radicals across all three antioxidant assays. Toxicity results showed that oral administration did not induce any signs of toxicity, behavioral changes, or mortality, with LD_{50} values exceeding 5 g/kg. **Conclusions:** The essential oil of *Salvia chudaei* is a promising natural source of bioactive compounds with significant antimicrobial and antioxidant potential and a high safety profile. This research supports its use in the development of healthy food products and natural preservatives.

Keywords: *Salvia chudaei*; Essential Oil; CG/MS; Antimicrobial; Antioxydant.

Development of Functional Gluten-Free Cookies Enriched with Nutrient Rich Alternative Flours

Sabrina Ferradji, Hayat Bourekoua
Equipe de fabrication de nouveaux Produits Agroalimentaires (FNPAA), Laboratoire de Nutrition et Technologie Alimentaire (LNTA), Institut de la Nutrition, de l'Alimentation et des Technologies Agro-Alimentaires (INATAA), Université Constantine 1 Frères Mentouri, Algeria

ABSTRACT
Background: Celiac disease is one of the most common gastrointestinal diseases, manifesting as malabsorption resulting from villous atrophy. Since a strict gluten-free diet remains the only effective treatment, developing high-quality gluten-free products is essential. **Aims:** The aim of this study was to investigate the effect of enriching gluten-free cookies (rice/corn/starches cookies) with nutrient-rich alternative flours: soya, acorn, chestnut, chickpea, quinoa, and millet, focusing on the technological and antioxidant properties. **Materials and Methods:** The base formulation consisted of a flour-starch combination (70% flour and 30% starch). An extreme vertices mixture design was employed to optimize the mix of starches added X_1: corn starch; X_2: potato starch; X_3: tapioca starch). The optimized cookies were then enriched with the different flours and their physical properties (expansion factor, spread ratio) and antioxidant properties were evaluated. **Results:** The main results indicated that significant differences ($p < 0.05$) were observed between enriched cookies and the optimum for physical parameters, including expansion factor and spread ratio. The highest expansion factor was obtained with corn-enriched cookies, whereas soy-enriched cookies showed the lowest. Quinoa-enriched cookies exhibited a notably high spread ratio, followed by soy-enriched cookies. Replacing corn flour also enhanced the antioxidant profile of the cookies. Acorn-enriched cookies (2.83 mg GAE/g dw) and soy-enriched cookies (2.49 mg GAE/g dw) showed the highest total phenolic contents, reflecting their richness in bioactive compounds. This increase in phenolics was accompanied by a marked improvement in antioxidant activities, as demonstrated by stronger DPPH and ABTS radical-scavenging capacities, as well as higher reducing power. **Conclusions:** Incorporating acorn and soy flours enhances the nutritional and functional quality of gluten-free cookies, underscoring their potential as alternative ingredients to improve both technological performance and nutritional value in value-added gluten-free products.

Keywords: Gluten-Free Cookies; Formulation; Antioxidants Activities; Physical Proprieties.

Functional Vegetable Oil Obtained by Ultrasound-Assisted Extraction of Orange Pomace Antioxidants

Ahlem Gouachi, Ala Eddine Derardja, Yassine Benchikh
Institute of Nutrition, Food and Agro-Food Technologies (INATAA), Frères Mentouri University, Constantine, Algeria

ABSTRACT
Background: In recent years, significant progress has been made in the recovery of bioactive molecules from agro-industrial by-products, particularly carotenoids. These bioactive compounds, known for their high nutritional potential, represent a natural source of antioxidants. They can be extracted from materials such as orange pomace and are highly valued in the food and medical industries for the development of functional ingredients and for their health-promoting properties. **Aims:** In this context, our work aims to optimize an extraction process to obtain a functional vegetable oil, intended either for direct consumption or for use in the formulation of high-value-added food products. **Methods:** We investigated the extraction of carotenoids using ultrasound-assisted extraction (UAE) with vegetable oil as a green solvent. A Central Composite Design (CCD) combined with Response Surface Methodology (RSM) was applied to identify the optimal operating conditions affecting carotenoid yield. The yield was measured by spectrophotometry and expressed as mg of *β*-

carotene/100 g of dry matter. **Results:** Our results demonstrated the practical feasibility of this approach, with a *p*-value < 0.05 and an R^2 close to 1. They highlight the potential of this strategy for producing a functional oil rich in natural antioxidants, offering a promising alternative for the agro-food industry. **Conclusions:** The study concludes that the optimized extraction process using vegetable oil as a green solvent is an effective and sustainable method to valorize orange pomace into a functional oil rich in natural antioxidants.

Keywords: Carotenoids; Natural Antioxidants; By-Products; Ultrasound-Assisted Extraction; Vegetable Oil.

Natural Antimicrobials for Safer Foods: The Potential of *Curcuma longa* Essential Oil

Naima Hadjadj, Zakia Abdellaoui, Fateh Bougherra, Meriem Retimi, Mahdjouba Beknounou, Faiza Kessoum

Department of Food Sciences, Faculty of Natural and Life Sciences, Laboratory of Food Science, Technology and Sustainable Development, University of Blida 1, Algeria

ABSTRACT

Background: Antibiotic resistance is now one of the greatest public health challenges, and infections are becoming increasingly difficult to treat. In response to this urgent situation, natural molecules, particularly essential oils, are attracting growing interest. *Curcuma longa* is a medicinal plant valued for its bioactive compounds, including its essential oil (EO), which is increasingly investigated for antimicrobial applications. **Aims:** This study aimed to assess the antimicrobial activity of *Curcuma longa* essential oil, and explore its potential as a natural alternative to conventional antibiotics. **Methods:** The essential oil was extracted from *Curcuma longa* rhizomes using hydrodistillation. Antimicrobial activity was evaluated against two Gram-positive bacteria (*Bacillus subtilis* and *Staphylococcus aureus*) and two Gram-negative bacteria (*Escherichia coli* and *Pseudomonas aeruginosa*). Both qualitative assays, determined by the aromatogram method, and quantitative assays, determined by Minimum Inhibitory Concentration (MIC) determinations, were performed to assess the inhibitory effect of the EO. **Results:** *Curcuma longa* essential oil yield was 1.78%. This EO demonstrated notable antimicrobial activity, particularly against Gram-positive bacteria, and this activity increased with EO concentration. *Bacillus subtilis* and *Staphylococcus aureus* were highly sensitive, while *Escherichia coli* and *Pseudomonas aeruginosa* showed resistance. MIC results indicated the following increasing order of sensitivity: *Staphylococcus aureus* < *Bacillus subtilis*. **Conclusions:** The essential oil of *Curcuma longa* exhibits promising antimicrobial potential, especially against Gram-positive strains. Its dose-dependent activity and confirmed MIC values suggest its potential use as a natural antimicrobial agent which can be used as an alternative to antibiotics and synthetic antimicrobial agents.

Keywords: *Curcuma longa*; Medicinal Plants; Essential Oil; Antimicrobial Activity; MIC.

From Bark to Acorn: Exploring the Bioactive Compounds of *Quercus suber* for Innovative Product Development

Nassima Kehoul, Fatima Boukezoula, Yacine Torche, Rania Chaib

Department of Biological and Agricultural Sciences, Abdelhafid Boussouf University, Mila, Algeria

ABSTRACT

Background: Phenolic compounds, including polyphenols, flavonoids, and tannins, are potent bioactive molecules in medicinal plants due to their exceptional antioxidant properties and their ability to alleviate oxidative stress-related disorders. Acting as natural free radical scavengers and oxidation inhibitors, these compounds are valuable candidates for the development of functional and innovative products. Among Mediterranean flora, the cork oak (*Quercus suber* L.) is a prominent species in northern Algeria, traditionally prized for its astringent, antiseptic, and antimicrobial properties. **Aims:** This study investigated the phytochemical composition and antioxidant potential of bark, leaves, and acorns *of Quercus suber* collected from Mila Province. **Methods:** Plant materials were air-dried, finely powdered, and extracted via hydroethanolic maceration (ethanol/water, 70/30 v/v). Total phenolic, flavonoid, and tannin contents were quantified using spectrophotometric methods. Antioxidant activity was assessed through DPPH, ABTS, CUPRAC, and Phenanthroline assays. LC-MS analysis was performed to identify the specific bioactive composition of the extracts. **Results:** All extracts exhibited notable antioxidant activity, with considerable variation between plant parts. The bark displayed the highest phenolic content (338 mg GAE/g) and potent DPPH radical scavenging activity (IC_{50} = 5.45 µg/mL), outperforming standard antioxidants BHA and BHT. LC-MS analysis revealed significant differences in bioactive composition, with the bark particularly enriched in catechin and vanillin. Leaves were rich in flavonoids (78 mg QE/g), whereas acorns contained comparatively lower levels of phenolic and flavonoid compounds. These results highlight *Quercus suber* as a promising natural source of bioactive compounds suitable for incorporation into functional foods, dietary supplements, and nutraceuticals, which may also contribute to gut health and immune support. **Conclusions:** In conclusion, *Quercus suber* demonstrates considerable potential for valorization in nutraceutical, functional food, and cosmetic applications. Further studies focusing on the isolation, biological characterization, and mechanistic evaluation of individual compounds are recommended to optimize their integration into innovative formulations.

Keywords: *Quercus suber*, Bioactive Compounds, Antioxidant Activity, Functional Foods.

Valorization of *Stevia rebaudiana* Glycosides as Bioactive Candidates for Functional Food and Health-Promoting Applications

Filicia Khettar [1], Katia-Louiza Asmani [1], Khalef Lefsih [1], Moussa Berkoud [1], Kahina Taleb [1], Noria Saadoun [2], Samir Ait-Said [2], Lydia Radja [1], Fazia Krouchi [3]

[1] *Department of Microbiology-Biochemistry, University of Mouloud Mammeri, Tizi-Ouzou, Algeria*

[2] *Department of Biology, University of Mouloud Mammeri, Tizi-Ouzou, Algeria*

[3] *Department of Agronomy, University of Mouloud Mammeri, Tizi-Ouzou, Algeria*

ABSTRACT

Background: The search for bioactive molecules from plant sources has become an important strategy in functional foods development, especially when green extraction techniques are used to recover natural compounds while minimizing synthetic residues and environmental impact. Within this context, *Stevia rebaudiana* has emerged as a valuable ingredient for its naturally sweet steviol glycosides which have

promising health-related properties. Beyond their well-known sweetening capacity, steviol glycosides have been associated with antioxidant, anti-inflammatory, and metabolic regulatory activities, supporting their potential role as multifunctional components in health-promoting formulations. **Aims:** This work aimed to obtain a steviol glycoside-enriched fraction and evaluate its chemical profile and antioxidant activity. **Methods:** A green extraction was performed, followed by purification through anti-solvent crystallization to selectively concentrate steviol glycosides and limit the co-extraction of undesired constituents. The enriched fraction was analyzed by Thin Layer Chromatography for identity confirmation and FTIR spectroscopy to characterize the functional groups of glycosylated diterpenes. Antioxidant activity was evaluated using the DPPH radical scavenging assay. **Results:** TLC showed co-migration with reference standards, confirming the presence of major steviol glycosides such as rebaudioside A, while FTIR revealed characteristic absorption bands attributed to O–H stretching of glycosidic hydroxyl groups, C–H vibrations of carbohydrate moieties, and C=O stretching of the steviol aglycone backbone. The fraction showed strong radical scavenging activity, suggesting its potential incorporation into a variety of food formulations, which could provide additional health benefits to consumers and also enhance product stability and extend shelf-life. **Conclusions:** These findings reinforce the interest in steviol glycoside-rich extracts as natural functional compounds and support their integration into nutraceutical or health-oriented food products.

Keywords: Steviol Glycosides; *Stevia rebaudiana*; Antioxidant Activity; Green Extraction; FTIR.

Physico-Chemical and Microbiological Characterization of Olive Pomace from Eighteen Oil Mills (Traditional and Modern) Across Six Algerian Regions

Nourhane Labdai [1], Rim Tinhinane Maougal [1,2], Fatiha Menkoucha [1], Bouchedja Majda [1], Meriem Benamara [1,2], Malika Barkat [1], Souad Cherak [1]

[1] *Laboratoire de Biotechnology et Qualité Alimentaire, BIOQUAL, Institut de Nutrition, de l'Alimentation et Technologies Agro-Alimentaire (INATAA), Université Frères Mentouri, Constantine 1 (UFMC 1), Algérie*

[2] *Laboratoire de Génétique Biochimie et Biotechnologie Végétales (GBBV), Université Frères Mentouri, Constantine 1 (UFMC 1), Algérie*

ABSTRACT

Background: This study was initially conducted to evaluate the physico-chemical and microbiological composition of olive pomace. Considering the high microbial load of olive pomace and the biotechnological potential of these microorganisms, particularly attributable to their enzymatic activity, the study then aimed to identify yeast and mold strains exhibiting relevant bio-degradative enzymatic activity. **Methods:** Eighteen samples from six regions were analyzed in the laboratory (three per region, obtained from traditional extraction processes 'press' and modern 'two-phase and three-phase' systems). The physico-chemical analyses focused on pH, dry matter, ash, and total nitrogen content, while the microbiological analyses concerned the enumeration of yeasts and molds. **Results:** The physico-chemical analyses revealed average values of 5.44, 67.22%, 3.4%, and 3.47% respectively for pH, dry matter, ash, and nitrogen content. Furthermore, microbiological analysis highlighted a high load of yeasts and molds, with an average concentration of 2.5×10^7 CFU/ml. Considering the high microbial load of olive pomace and the biotechnological potential of these microorganisms, particularly attributable to their enzymatic activity, the study then aimed to identify yeast and mold strains exhibiting relevant bio-degradative enzymatic activity. Preliminary results reveal that several microorganisms display notable enzymatic activity, requiring further characterization in subsequent work. **Conclusions:** This approach falls within the perspective of valorizing olive pomace as a source of microorganisms producing bioactive metabolites, notably enzymes that could be exploited in the formulation of functional foods. The identification of strains of interest could thus contribute to the development of new ingredients enhancing the nutritional quality and health benefits of food products.

Keywords: Olive Pomace; Microorganisms; Enzymes; Enzymatic Activity.

Olive Pomace as a Functional Feed Ingredient: Impact on Growth Performance, Digestive Efficiency, and Metabolic Health in Wistar Rats

Nacera Lahouel [1,2], Omar Kheroua [1]

[1] *Laboratory of Physiology of Nutrition and Food Safety, Department of Biology, Faculty of Natural and Life Sciences, University Oran 1 Ahmed Ben Bella, Oran, Algeria*

[2] *Unité de Recherche Appliquée en Energies Renouvelables, URAER, Centre de Développement des Energies Renouvelables, CDER, Ghardaïa, Algeria*

ABSTRACT

Background: Olive pomace (OP), a by-product of olive oil extraction rich in bioactive compounds, represents a promising sustainable alternative for animal nutrition. **Aims:** This study evaluated the nutritional efficacy of OP as a functional feed ingredient in a rat model. **Methods:** Fourteen male Wistar rats were randomly allocated into two experimental groups (n = 7 per group): a standard control diet (S) or an OP-based diet for 28 days. **Results:** The OP diet produced remarkable body weight gain of 95.86 ± 2.48 g (78.33% increase), achieving 92.6% of the standard group performance (103.5 ± 0.80 g; 80.73% increase) with significantly lower energy intake (1250.00 ± 7.40 kcal/rat vs. 1891.6 ± 7.14 kcal/rat), indicating superior feed conversion efficiency. Despite lower nitrogen balance and protein apparent digestibility coefficient in the OP group, significant intestinal morphological adaptations were observed, with villus height reaching 386.5 ± 15.2 µm and villus height-to-crypt depth ratio improving to 2.47 ± 0.11, compared to 1.92 ± 0.08 in the S group. These structural enhancements suggest improved absorptive capacity that may compensate for reduced digestibility. Biochemical profiling revealed no adverse effects on liver or kidney function. **Conclusions:** These results demonstrate that olive pomace possesses distinct functional properties, combining efficient growth promotion with beneficial gut health effects, supporting its valorization as a sustainable feed ingredient in animal nutrition systems.

Keywords: Olive Pomace; Functional Feed; Feed Efficiency; Intestinal Morphology; Gut Health.

In Vitro Antioxidant and Antifungal Activities of *Thymus* sp. Acetate Extract and its Cytotoxic Effect on HCC Cells

Meriem Laraba [1], Vittoria Infantino [2], Anna Santarsiero [2], Ilaria Pappalardo [2], Kaouther Zouioueche [1], Aya Berkane [1], Ali Debbi [3], Chawki Bensouici [3], Fadila Benayache [1], Samir Benayache [1], Djamila Zama [1]

[1] *Research Unit : Valorization of Natural Resources, Bioactive Molecules and Physico-chemical and Biological Analyzes (VARENBIOMOL), University Frères Mentouri Constantine 1, Algeria*

[2] *University of Basilicata, Department of Science, 85100 Potenza, Italy*

[3] *Biotechnology Research Center (CRBt) Constantine, Algeria*

ABSTRACT

Background: *Thymus* species are aromatic medicinal plants widely recognized for their bioactive secondary metabolites, especially phenolic and flavonoid compounds, which are known for their antioxidant and antimicrobial potentials. Despite their traditional uses, limited data exist on their antifungal and cytotoxic effects on human cancer cells. **Aims:** This study aimed to evaluate the in vitro antioxidant and antifungal activities of the acetate extract of *Thymus* sp., and to investigate its cytotoxic effect on human hepatocellular carcinoma (HCC) cells. **Methods:** The acetate extract of *Thymus* sp. was prepared by solvent extraction. Antioxidant activity was assessed using DPPH, FRAP, CUPRAC, ABTS and Phenanthroline assays, while antifungal potential was tested against selected pathogenic fungal strains. The cytotoxicity of the extract was evaluated on HCC cells using the MTT assay to determine cell viability. **Results:** The *Thymus* acetate extract exhibited strong antioxidant capacity in both DPPH and FRAP assays, showing dose-dependent radical scavenging activity. It also demonstrated significant antifungal activity, particularly against Candida albicans. Furthermore, the MTT assay revealed a moderate cytotoxic effect on HCC cells, suggesting selective toxicity toward cancerous cells. The results indicate that the acetate extract of *Thymus* sp. possesses potent antioxidant and antifungal properties, along with a promising cytotoxic effect on HCC cells. **Conclusions:** These findings support the potential use of *Thymus* extracts as natural sources of bioactive compounds for pharmaceutical and therapeutic applications.

Keywords: *Thymus;* HCC; MTT; Antioxidant; Antifungal.

From Fermentation to Functionality: Nutritional and Beneficial Insights (A Review)

Souhila Mazguene, Zahia Brara, Ouarda Djaoudene, Tassadit Benhammouche

Research Centre of Agri-Foods Technologies (CRTAA), Route de Targa Ouzemour, University Campus, Béjaïa, Algeria

ABSTRACT

Background: Approximately 30% of the global human diet comprises fermented foods, which are widely consumed across diverse cultures and lifestyles. Their production is economically advantageous, relying on available, seasonal raw ingredients from local agriculture. Historically, fermentation has been adopted for its preservative aspect, but nowadays, its popularity is enhanced by the increasing evidence of the fermented foods' association with health. **Aims:** We intend to highlight the nutritional and health-related attributes of fermented foods. **Methods:** The literature research was conducted using the following databases: PubMed, ScienceDirect, Scopus and Web of Science. This review used the following search terms: fermentation, fermented food, functional food, lactic acid bacteria, bioactive peptides, probiotics, postbiotics, and health effects. We analysed papers from 2020 to 2025. **Results:** The bibliometric study demonstrates that fermented foods are a source of probiotics and various biomolecules, including vitamins, minerals, amino acids, and dietary fibre, providing high nutritional value. Fermented products are often regarded as superfoods, contributing to digestive health by supporting nutrient assimilation, balancing gut microbiota, and modulating the immune system. The intake of fermented foods can mitigate metabolic disorders; they reduce intestinal glucose absorption, thereby offering protective effects against diabetes. They additionally support weight management and cardiovascular health by significantly lowering total cholesterol, LDL cholesterol, and triglycerides. Their anti-inflammatory and immunoregulatory properties are largely attributed to their abundant antioxidants and lactic acid bacteria. These microbes help maintain a healthy gut microbiome and boost both local and systemic immunity. They interact with the gut mucosa, reinforce epithelial barrier integrity, and competitively inhibit the proliferation of pathogenic microorganisms. **Conclusions:** Fermentation can be applied to almost all foods. Fermented foods are well studied and support the health benefit concept, and their intake should be encouraged by governments and organisations. Numerous start-ups are innovating, particularly in Western countries, with the adoption of fermentation technology.

Keywords: Fermented Foods, Functional Foods, Probiotics, Postbiotics, Health.

Safe Enterocin-Producing *Enterococcus faecium* from Algerian Fig–Olive Preparation: Bioprotective Cultures for Functional Food and Health-Oriented Applications

Mohamed Merzoug [1], Keltoum Bendida [1], Marwa Aireche [1], Zohra Yasmine Zater [2], Chaimaa Naila Brakna [1], Amaria Ilhem Hammadi[1], Yasmine Saidi [1], Svetoslav Dimitrov Todorov [3], Djamal Saidi [1]

[1] *Genomics Technology Platform, Higher School of Biological Sciences of Oran, Oran, Algeria.*

[2] *Laboratory of Biology of Microorganisms and Biotechnology, University of Oran 1 Ahmed Ben Bella, Algeria*

[3] *ProBacLab, Laboratório de Microbiologia de Alimentos, Departamento de Alimentos e Nutrição Experimental, Food Research Center, Faculdade de Ciências Farmacêuticas, Universidade de São Paulo, Brazil*

ABSTRACT

Background: Growing interest in functional foods has intensified the search for natural microbial cultures that can simultaneously support product safety and fit clean-label expectations. Algerian traditional dried figs marinated in olive oil represent a nutrient-rich, minimally processed food ecosystem that may harbor such beneficial microorganisms. **Aims:** In this work, *Enterococcus faecium* strains were recovered from this matrix and rigorously characterized to assess their bioprotective and safety attributes for potential use in health-oriented food systems. **Methods:** Twelve isolates were identified as E. faecium by MALDI-TOF MS and 16S rRNA gene sequencing. Genotyping by BOX-PCR, GTG-PCR and ERIC-PCR revealed marked intraspecies

diversity, with BOX-PCR offering the highest discriminatory power. **Results:** Functional screening showed a broad distribution of enterocin genes: entA was detected in all strains, while entB and entL50A/B were present in 60% and 20% of isolates, respectively. These genotypes were consistent with antimicrobial activity against Enterococcus faecium VCY, Micrococcus luteus GPE 3001, Staphylococcus aureus ATCC 25923, Pseudomonas aeruginosa ATCC 27853 and Acinetobacter lwoffii GPE 3002. Strain HFM7 emerged as the most active, displaying the largest inhibition halo (20.0 ± 1.0 mm) and carrying three enterocin genes (entA, entL50A and entL50B). Loss of activity after protease treatment confirmed the proteinaceous nature of the inhibitory compounds. Crucially, none of the isolates harbored the tested virulence determinants (esp, gelE, hyl) or antibiotic resistance genes (vanA, vanB, ermA, ermB, aac(6')-Ie-aph(2'')), underscoring a favorable safety profile. **Conclusions:** Taken together, these findings position E. faecium strains from traditional fig–olive preparation as promising bioprotective cultures for functional foods aimed at enhancing microbial safety, extending shelf life and supporting consumer demand for natural, health-oriented preservation strategies.

Keywords: Functional Foods; *Enterococcus faecium*; Enterocins; Biopreservation; Traditional Algerian Foods.

Determination of Vitamin *C* Content and Anti-Oxydant Activity of Guava (*Psidium guajava*. L) Cultivated in Algeria

Amira Nebbak [1], Mustapha Mounir Bouhenna [1], Camelia Tabti [2], Rayane Boughambouz [2], Fatima Zohra Badri [1], Khaldoun Bachari[1], Idir Bitam [3]

[1] *Centre de Recherche Scientifique et Technique en Analyses Physico-chimiques (CRAPC), Tipaza, Algeria*

[2] *École Supérieure des Sciences de l'Aliment et des Industries Agroalimentaires (ESSAIA), Algeria*

[3] *Centre de recherche en agropastoralisme (CRAPAST), Algeria.*

ABSTRACT

Background: Vitamins are essential organic compounds fundamental to maintaining general health. They are nutrients mainly associated with fruit consumption. *Psidium guajava*, an exotic plant introduced in North Africa, contains high concentrations of bioactive compounds. It has been shown to be an excellent source of vitamin *C*. **Aims:** The present study aimed to analyze levels of vitamin *C* of white and red guava (*Psidium guajava*. L) and the leafs from the Northern Algeria. **Methods:** The vitamin *C* was quantified using the analytical method High Performance Liquid Chromatography (HPLC) using different fruit states (dry, frozen and freeze-dried). Moreover, it defines the chemical antioxidant activity by ABTS assay. **Results:** Results revealed that vitamin C ranged from 4.64 mg/100 g to 33.74 mg/100 g. The antioxidant activity showed ethyl acetate fraction bearing the best results. **Conclusions:** These findings revealed that this exotic fruit can be consumed as a nutraceutical ingredient by the Algerian population and exploited as a natural source of vitamin C in the agri-food industry.

Keywords: ABTS; Algeria; HPLC; *Psidium guajava*; Vitamin *C*.

Hydrolysis of Bovine Caseins by Immobilized Ficin

El Hocine Siar [1,2], Pedro Abellanas-Perez [2], Roberto Fernandez-Lafuente [2]

[1] *Departamento de Biocatalisis, ICP-CSIC, Campus UAM-CSIC, Madrid 28049, Spain*

[2] *Agri-food Engineering Laboratory (GENIAAL), Institute of Food, Nutrition and Agri-Food Technologies (INATAA), University of Brothers Mentouri Constantine 1, Algeria*

ABSTRACT

Background/Aims: The objective of this work is the use of immobilized ficin in the production of bioactive peptides through the hydrolysis of bovine caseins. **Methods:** Ficin was immobilized on glyoxyl-agarose, followed by the study of its proteolytic potential on bovine caseins and the characterization of the biological activities of the resulting hydrolysates, particularly their antioxidant activity. **Results:** The results obtained showed that the enzymatic extract immobilizes rapidly on agarose activated with glycidol. Immobilized ficin retains 89% of its proteolytic activity. On the other hand, the results demonstrated that hydrolysates obtained with immobilized ficin exhibit greater antioxidant activity than those obtained with free ficin. The percentage of DPPH inhibition was significant, with values estimated at 23.71%, 41.81%, 53.89%, 62.27%, and 72.45% at 0.5, 1, 2, 4, and 5 hours of hydrolysis, respectively. Regarding the use of free ficin, the results showed that the percentage of DPPH inhibition was also important but varied, with values estimated at 43.57%, 61.43%, 73.05%, 42.19%, and 37.39% at 0.5, 1, 2, 4, and 5 hours of hydrolysis, respectively. This variation is due to the intensive hydrolysis of caseins. **Conclusions:** These findings reflect the potential of using ficin in casein hydrolysis for the production of peptides of interest (antioxidant).

Keywords : Ficine, Immobilisation ; Caséines ; Hydrolyse ; Peptides Antioxydants.

Physicochemical, Phytochemical, and Sensory Study of a Fresh Cheese Enriched with Spirulina Algae

Siham Ydjedd [1,2], Makhlouf Chaalal [2,3], Afaf Chebout [2,3], Asma Beroual [2] And Maroua Doubali [2]

[1] *Laboratoire GENIAAL, Constantine, Algeria*

[2] *Laboratoire SAFIVIA, Constantine, Algeria*

[3] *Laboratoire BIOQUAL, Institut de la Nutrition, de l'Alimentation et des Technologies Agro-Alimentaires (INATAA), Université Constantine 1 Frères Mentouri, Constantine, Algeria*

ABSTRACT

Background: Functional foods enriched with bioactive compounds have gained increasing attention due to their potential health benefits. Among these, microalgae such as spirulina are recognized for their high content of proteins, vitamins, minerals, and antioxidants. Incorporating such bioactive ingredients into widely consumed foods like dairy products offers a promising approach to enhance their nutritional and functional properties. **Aims:** The objective of the present study was to investigate the enrichment of fresh cheese with spirulina, a microalga rich in bioactive compounds, to improve its nutritional and functional qualities. **Methods:** Spirulina was incorporated at different concentrations (0.1%, 0.2%, and 0.3%) into fresh cheese made from cow's milk. Physicochemical analyses (pH,

moisture, acidity, Brix, and conductivity), phytochemical evaluations (total polyphenols, flavonoids, tannins, and carotenoids), antioxidant activity assays (DPPH, FRAP, and phosphomolybdate tests), and sensory analysis were performed to assess the effects of spirulina enrichment. **Results:** The results showed that incorporating 0.3% spirulina significantly enhanced the functional properties of fresh cheese. The main physicochemical parameters were: pH 4.57 ± 0.03, titratable acidity 84.66 ± 2.31 D°, moisture 89 ± 3.54%, and electrical conductivity 2005 ± 1.44 µS/cm. Phytochemical analysis revealed high levels of bioactive compounds, including total phenolics (166.93 ± 7.85 mg GAE/100g), flavonoids (6.36 ± 0.27 mg QE/100g), tannins (127.42 ± 0.27 mg TE/100g), and carotenoids (5.74 ± 0.04 mg βC/100g). Antioxidant activity including DPPH, FRAP, and phosphomolybdate was also enhanced, with values of 45.46 ± 1.27%, 37.05 ± 0.63 mg QE/100g, and 4.73 ± 0.20 mg GAE/100g, respectively. Sensory evaluation showed improved color (8.47/10), stable texture (5.63–5.90/10), slightly reduced odor (3.23/10), and minor taste changes. **Conclusions:** Overall, the moderate addition of spirulina to fresh cheese appears to be a promising strategy for developing innovative functional dairy products.

Keywords: Fresh Cheese, Spirulina, Bioactive Compounds, Antioxidant Activity, Sensory Analysis.

Melissopalynological Analysis, Physicochemical Characterization, Phenolic Compound Content and Antioxidant Activities of an Algerian Honey

Abel Zenati [1] , Zina Tafinine-Mouhoubi [2], Rim Salhi [1], Nawel Guenaoui [2], Roukia Bouizar [1], Rania Agabi [1], Nadia Amessis-Ouchemoukh [1].

[1] *Faculty of Natural and Life Sciences, Laboratory of Biomathematics, Biophysics, Biochemistry and Scientometrics, A. MIRA University of Bejaia, Bejaia, Algeria*

[2] *Faculty of Natural and Life Sciences, Laboratory of Applied Biochemistry, A. MIRA University of Bejaia, Bejaia, Algeria*

ABSTRACT

Background: The relationship between the honeybee *Apis mellifera* and plant pollination produces honeys with distinct characteristics that are strongly influenced by their botanical source. This study is in line with previous work carried out on Algerian honeys and provides results that are consistent with the expected quality criteria. **Aims**: In this study, an Algerian honey sample was characterized through melissopalynological analysis (without acetolysis), physicochemical evaluation, as well as determination of phenolic compounds and measurement of its antioxidant activity. **Methods:** The honey was analyzed for physicochemical parameters (moisture, pH, ash content, 5-hydroxymethylfurfural, proline). Antioxidant capacities were assessed using several methods: DPPH and ABTS scavenging activities, CUPRAC assay, phosphomolbdeneum assay, FRAP and ferric chelating method. Melissopalynological analysis was used to determine the botanical origin. **Results:** The results reveal a dominant pollen of the genus *Ziziphus lotus* (Rhamnaceae) at 82%, confirming the monofloral character of the honey. Secondary pollens belong to the Zygophyllaceae, Fabaceae, Asteraceae and Brassicaceae families, illustrating the local floristic diversity. The physicochemical parameters fully comply with international standards, with moisture, pH, free acidity, 5-HMF level and proline concentration confirming the high quality of this honey. **Conclusions**: The richness in phenolic compounds and the strong antioxidant potential observed confirm the bioactive properties of this honey. The high concentration of *Ziziphus lotus* pollen establishes its monofloral status and superior quality according to international standards.

Keywords: Algerian Honey; Melissopalynological Analysis; *Ziziphus lotus*; Physicochemical Parameters; Antioxidant Activity.

From Red Juniper (*Juniperus Phoenicea L.*) to the Table: Valorization of the Traditional Know-How for Transforming Red Juniper Berries into *"El Robb"*, A Syrup with Functional and Health-Related Uses

Lamia Zoubiri [1], Yahia Bouattit [2], Malika Barkat [1]

[1] *Research Laboratory in Food Sciences, Formulation Innovation, Valorization, and Artificial Intelligence (SAFIVIA), Institute of Food and Agro-Food Technologies (INATAA), Mentouri Brothers University, Constantine 1, Constantine, Algeria*

[2] *Institute of Food and Agro-Food Technologies (INATAA), Mentouri Brothers University, Constantine 1, Constantine, Algeria*

ABSTRACT

Background: The red juniper (*Juniperus phoenicea* L.) is an emblematic plant of the Algerian high plateaus, widely recognized for its medicinal properties and traditional uses, attributed to its bioactive compounds and essential oils. **Aims:** This ethnobotanical study aimed to document local knowledge and the functional and health-related uses linked to the valorization of the red berries of *Juniperus phoenicea*. **Methods:** To ensure data relevance, the survey initially targeted families known for their active role in traditional activities, particularly in the Aïn Ghrab area of the commune of Djebel Messaâd of M'sila municipality. Based on these criteria, a simple random sample of 60 households from this area was then selected and surveyed using a questionnaire. **Results:** Results indicate that mature red berries are traditionally processed into El Robb, a syrup valued for its nutritional and therapeutic properties, prepared through hot maceration and prolonged cooking of carefully selected reddish-brown berries; this artisanal method yields a viscous, dark brown syrup with a woody aroma and a sweet, tangy flavor marked by a bitter aftertaste, with transformation efficiency ranging from 10–30% depending on berry quality and technique; stored in airtight glass jars, *El Robb* maintains stability for up to 24 months due to its acidic pH and abundance of bioactive compounds with antimicrobial and antioxidant activity, ensuring microbiological safety; traditionally, it is consumed both as medicine—relieving respiratory ailments, digestive disorders, and enhancing body strength—and as an energy-rich, satiating food highly valued by local populations and in historical contexts. **Conclusions:** This study highlights the ricshness of local artisanal knowledge and the functional potential of "*El Robb*" underlining its importance for future scientific valorization and the preservation of intangible cultural heritage linked to traditional practices.

Keywords: *Juniperus phoenicea*; *El Robb*; Survey; Questionnaire; Functional Potential.

Probiotic Potential of a *Lactococcus* Strain Isolated from the Traditional Algerian Cheese "*Klila*"

Safa Elhadjali [1,2], Faiza Boughachiche [1,2], Boutheyna Khemaci [1], Douaa Ziani [1], Serine Mahcene [1]

[1] Institute of Nutrition, Food and Agri-Food Technologies, Constantine 1, Frères Mentouri University, Algeria
[2] Biotechnology and Food Quality Research Laboratory (BIOQUAL), Constantine, Algeria

ABSTRACT

Background and Aims: Algerian artisanal Klila cheese is an important source of microorganisms with probiotic potential, particularly Lactococcus. The study of an indigenous strain aims to evaluate its resistance to gastrointestinal conditions, its enzymatic activity and its production of bioactive compounds. The objective of this study is to investigate the probiotic characteristics of a Lactococcus strain isolated from this fermented product. **Methods:** The analysis focused on the microbiological identification of the strain, its tolerance to difficult physiological conditions, particularly high acidity (pH 2) and the presence of bile salts (0.3%), as well as its antimicrobial activity against pathogenic microorganisms. The absence of haemolytic activity was also verified to ensure its safety. **Results:** The results obtained are encouraging overall and highlight several promising probiotic characteristics, confirming the potential of this strain as an interesting candidate for industrial applications and the development of functional foods. **Conclusions:** In conclusion, this study highlights the interest of the strain evaluated and opens up prospects for further research with a view to its use in various food formulations.

Keywords: Probiotics; *Lactococcus*; Antimicrobial Activity;Tolerance to Acidity and Bile Salts; Agri-Food Applications.

Production of α-Amylase by Entomopathogenic Fungi Cultivated on a Carrot Waste-Based Medium

Ouidad Abdelazi [1,3], Ouissem Meghnous [2], Mohamed Mourad Senoussi [3], Rania Zamouche Zerdazi [4], Ismail Karaca [5]
[1] Laboratory of Applied Biochemistry, Faculty of Natural and life sciences, Constantine 1 Frères Mentouri University, Constantine. Algeria
[2] Laboratory of Biology and Environment, Faculty of Nature and Life Sciences, Constantine 1, Mentouri University, Constantine, Algeria
[3] Laboratory of Biomolecules and Plant Breeding, Larbi Ben M'hidi University, Oum El Bouaghi, Algeria
[4] Laboratory of Environmental Process Engineering, Faculty of Process Engineering, Salah Boubnider Constantine 3 University, Constantine, Algeria
[5] Department of Plant Protection, Faculty of Agriculture, Isparta University of Applied Sciences, Isparta, Turkey

ABSTRACT

Background and Aims: The production of industrially relevant enzymes using agro-industrial wastes represents a sustainable and cost-effective approach. In this study, entomopathogenic fungi isolated from *Ectomyelois ceratoniae* were evaluated for their ability to produce α-amylase using a culture medium formulated from carrot waste. **Methods:** Fourteen fungal isolates belonging to the genera *Aspergillus*, *Fusarium*, and *Cladosporium* were identified. The effect of pH (4, 7, and 10) on enzymatic activity was assessed after incubation at 28°C for three days. **Results:** The results showed that *Fusarium* sp. exhibited the highest amylolytic activity, reaching 284.64 U at pH 10. **Conclusions:** These findings highlight the potential of entomopathogenic fungi and plant-derived waste substrates for the sustainable production of industrial enzymes.

Keywords: Entomopathogenic Fungi; *Fusarium*; α-amylase; Carrot Waste; *Ectomyelois ceratoniae*.

Cookies Based on the Algerian Barley Varieties « *Fouara* » and « Céleste »

Faiza Adoui, Chahinez Benelouezzane, Ameni Harkati, Ilhem Achi, Dhouha Bounefla
Institut de la Nutrition, de l'alimentation et des technologies Agro-alimentaires (INATAA), Frères Mentouri University Constantine1, Algeria

ABSTRACT

Background: Traditionally, barley is mainly used to prepare bread and couscous. These products are not appreciated by the new generation. Currently, barley is attracting more and more attention from the agri-food industry, particularly in the development of functional products rich in β-glucans. Products such as cookies present common examples in the field of functional foods due to their convenience and ability to meet consumer expectations in terms of nutritional composition, shape, and appearance. **Aims:** Our work aims to contribute to the diversification of barley consumption patterns by studying the feasibility of developing biscuits based on two local varieties of barley: the variety "Fouara," characterized by a high β-glucan content, and the variety "Celeste," characterized by bare grains without shells. **Methods:** These preparations were subjected to physico-chemical and sensory characterizations in order to evaluate their quality and acceptability by consumers. **Results:** The cookies exhibited good shape stability, with specific volumes varying between 1.34 ± 0.08 cm^3/g and 1.91 ± 0.11 cm^3/g. The Fouara salted cookies, with a humidity of 4.00%, show a value significantly lower than that of the Céleste variety (7.46%) and the wheat control (7.78%), which do not differ significantly between them. The sweet barley-based cookies (Fouara and Céleste) have a significantly lower moisture content than the wheat-based control. An accentuated dark hue is mainly associated with sweet Fouara biscuits, reflecting a higher non-enzymatic browning intensity. The sweet formulation tends to increase the dark color. Sensorially, the salty versions were particularly well-rated, reaching up to 4/5 according to the acceptability test. **Conclusions:** These results suggest that these cookies may offer better crispiness and storage stability.

Keywords: Barley; Biscuits; Physical Properties; Sensory Acceptability.

Valorization of Whey Powder in Traditional Madeleines: Impact on Texture, Structure, and Sensory Quality

Ibtissam Ameur, Sara Lemmadi, Faiza Adoui
Institute of Nutrition, Food and Agri – Food Technology (I.N.A.T.A.A), Université Frères Mentouri Constantine 1, Algeria

ABSTRACT

Background: Egg substitution in bakery products is of growing interest for improving sustainability and valorizing dairy by-products such as whey powder. **Aims:** The aim of this study was to evaluate the feasibility of producing madeleines, a traditional Spanish cake, by partially or totally replacing eggs with whey powder, and to investigate the effect of this substitution on their physicochemical, techno-functional, and sensory properties. **Methods:** The raw materials were first analyzed to determine their particle size, moisture content, protein composition, and the techno-functional properties of the whey powder. Egg-based control madeleines were compared to formulations with different substitution levels: 25%, 50%, 75%, and 100%. The final products were then subjected to physicochemical analyses and

sensory evaluation. **Results:** The results showed that 25% and 50% substitutions reduced batter density (1.127 ± 0.001 g/cm³ and 1.118 ± 0.003 g/cm³, respectively), indicating better aeration. Rehydration and homogenization of the whey powder prior to incorporation improved the texture. Specific volume decreased with increasing substitution levels. Furthermore, incorporating whey increased the total number of alveoli in the 25%, 50%, and 100% samples, while their average size decreased, suggesting a finer internal structure. Sensory evaluation indicated that the 25% substituted madeleines closely resembled the control in appearance and received positive feedback. The 100% substitution was less favorably rated. No significant differences were observed among the 25%, 50%, and control samples regarding odor, taste, or crumb texture. Finally, the adhesiveness of all formulations was deemed acceptable. **Conclusions:** Finally, the adhesiveness of all formulations was deemed acceptable.

Keywords: Whey powder; Valorization; Egg; Substitution; Madeleine.

Development of a Functional Yogurt for Diabetic Populations Using Novel Ingredient Combinations: Chia Seeds, Sweet Potato, and Pomegranate Juice

Fatima Asmaa Beldjilali, Sadika Haouhach, Akila Guenzet
Department of Biotechnology, Faculty of Natural and Life Sciences,University of Sciences and Technology of Oran Mohamed Boudiaf, Oran, Algeria

ABSTRACT

Background: The growing prevalence of diabetes worldwide necessitates the development of innovative functional foods with controlled glycemic impact. Yogurt, as a widely consumed fermented dairy product, represents an ideal matrix for nutritional enrichment aimed at managing metabolic disorders. **Aims:** This study aimed to develop a novel functional yogurt formulation based on goat's milk, enriched with chia seeds (*Salvia hispanica L.*), sweet potato (Ipomoea batatas), and pomegranate juice (*Punica granatum*), specifically designed for diabetic consumers, and to evaluate its microbiological, physicochemical, sensory properties, and glycemic impact. **Methods :** The raw materials and final product underwent comprehensive quality control analyses. Microbiological quality was assessed following standard methods. Physicochemical parameters, including pH, titratable acidity, density, dry matter, and fat content, were determined according to the Algerian Official Journal and AFNOR standards. Sensory evaluation was conducted using descriptive analysis and hedonic testing with trained panelists, comparing the developed product with commercial alternatives. The glycemic response was evaluated in diabetic subjects through measurement of fasting and postprandial blood glucose levels. **Results:** The results demonstrated excellent microbiological safety and physicochemical quality of both the goat's milk and the formulated yogurt, with all parameters complying with regulatory standards. Sensory analysis revealed superior organoleptic characteristics in the developed product compared to commercial counterparts, particularly in color, texture, taste, and aroma, resulting in its first ranking in preference tests. Clinical evaluation showed a minimal postprandial glycemic increase in diabetic subjects following consumption of the enriched yogurt. **Conclusions:** The innovative yogurt formulation developed in this study represents a significant advancement in functional food technology for diabetes management. The combination of goat's milk with chia seeds, sweet potato, and pomegranate juice resulted in a product with an enhanced nutritional profile, superior sensory attributes, and a favorable glycemic response, offering a promising dietary option for diabetic populations.

Keywords: Functional Food; Goat Milk; Diabetes Management; Sweet Potato; Pomegranate.

Biotechnological Valorization of Olive Pomace: Isolation and Enzymatic Characterization of Fungal Strains

Meriem Benamara [1], Malika Barkat [2], Rym Tinhinene Maougal [1]
[1] *Laboratoire BIOQUAL, Département de Biotechnologie Alimentaire, Institut INATAA, UFMC1, Constantine, Algeria*
[2] *Laboratoire SAFIVIA, Département de Biotechnologie Alimentaire, Institut INATAA, UFMC1, Constantine, Algeria.*

ABSTRACT

Background: The olive tree (*Olea europaea* L.) represents a crop of major importance throughout the Mediterranean basin, particularly in Algeria. Olive oil extraction generates solid residues known as olive pomace, which are generally underexploited and may cause environmental impacts. This research contributes to the biotechnological valorization of olive oil by-products, in line with the objectives of sustainable development and the promotion of the circular economy. **Aims:** This study is part of a valorization approach for this by-product by examining the fungal diversity it contains and evaluating the enzymatic potential of the isolated strains. **Methods:** Olive pomace samples were collected from two oil mills located in Bordj Bou Arreridj and Khenchela (Algeria). These residues served as a medium for the isolation and identification of different fungi. The enzymatic capacities of these isolates were studied by targeting several hydrolases, notably cellulase, caseinase, and esterase. **Results:** Six genera were identified: *Penicillium*, *Aspergillus*, *Mucor*, *Rhizopus*, *Wallemia*, and *Moniliella*. The genera *Penicillium* and *Aspergillus* stood out for their particularly high enzymatic production, confirming their relevance for various industrial applications. The results obtained show that olive pomace constitutes a favorable substrate for fungal growth and the synthesis of enzymes of interest. **Conclusions:** Olive pomace constitutes a favorable substrate for fungal growth and the synthesis of enzymes of interest. The identification of high-performing strains of *Penicillium* and *Aspergillus* underscores the potential of using olive processing waste as a low-cost medium for producing industrial enzymes, supporting sustainable agricultural practices.

Keywords: Olive Pomace; Fungi; Biotechnological Valorization; Circular Economy; Sustainable Development.

Impact of Tomato By-Product Incorporation on Selected Properties of Extruded Gluten Free Pasta

Hind Benchettah [1], Abdallah Bouasla [1], Agnieszka Wójtowicz [2], Leila Benatallah [1]
[1] *Laboratory of Agro-Food Engineering (GéniAAl), Institute of Nutrition, Food and Agro-Food Technologies (INATAA), Brothers Mentouri Constantine 1 University, Constantine, Algeria*
[2] *Department of Thermal Technology and Food Process Engineering, University of Life Sciences in Lublin, 31 Głęboka Str., 20-612 Lublin, Poland*

ABSTRACT

Background: Tomato by-product (TBP) is a nutrient-rich by-product that could enhance the nutritional value of gluten-free pasta and

support sustainable waste reduction. **Aims:** This study investigated selected quality properties of gluten-free rice pasta fortified with different amounts of TBP (0, 7.5, and 10%). **Methods**: Gluten-free pasta was made using a single screw extruder EXP-45-32 (Zamak Mercator, Skawina, Poland). Cooking quality (cooking loss and water absorption capacity), textural properties (hardness and firmness), and specific mechanical energy were evaluated. **Results:** The results showed that the increase of incorporation level increased significantly ($p<0.05$) cooking loss (8.35–14.47%), WAC (116.12–131.52%), and specific mechanical energy (0.11–0.72 kWh/kg) and decreased both hardness (5.68–13.07 N) and firmness (318.5–401.25 N). **Conclusions:** TBP can successfully be used (less than 7.5%) in nutritionally valuable pasta formulations. The processing parameter optimization may allow the application of TBP in the production of gluten-free pasta fortification.

Keywords: Extrusion-Cooking; Tomato By-Product; Gluten Free Pasta; Textural Properties; Cooking Quality.

Lipophilic Bioactive Fraction of Olive Pomace: A Clean-Label Perspective

Madjda Cherifa Bouchedja [1], Malika Barkat [2], Rim Tinhinen Maougal [3]

[1] *Biotechnology and Food Quality Laboratory (BIOQUAL), INATAA, UFMC1, Constantine, Algeria*

[2] *Food Science Research Laboratory for Formulation, Innovation, Valorization, and Artificial Intelligence (SAFIVIA), INATAA, UFMC1, Constantine, Algeria*

[3] *Biotechnology and Food Quality Laboratory (BIOQUAL), INATAA, UFMC1, Constantine, Algeria*

ABSTRACT

Background: Olive pomace, the main solid residue of the olive oil industry, represents a largely unexploited source of bioactive compounds with potential applications in clean-label food development and sustainable resource management. While hydrophilic components have been widely studied, the lipophilic fraction is gaining attention for its potential to provide natural pigment, antioxidant protection, and aroma enhancement in food systems. **Aims:** This contribution aims to provide an overview of lipophilic constituents in olive pomace, discuss their potential functional applications, and identify priorities for future research to address the currently fragmented data in the literature. **Methods:** The study highlights the need for systematic approaches integrating optimized extraction techniques with robust analytical characterization. It evaluates how multiple factors—such as olive variety, ripeness, extraction technology, and postprocessing conditions—influence the levels and distribution of non-polar bioactive constituents. **Results:** Current literature indicates that olive pomace contains a variety of non-polar bioactive constituents with techno-functional relevance. Recovering these natural pigments and aroma-associated molecules offers a sustainable strategy to replace synthetic additives while enhancing the nutritional and sensory quality of foods. **Conclusions:** Transforming by-products into functional ingredients meets modern innovation trends by promoting naturalness and circular economy principles. Future research should prioritize standardized methodologies to transition these lipophilic compounds from waste into high-value food applications.

Keywords: Olive Pomace; Lipophilic Bioactives; Clean-Label; Sustainable Valorization.

Meat-Powder-Fortified Savory Cookies: Formulation and Evaluation

Hiba-Ryma Boudechicha [1,2], Kahina Hafid [1,2,3], Besma Louahem [2], Chaima Bakhouche [2], Nesrine Boudarene [2]

[1] *Laboratoire de recherche Biotechnologie et Qualité des Aliments (BioQuAl), equipe Marqueurs de la Qualité des Viandes (MaQuaV), INATAA, Université Frères Mentouri, Constantine, Algzria*

[2] *INATAA, Université Frères Mentouri Constantine, Constantine, Algeria*

[3] *Laboratoire de recherche en Sciences Alimentaires, Formulation Innovation Valorisation et Intelligence Artificielle (SAFIVIA), INATAA, Université Frères Mentouri, Constantine, Algeria*

ABSTRACT

Background: In response to increasing demand for innovative, convenient, and naturally protein-enriched food products, this study proposes the formulation of savory cookies fortified with meat powder. **Aims:** The study aimed to develop high-protein, meat-powder-enriched cookies and identify an optimal formulation in terms of sensory quality and nutritional content. **Methods:** The meat powder was prepared from seasoned meat subjected to drying, with treatment at 120°C for 2 hours, identified as optimal for producing a stable, aromatic, and easily grindable powder. Four cookie formulations were developed by varying the proportions of meat powder, oat flour, and the type of binder (eggs/yogurt). Sensory testing was conducted to determine the optimal formulation. **Results:** Sensory testing identified the optimal formulation containing 20 g of meat powder, 46 g of oat flour, and eggs as the binder. The resulting cookies were characterized by a low moisture content (16.66%), a high protein level (42.78 g/100 g), and significant lipid content (28.9 g/100 g), while carbohydrate content remained moderate (0.56 ± 0.075 g/100 g). Microbiological analyses confirmed the product's safety. Sensory evaluation showed good overall acceptability, particularly regarding the crisp texture and spicy aroma. **Conclusions:** These meat-powder-enriched cookies therefore represent an innovative, high-value protein snack suitable for diverse nutritional needs.

Keywords: Meat Powder; Savory Cookies; Protein Enrichment; Food Formulation; Sensory Evaluation.

Locust Bean Gum as an Effective Edge of Edible Coating: Formulation and Assessment

Yasser Boudermine [1], Ala Eddine Derardja [2]

[1] *Department of Food Biotechnology, Institute of Nutrition, Food and Agri-food Technologies (INATAA), University of Constantine 1, INATAA, Constantine, Algeria.*

[2] *Biotechnology and Food Quality (BIOQUAL) Laboratory, Institute of Nutrition, Food and Agri-food Technologies (INATAA), INATAA, Constantine, Algeria.*

ABSTRACT

Background: Preserving the quality of strawberries after harvesting is a crucial issue because they have a limited shelf life. A number of techniques, such as edible coatings that are gaining attention, increase the shelf life of strawberries. **Aims:** The study aims to formulate and evaluate an edible coating (EC) with locust bean gum (LBG) as the main component. **Methods:** The coating was developed by dissolving LBG in distilled water while stirring continuously for an hour. After the LBG content was optimized, glycerol was added as a plasticizer.

Ascorbic acid (AA) was added as a preservative to develop a secondary formulation. The efficacy of the coatings was assessed on strawberries, comparing two treatments: EC_1 (LBG + glycerol) and EC_2 (LBG + glycerol + AA), against an uncoated control (EC_0). After being soaked in the coating solutions for a minute, the strawberries were allowed to air dry before being kept at 4°C. Weight loss, pH, microbial growth, and color were among the parameters that were evaluated on days 1, 7, and 14 of storage. **Results:** The results indicated that, in comparison to EC_0, both EC_1 and EC_2 considerably decreased weight loss. Over time, the pH of all the samples reduced. During the initial storage period (days 1 and 7), the coatings also effectively inhibited microbial growth, with EC_2 performing better. Furthermore, coated samples, particularly those with the EC_2 formulation, maintained better luminosity and red color intensity. **Conclusions:** The finding shows that LBG is an effective base for EC. It provides a sustainable and biodegradable alternative to conventional packaging materials, improving food preservation and reducing environmental impact.

Keywords: Locust bean gum; Edible coating; Strawberry; Preservation; Biodegradable.

Characterization of Rutabaga Powder and its Potential use in Functional Food Formulations

Malak Errahmene Bouhaha [1], Farida Kehal [2,3], Amani Zouhour Bouhlais [1], Loucif Chemache [3], Malika Barkat[2], Hacène Namoune[3]

[1] *Institut de la Nutrition, de l'Alimentation et des Technologies Agro-Alimentaires (INATAA), Université Frères Mentouri Constantine 1, Constantine, Algeria*

[2] *Laboratoire de recherche en Sciences Alimentaires, Formulation Innovation Valorisation et Intelligence Artificielle (SAFIVIA), Institut de la Nutrition, de l'Alimentation et des Technologies Agro-Alimentaires (INATAA), Université Frères Mentouri Constantine 1, Constantine, Algeria*

[3] *Laboratoire de Nutrition et Technologie Alimentaire (LNTA), Institut de la Nutrition, de l'Alimentation et des Technologies Agro-Alimentaires (INATAA), Université Frères Mentouri Constantine 1, Constantine, Algeria*

ABSTRACT

Background: The global demand for natural and plant-based functional ingredients highlights the potential of underutilized root vegetables such as rutabaga (*Brassica napus L. var. napobrassica*). Rutabaga is known for its antioxidant, anti-inflammatory, antimicrobial, and chemopreventive properties. Despite its nutritional benefits, it remains underexploited in food formulations. **Aims:** This study aimed to propose an alternative form of consumption by converting rutabaga into powder and to evaluate its potential as a functional ingredient. **Methods:** Rutabaga powder, obtained after drying, grinding, and sieving, was characterized for physical, hydration, moisture, and ash properties, while a hydroalcoholic extract was analyzed for total phenolics and antioxidant activity using DPPH, FRP, and pHM tests. **Results:** The results showed that the rutabaga powder had a relatively large particle size distribution with a D_{50} of 148.36 µm and a span of 1.37. Bulk and tapped densities were significantly lower, indicating a less compressed structure, while the CI (29.74) and HR (1.425) suggested low fluidity. Hydration properties were notable with WAC and OAC of 4.323 ± 0.716 g/g and 2.75 ± 0.335 g/g, respectively, and high values of WAI, WSI, swelling power, and water retention capacity. Ash and protein content were 4.50% and 6.70 g/100 g DM, respectively. Rutabaga powder showed a high concentration of polyphenols (194.96 ± 3.00 mg GAE/100 g DM), flavonoids (122.67 ± 1.50 mg QE/100 g DM), and high antioxidant activity. **Conclusions:** Overall, these attributes highlight the functional potential of rutabaga powder for incorporation into diverse food formulations as a natural functional ingredient.

Keywords: Rutabaga Powder; Functional Ingredient; Physical Properties; Phenolic Compounds; Antioxidant Activity.

Potential use of Eggplant-Peel Anthocyanins in Developing a Smart Packaging for Chicken Meat Freshness Monitoring

Cerine Yasmine Boulahlib [1,3], Moufida Aggoun [1], Rim Salhi [2], Roukia Bouizar [2], Beata Mikołajczak [3]

[1] *Research laboratory in Food Science, Formulation, Innovation, Valorization and Artificial Intelligence (SAFIVIA), Institute of Food Science, Nutrition and Agri-Food Technologies (INATAA), University of Constantine 1, Constantine, Algeria*

[2] *Laboratory of Biomathematics, Biophysics, Biochemistry and Scientometrics (3BS), faculty of Natural science and life, University of Abderrahmane Mira, Béjaia, Algeria*

[3] *Department of Meat Technology, Poznan University of Life Sciences, Poznan, Poland*

ABSTRACT

Background: This study aims to develop and characterize a novel biodegradable gelatin-alginate film incorporating eggplant peel anthocyanins, providing dual functionality as safe, natural colorimetric pH indicators and biodegradable alternatives to synthetic dyes. **Methods:** In this study, anthocyanins from eggplant peel were subjected to extraction, lyophilization, and incorporation into a gelatin-alginate-based matrix. Three distinct formulas were conceived: FC: the baseline control formula with no anthocyanins added; F1: film formula containing 0.2 mg/mL; and F2: film formula containing 2 mg/mL. In order to test the potential of films to be used as biosensors, their pH-indication ability was measured by pH-dependent increase in green intensity (IGI), and in order to be used as an active film, the antioxidant activity was measured by DPPH radical scavenging activity, as well as ferric reducing power. The color of the films was measured using a Color Vision System (CVS). **Results:** Results showed that the green intensity of films increased with increasing pH values from pH 1 to pH 10, which means that their sensitivity to different pH is significant and therefore, their indication effect based on pH is well established. Additionally, the films F1 and F2 showed significant antioxidant activities, notably DPPH scavenging activity of 23.32% and ferric reducing power activity of 30.013% and 70.82%, respectively. Meanwhile, the Fc shows the weakest antioxidant activities of 5.9% and 18.5% of DPPH scavenging activity and ferric reducing power, respectively. Additionally, the ΔE of the film increased closely with the concentration of anthocyanins, confirming that the color intensity of the films increases proportionally with the pigment content. **Conclusions:** Eggplant-derived anthocyanins were successfully incorporated into biodegradable films, yielding pH-responsive color changes and intrinsic antioxidant properties, with strong potential as intelligent active packaging for real-time freshness monitoring, particularly in meat systems.

Keywords: Functional Packaging; Active Packaging; Bioactive Compounds; Meat Quality; Shelf Life.

Study of the Technological and Sensory Quality of Gluten-Free Baguette Bread Based on Hydrothermally Treated Rice-Corn Formula

Souad Boulemkahel [1], Amel Betrouche [1], Ahlem Dib [1], Azhar Abdennebi [2], Djihane Akerdemagh [2], Leila Benatallah [1]

[1] *Laboratory of Agro-Food Engineering (GéniAAl), Institute of Nutrition, Food and Agri-Food Technologies (INATAA), University Constantine 1 Frères Mentouri (UC1FM), Constantine, Algeria*

[2] *Institute of Nutrition, Food and Agri-Food Technologies (INATAA), University Constantine 1 Frères Mentouri (UC1FM), Constantine, Algeria*

ABSTRACT

Background: Rice-corn formula (RCF) is often used for gluten-free baguette bread (GFBB) intended mainly for celiac patients. However, achieving the desired technological and sensory quality in gluten-free products remains a challenge compared to traditional wheat-based breads. **Aims:** Our present investigation aims to study the impact of hydrothermal treatment (HTT) of rice-corn formula (RCF) on the technological and sensory quality of gluten-free baguette bread (GFBB) intended mainly for celiac patients. **Methods:** The used flours, soft wheat flour (SWF), improved RCF, and unimproved RCF were characterized (moisture and ash content, particle size distribution, bulk density (BD), water absorption capacity (WAC), oil absorption capacity, swelling volume, and water retention capacity (WRC)). The GF bread-making was carried out with native and hydrothermally treated (HTT) improved and unimproved CRF, then compared to wheat control bread (WCB). A technological characterization of the breads was carried out: specific volume, baking weight loss (BWL), final moisture, the color of the crust and the crumb, and crumb alveolar structure. The sensory quality evaluation of breads was carried out using a hedonic test and a ranking according to preference. **Results:** The improved rice-corn flour (RCF) showed superior hydration properties, and hydrothermal treatment enhanced bread weight loss, swelling, moisture, crumb structure, and sensory quality, while also modifying color parameters, making gluten-free barley bread (GFBB) with improved and treated RCF the most appreciated by tasters. **Conclusions:** Indeed, the combination of HTT and the presence of improvers significantly enhance the technological and sensory quality of GFB based on RCF.

Keywords: Rice-Corn Formula; Gluten-Free Baguette Bread; Hydrothermal Treatment; Starch Gelatinization; Technological Quality.

Sensory and Microstructural Analyses of an Innovative Bread Enriched with Fermented Acorn and Sorghum Flours

Hayat Bourekoua, Rayene Belmouloud

Equipe FNPAA, Laboratoire de Nutrition et Technologie Alimentaire (L.N.T.A.), Institut de la Nutrition, de l'Alimentation et des Technologies Agro-Alimentaires (I.N.A.T.A-A.), Université Constantine 1 Frères Mentouri, Constantine, Algeria

ABSTRACT

Background: Bread, though one of the most widely consumed staple foods globally, is now being innovated through sustainable, health-promoting formulations using alternative and fermented grains as substitutes for refined wheat, driven by sustainability imperatives and evolving consumer demands. **Aims:** This work aimed to develop two dietary breads by replacing wheat flour with fermented sorghum and acorns with the goal of offering healthier products, while evaluating their sensory and microstructural profiles. **Methods:** Two central composite designs (CCD) were used to optimize the formulation of two enriched breads, based on technological parameters. A control bread made from wheat flour was used. The incorporation levels ranged from 3 to 30 g/100 g (w/w) for fermented acorn flour and from 3 to 25 g/100 g (w/w) for fermented sorghum flour. The optimal breads were then characterized for their sensory and microstructural properties: a hedonic test was performed with 60 panelists, and microstructure was conducted using a scanning electron microscope. **Results:** Optimal formulations were obtained with 4.12 g of fermented acorn flour and 5.47 g of fermented sorghum flour. Sensory analysis revealed a significant preference for acorn-enriched bread, with higher scores for texture (7.52) and acidity (6.13), and overall better appreciation compared to sorghum bread. Fermented flours improved bread appearance and aroma. Microstructural analysis showed acorn breads had a more open, uniform matrix with well-defined pores and cohesive protein-starch networks, while sorghum breads exhibited a fibrous, irregular structure with some disintegration at ×1000 magnification, though surfaces displayed well-incorporated rounded granules at ×2500 compared to the control. **Conclusions:** In conclusion, breads using fermented sorghum and acorns have distinct sensory profiles and improved microstructural textures. This demonstrates how challenging it is to develop novel sensory profiles while yet satisfying client demands.

Keywords: Fermented Acorn; Fermented Sorghum; Bread; Sensory Evaluation; Microstructure.

Techno-Functional Properties of Dried and Debittered Daper Berry Powders (*Capparis spinosa* L.) for Food Applications

Samira Bouza [1], Loucif Chemache [1], Farida Kehal [2], Feriel Litim [1], Hacène Namoune [1]

[1] *Laboratoire de la Nutrition et de Technologie Alimentaire (LNTA) Constantine, Algeria*

[2] *Laboratoire de recherche en Sciences Alimentaires, Formulation Innovation Valorisation et Intelligence Artificielle (SAFIVIA), Institut de la Nutrition et des Technologies AgroAlimentaires, Université Constantine 1 Frères Mentouri, Constantine, Algeria*

ABSTRACT

Background : Caper berries (*Capparis spinosa* L.) represent an underexplored botanical resource despite their abundance in Mediterranean regions and their traditional use in local food systems. Beyond their known sensory and nutritional attributes, their transformation into functional ingredients remains insufficiently documented. **Aims:** Developing techno-functional powders from caper berries could open new opportunities for their valorization in innovative and health-oriented foods. This study evaluates the physical and techno-functional properties of dried and debittered caper berry powders to assess their suitability for agri-food formulation. **Methods:** Fresh fruits were hand-harvested in three Algerian regions (Mila, Sétif, and Bejaia) and processed using two preservation methods: (i) drying followed by grinding and (ii) debittering through brining prior to drying and grinding. The powders obtained were analyzed for hydration properties, flowability (Carr Index and Hausner Ratio), and

densimetric characteristics. **Results:** Results show that the two powders exhibit similar Carr and Hausner values, indicating satisfactory flow properties. However, water-holding capacity (WHC) and water-absorption capacity (WAC) were higher in the dried powder compared with the debittered one. Densimetric parameters—including bulk, tapped, and true densities—were significantly different ($p > 0.05$) between the two powders. **Conclusions:** These findings confirm the technological relevance of both powders and demonstrate their potential as functional ingredients suitable for incorporation in a wide range of food matrices. Their hydration and flow properties make them promising candidates for developing innovative formulations or improving the functional profile of conventional products.

Keywords: *Capparis Spinosa* L., Caper Berry Powder; Debittering; Hydration Properties; Techno-Functional Functionality.

Impact of the Incorporation of Carob Powder on the Physicochemical, Colorimetric, and Functional Properties of Traditional Couscous

Fatima Brahimi [1,2], Farida Kehal [1,2], Malak Errahmene Bouhaha [3], Ibtissem Bendagga [3], Tahani Fridjat [3], Loucif Chemache [2], Namoune Hacène [2], Malika Barkat [1]

[1] *Laboratoire de recherche en Sciences Alimentaires, Formulation Innovation Valorisation et Intelligence Artificielle (SAFIVIA), Institut de la Nutrition, de l'Alimentation et des Technologies Agro-Alimentaires (INATAA), Université Frères Mentouri Constantine 1, Constantine, Algeria*

[2] *Laboratoire de Nutrition et Technologie Alimentaire (LNTA), Institut de la Nutrition, de l'Alimentation et des Technologies Agro-Alimentaires (INATAA), Université Frères Mentouri Constantine 1, Constantine, Algeria*

[3] *Institut de la Nutrition, de l'Alimentation et des Technologies Agro-Alimentaires (INATAA), Université Frères Mentouri Constantine 1, Constantine, Algeria*

ABSTRACT

Background: Couscous, a staple in Algerian cuisine, can be nutritionally enhanced through enrichment with carob powder, offering soluble fibers, polyphenols, galactomannans, and natural sugars as a sustainable strategy to improve health benefits without altering traditional dietary habits. **Aims:** This study evaluates the impact of incorporating carob powder at different rates (0%, 10%, 20%, and 30%) on the physicochemical, colorimetric, and functional properties of traditional couscous. **Methods:** The formulations were prepared using durum wheat semolina according to the traditional couscous preparation process, then subjected to analyses focusing on moisture, ash, dietary fiber, protein, and lipids, as well as the content of bioactive compounds (total polyphenols and flavonoids) and antioxidant activity. At the same time, the colorimetric parameters of the CIELAB system (L^*, a^*, b^*) were evaluated to determine the visual effect induced by the addition of carob. **Results:** The results show that the enrichment with carob powder leads to a significant increase in fiber, minerals, and sugars. Conversely, proteins and fats gradually decrease. An increase in polyphenols and antioxidant activity, reflecting an enhancement of the functional potential and nutritional value of couscous. On the colorimetric level, a decrease in luminosity values (L^*) is observed, accompanied by an increase in red (a^*) and yellow (b^*) tones, reflecting a progressive darkening of the product, attributable to the natural pigmentation of the carob and its content of bioactive compounds. **Conclusions:** These results highlight the relevance of carob powder as a natural functional ingredient to develop couscous enriched with fiber and antioxidants, meeting current expectations in terms of health, nutrition, and the valorization of traditional products.

Keywords: Couscous; Carob Powder, Physicochemical Properties; Antioxidants; Color.

Caper (*Capparis Spinosa*) Young Shoots: Debittering, Bioactive Composition, and Potential for Food Use

Loucif Chemache [1], Farida Kehal [2], Samira Bouza [1], Feriel Litim [3], Malak Bouhaha [3], Hacène Namoune [1]

[1] *Laboratoire de la Nutrition et de Technologie Alimentaire (LNTA), Constantine, Algeria*

[2] *Laboratoire de recherche en Sciences Alimentaires, Formulation Innovation Valorisation et Intelligence Artificielle (SAFIVIA), Constantine, Algeria*

[3] *Institut de la Nutrition et des Technologies Agro-alimentaires, Université Constantine 1 Frères Mentouri, Constantine, Algeria*

ABSTRACT

Background: Caper (*Capparis spinosa* L.) is traditionally exploited for its flower buds (capers), while other plant parts remain underutilized in human nutrition. This study investigates the valorization of young vegetative shoots, a tender yet highly bitter fraction. **Aims:** The study aims to investigate the valorization of young vegetative shoots and evaluate the impact of a debittering process on their nutritional, antioxidant, and sensory properties to assess their potential as a functional plant ingredient. **Methods:** Young shoots were harvested at the tender stage, washed, and subjected to a debittering process consisting of successive water immersions to reduce bitterness. After gentle drying, extracts were prepared to determine polyphenols, flavonoids, chlorophyll a and b, and carotenoid pigments using standard spectrophotometric methods. Antioxidant activities were assessed through DPPH and FRAP assays. A sensory evaluation was also conducted with a semi-trained panel to assess residual bitterness, texture, and overall acceptability. **Results:** The study determined that debittering young shoots via aqueous treatment effectively reduces bitterness while maintaining high nutritional and sensory quality. Despite processing, the shoots retained significant levels of phenolic compounds and flavonoids, alongside stable concentrations of carotenoids and chlorophylls a and b. These preserved bioactives translated into robust antioxidant performance. Sensory evaluations confirmed that the treatment successfully neutralized bitterness while preserving a tender texture and desirable vegetal aroma, significantly enhancing overall acceptability. **Conclusions:** Overall, debittered young caper shoots appear as a promising new plant resource, combining nutritional interest, noteworthy antioxidant activity, and favorable sensory attributes.

Keywords: Caper Shoots; Debittering; Techno-Functional Properties; Antioxidant Activity; Food Applications.

Formulation of Biscuit Flour Enriched with Soft Wheat Germ: A Physicochemical Approach

Derouiche Meriem [1], Benabid Hamida [1], Medjoudj Hacène [3], Boukezzoula Fatima [2], Ayad Nourhan, Bencharif Meriem [1]

[1] *Laboratory of Food Engineering, Institute of Nutrition, Food and Agrifood Technologies (INATAA) University of Constantine 1, Constantine, Algeria*

[2] *Institute of Natural and Life Sciences University Larbi Ben Mhidi of Oum El Bouaghi, Algeria.*

[3] *Abdelhafid Boussouf University Center, Mila, Algeria*

ABSTRACT

Background: Soft wheat germ, a cereal processing by-product, is rich in high-quality proteins, unsaturated fatty acids, dietary fiber, vitamins, and antioxidants, offering significant nutritional and functional potential. **Aims:** The present study aims to examine the effect of the progressive incorporation of wheat germ flour on the physicochemical characteristics of flour intended for biscuit manufacturing. **Methods:** Five flour formulations (F1 to F5) were developed by gradually incorporating wheat germ flour at substitution levels ranging from 3% to 15% into soft wheat flour (type T55). Physicochemical analyses were carried out on both the raw materials (Soft wheat flour and wheat germ flour) and the composite flours (F1 - F5). The parameters evaluated included moisture content (oven-drying method), pH and titratable acidity, crude fat content determined by Soxhlet extraction, and ash content determined using a muffle furnace incineration method. **Results:** The results demonstrated that the incorporation of wheat germ flour significantly influenced the physicochemical properties of the flour. The pH level climbed from 6.72 to 6.95, the titratable acidity decreased from 0.029 to 0.117, the ash content rose from 0.52% to 1.20%, and the fat content decreased from 1.41% to 2.32%, resulting in a slight decrease in moisture from 12.4% to 11.52. Overall, the gradual incorporation of wheat germ flour enhances the nutritional quality of biscuit flour by improving its fat and mineral. **Conclusions:** These findings support the current trend of enriching bakery products with nutrient-dense ingredients without compromising their technological properties.

Keywords: Biscuit; Formulation; Physicochemical; Wheat Germ.

Development of a Novel Gluten Free Muffin Enriched with Chestnut Flour: Physical, Textural, Sensory, and Antioxidant Characteristics

Ahlem Dib [1], Agnieszka Wojtowicz [2], Leila Benatallah [1]

[1] *Université Constantine 1-Frères Mentouri. Institut de la Nutrition, de l'Alimentaton et des Technologies Agro-alimentaires (INATAA), Constantine, Algeria*

[2] *Department of Thermal Technology and Food Process Engineering, University of Life Sciences in Lublin, Głęboka 31, 20-612 Lublin, Poland.*

ABSTRACT

Background: Chestnut fruit abounds in carbohydrates, proteins, unsaturated fatty acids, fiber, and polyphenolic compounds, as well as vitamins and micronutrients, that are behind the health-promoting properties of this plant. **Aims:** This study investigates the potential of substituting rice flour (RF) with chestnut flour (CF) at levels of 10–50% to produce gluten-free, nutritionally healthy muffins. **Methods:** Regarding the studied muffins, the following were determined: the physical, textural, antioxidant, chemical composition, and sensory properties. Chromatographic analysis (HPLC-ESI-MS/MS (high-performance liquid chromatography-electrospray ionization tandem mass spectrometry)) was used to reveal the variety of phenolic acids. **Results:** L'évaluation technologique a montré une amélioration du volume spécifique des muffins enrichis en farine de châtaigne (CF), supérieure à celle du témoin sans gluten, avec un maximum atteint à 40% de CF (3,45 cm^3/g) et une humidité finale plus faible. L'incorporation de cet additif a permis d'obtenir une bonne structure alvéolaire, les muffins à 30 et 40% de CF présentant les plus grandes tailles de cellules et fractions de surface. Les propriétés texturales ont révélé des valeurs favorables de dureté et d'adhésivité par rapport aux muffins témoins à base de farine de riz. Sur le plan nutritionnel, la teneur en fibres alimentaires totales a significativement augmenté. **Conclusions:** Our research has demonstrated that our innovative gluten-free muffins, with the addition of chestnut flour, have the potential to be a source of polyphenolic compounds, including free phenolic acids, that are valuable for human health.

Keywords: Gluten-Free Muffins, Chestnut Flour; Functional Food, Textural Properties, Antioxidant Activity.

Valorization of Agri-Food Co-Products as an Appetite Suppressant Dietary Supplement

Anissa Djadli [1], Dahbia Ines Dahmani [2], Yasmine Boudida [3]

[1] *Department of Biochemistry and Molecular and Cellular Biology, Faculty of Nature and Life Sciences, Constantine, Algeria*

[2] *Department of Biochemistry and Molecular and Cellular Biology, Faculty of Nature and Life Sciences, Constantine, Algeria*

[3] *The Institute of Nutrition, Food and Agri-Food Technologies (INATAA), Constantine, Algeria*

ABSTRACT

Background: Obesity and overweight are major health issues today, constantly increasing in the world due to a dietary imbalance and an increasingly sedentary lifestyle. To meet this challenge, we offer a natural and innovative solution: Green Faim, an appetite suppressant formulated from valorized agri-food co-products. Green Faim is based on a functional combination of agri-food by-products. **Aims:** The scientific study conducted around this product has integrated several series of tests (in vitro, in vivo, and in silico) to characterize its properties and evaluate its potential as a natural weight management supplement. **Methods:** The physicochemical analyses made it possible to determine the composition in protein, lipid, sugar, and pH and the gastric swelling test. The in vivo tests were carried out on rats subjected to a hypercaloric cafeteria-like diet in order to simulate experimental obesity; the objective was to evaluate the impact of Green Faim on appetite by evaluating food consumption and body weight changes, and finally the data are processed in silico by SPSS. **Results:** The analysis of physicochemical parameters revealed that our sample is rich in protein with a percentage of 15.08%, lipid 10.41%, sugar 2.61%, and pH of 5.33, and for the swelling test gave an index of 9 ml/g. It's to say that the product is capable of absorbing 9 ml of water, which translates to a feeling of rapid satiety. Statistical analysis shows that the product has an appetite suppressant effect of 31.5% and a slimming effect of 25.1%. **Conclusions:** In conclusion, Green Faim represents a natural, economic, and sustainable alternative to support the fight against obesity and overweight. Its physicochemical properties, its high swelling capacity, and the positive results from in vitro, in silico, and in vivo studies confirm its potential as an innovative dietary supplement promoting the regulation of appetite.

Keywords: Obesity; Agri-Food Co-Products; Green Faim; Gastric Swelling Test; Appetite Suppressant.

Study of the Proteolytic Activity of an Indigenous Strain Isolated From Traditional *Klila* Cheese

Safa Elhadjali [1,2], Faiza Boughachiche [1,2], Boutheyna Khemaci [1], Douaa Ziani [1], Serine Mahcene [1]

[1] *Institute of Nutrition, Food and Agri-Food Technologies, Constantine 1Frères Mentouri University, Algeria*

[2] *Biotechnology and Food Quality Research Laboratory (BIOQUAL), Constantine, Algeria*

ABSTRACT

Background and Aim: The traditional Algerian cheese 'Klila' is a matrix rich in indigenous microorganisms that may have promising functional activities. The present study aims to produce and study the proteolytic enzymes of a Lactococcus strain isolated from this fermented product. **Methods:** After fermentation, proteolytic activity was measured. The various properties of the enzyme produced were then studied at different temperatures (30 to 80°C) and different pH levels (pH 5 to 12). **Results:** The results revealed interesting activity, with maximum values at 30°C (and stable up to 70°C) and pH 9. This alkaline and thermostable protease highlights its potential as a biocatalyst for demanding industrial applications. **Conclusions:** The study thus highlights the importance of using indigenous strains from traditional foods in the development of functional foods, contributing to both food safety and biotechnological innovation.

Keywords: Klila; Proteolytic Activity; *Lactococcus*; Production; Lactic Acid Bacteria.

Effect of Honey Addition on Physical Properties, Oxidative Stability, and Digestibility of Margarine

Nawel Guenaoui [1], Salim Ouchemoukh [1], Rim Salhi [2], Lynda Moumeni [1], Lynda Benchekhchoukh [1], Rabha Ayad [2], Nadia Amessis-Ouchemoukh [2]

[1] *Université de Bejaia, Faculté des Sciences de la Nature et de la Vie, Laboratoire de Biochimie Appliquée, Bejaia, Algeria*

[2] *Université de Bejaia, Faculté des Sciences de la Nature et de la Vie, Laboratoire de Biomathématique, Biochimie, Biophysique et Scientométrie (L3BS), Bejaia, Algeria*

ABSTRACT

Background: Margarine is a widely consumed fat product, but its oxidative stability and nutritional profile can be further optimized. Honey is a natural ingredient known for its bioactive properties that could potentially enhance the quality and health benefits of such lipid-based spreads. **Aims:** The present study investigated the effect of adding honey on the physicochemical properties, oxidative stability, lipid digestion, and price of margarine produced on a pilot scale. **Methods:** The margarine containing honey (MH) was compared to a control commercial margarine (MC). Analyses included the measurement of color, pH, humidity, solid fat content, and rheological properties (elastic modulus G'). Polarized light microstructural analysis was performed to observe crystal dimensions. Oxidative stability was tested under accelerated storage conditions (45 and 60°C for up to 90 days), and the efficiency of lipid digestion was evaluated. A price comparison was also conducted. **Results:** Honey addition modified margarine color, pH, humidity, and solid fat content, which, however, were within the ranges set for margarine standards. MH also showed higher elastic modulus (G)' values than MC, which, however, did not impair margarine spreadability. Polarized light microstructural analysis showed that honey addition increased crystal dimension. Under accelerated storage conditions (45 and 60°C for up to 90 days), the oxidative stability of MH was significantly higher than that of MC. In addition, the presence of honey improved the efficiency of lipid digestion (66%) compared to that of MC (54%). The price of MH was 3.20 €/kg compared to 2.75 €/kg for MC. **Conclusions:** Despite the higher price of MH (3.20 €/kg) than that of MC (2.75 €/kg), honey presents high potential application prospects in margarine, driven by its ability to increase product oxidative stability and to modulate lipid digestibility.

Keywords: Algerian Honey; Oxidative Stability; Structural Properties; *In vitro* Digestibility; Price.

Innovative Pharmacological Assessment of *Capparis spinosa* l.: Antioxidant, Anti-inflammatory and Gastroprotective Potential for Phytomedicine Development

Sihem Halmi, Aicha Madi, Chouaib Kandouli

Faculty of Natural and Life Sciences, Frères Mentouri University of Constantine 1, Constantine, Algeria

ABSTRACT

Background: *Capparis spinosa* L. (Caper plant) is a traditional medicinal species widely used in Mediterranean medicine to treat inflammatory disorders, gastric dysfunctions and skin infections. **Aims:** The present study investigates its therapeutic potential through a combined in vitro and in vivo pharmacological approach, aiming to explore its suitability for the development of an innovative natural health product. **Methods:** A methanolic extract of *C. spinosa* leaves was subjected to phytochemical profiling, which revealed a high content of polyphenols, flavonoids, alkaloids and glucosinolates. The antioxidant potential was evaluated using the DPPH radical scavenging assay. Antimicrobial activity was assessed against Gram-positive and Gram-negative pathogenic bacteria. In vivo evaluation focused on anti-inflammatory and gastroprotective activities using carrageenan-induced paw edema and ethanol-induced gastric ulcer models. Additionally, analgesic activity was observed using the acetic acid-induced writhing test. Toxicological assessment was also performed to evaluate acute toxicity. **Results:** The antioxidant potential demonstrated strong free radical inhibition, closely correlated to the total phenolic content. Antimicrobial activity showed significant inhibition zones particularly against *Staphylococcus aureus* and *Escherichia coli*. The extract significantly reduced inflammatory edema and demonstrated remarkable gastric mucosal protection, comparable to standard anti-ulcer drugs. Additionally, analgesic activity was observed, suggesting the presence of bioactive compounds capable of modulating pain pathways. Toxicological assessment revealed low acute toxicity, supporting its safety within therapeutic dose ranges. **Conclusions:** These findings highlight the promising potential of *Capparis spinosa* as a candidate for the development of innovative phytotherapeutic products. Further investigations, including bio-guided fractionation and clinical validation, are recommended to identify active components and accelerate their pharmaceutical valorization.

Keywords: *Capparis Spinosa*; Antioxidant; Gastroprotective; Antimicrobial; Phytotherapy.

Capparis spinosa L.: Toward a Sustainable Natural Antioxidant and Antimicrobial Innovative Product

Sihem Halmi, Aicha Madi, Chouaib Kandouli

Faculty of Natural and Life Sciences, Frères Mentouri University of Constantine 1, Constantine, Algeria.

ABSTRACT

The growing demand for sustainable and natural health solutions encourages the exploration of Mediterranean medicinal plants with high added value. *Capparis spinosa* L. (caper plant), widely distributed in Algeria, stands out as a promising candidate for the development of innovative bioactive products. **Aims:** This study focuses on the biotechnological valorization of *Capparis spinosa* through methanolic extraction of leaves and roots, followed by phytochemical analyses and biological assessments. **Methods:** The obtained extracts were tested for their antioxidant activity (DPPH and FRAP assays) and antimicrobial effects against *Staphylococcus aureus*, *Escherichia coli*, and *Candida albicans*. **Results:** The results reveal a significant antioxidant capacity, with IC_{50} values comparable to ascorbic acid, along with marked inhibitory effects against the tested pathogenic microorganisms. These biological activities are mainly attributed to the high content of polyphenols and flavonoids, particularly quercetin and rutin, known for their protective effects against oxidative stress and microbial infections. **Conclusions:** Overall, *Capparis spinosa* represents a strategic resource for the development of natural antioxidant and antimicrobial health products, supporting a reduction in dependency on synthetic antibiotics while promoting the sustainable valorization of Algerian biodiversity. This approach contributes to responsible innovation, linking public health, plant biotechnology, and sustainable development.

Keywords: *Capparis spinosa* L; Plant Biotechnology; Natural Antioxidants; Antimicrobial.

Evaluation of Alpha Amylase Inhibitory Activity and Antioxidant Activities of Algerian Chickpea (*Cicer arietinum* L.) Flour and Dderived Milk

Aya Hamioud [1], Farida Benmeziane [1,2], Chawki Bensouici [3], Lynda Djermoune-Arkoub [1,4], Ouarda Aissaoui- Zitoun [5], Leila Benatallah [6], Halima Boughellout [6]

[1] *Université de Bejaia, Faculté des Sciences de la Nature et de la Vie, Département de Biologie, Laboratoire de Biomathématiques, Biophysique, Biochimie et Scientométrie (L3BS), Bejaia, Algeria*

[2] *Département des Sciences Agronomiques, Faculté des Sciences Naturelles et de la Vie, Université Chadli Bendjedid d'El-Tarf, Algeria*

[3] *Biotechnology Research Center, UV 03, Constantine, Algeria*

[4] *Faculté de Technologie/Département de Génie des Procédés, Bejaia, Algérie*

[5] *Agro-Food Engineering Laboratory (GENIAAL), Institut de La Nutrition, de l'Alimentation Et Des Technologie Agro-Alimentaires (INATAA) University Mentouri Constantine 1 (UFMC1), Constantine, Algeria*

[6] *Département de Technologie Alimentaire, Laboratoire de génie industriel alimentaire, Institut de l'alimentation de la Nutrition et des Technologies Agroalimentaires (INATAA), Université Constantine 1, Algeria*

ABSTRACT

Background: Legumes have recently attracted growing attention for their positive impact on human health, including lowering the risk of type 2 diabetes, cardiovascular diseases, certain cancers, and obesity. These benefits are linked to their rich nutritional profile and bioactive compounds such as flavonoids, phenolic acids, tannins, and saponins. Among them, chickpeas (*Cicer arietinum* L.) stand out due to their long history of both edible and medicinal use. They are particularly rich in plant proteins, vitamins, minerals, and essential amino acids, which support diverse biological activities including antioxidant and antidiabetic effects. However, chickpeas also possess an antinutritional property through their ability to inhibit α-amylase, an enzyme responsible for starch breakdown. **Aims:** The growing demand for plant-based milk alternatives beyond soy beverages is driven by different reasons, from health-related issues to environmental impacts. Therefore, developing protein-rich drinks from pulses, such as chickpeas, offers a promising alternative to dairy, providing numerous health benefits. **Methods:** The study evaluated the α-amylase inhibitory activity, using the iodine/potassium iodide (IKI) method, and the antioxidant activities (ABTS, DPPH assays) of methanolic extracts from chickpea milk and chickpea flour. **Results:** The chickpea milk extract demonstrated a higher α-amylase inhibitory activity (22%) compared to the flour extract (14%). In terms of antioxidant ability, both chickpea milk and flour samples showed significant ABTS scavenging activity, with an inhibition percentage of 58% and 46%, respectively. However, their DPPH radical scavenging activity was notably lower. **Conclusions:** Chickpea milk enhances the bioavailability of bioactive compounds, making key nutrients and phytochemicals more accessible. It emerges as a promising functional beverage with notable health benefits, including significant α-amylase inhibition that supports carbohydrate digestion control and blood sugar management.

Keywords: α-Amylase Inhibition; Chickpea Milk; Legumes; Antioxidant Activity; Bioactive Compounds.

Formulation and Characterization of a *Cherbet*-Type Beverage Enriched with Whey and Matcha Tea: Experimental Study at the CRSTRA-Biskra

Nadia Hassina [1], Khadidja Medjaneh [1], Nouha Zaaboub [1], Ourida Benouamane [2], Mawahib Djedidi [2], Souad Hammadi [2], Abdelhamid Foughalia [2]

[1] *CQIAA, INSFP HASSANI Bouneb, Biskra, Algiers, Algeria*

[2] *Center of Scientific and Technical Research on Arid Region (CRSTRA), Campus of Mohamed Khider University, Biskra, Algeria*

ABSTRACT

Background: *Cherbet* is a traditional Algerian lemon-based beverage appreciated for its refreshing character but limited nutritional value. Whey, a nutrient-rich dairy by-product, and matcha, known for its high polyphenol content and antioxidant potential. **Aims:** The objective of this study was to develop and characterize an innovative functional whey-based *cherbet* enriched with different concentrations of liquid matcha extract, and to evaluate its physicochemical properties, antioxidant activity, microbiological quality and sensory acceptability. **Methods:** Three formulations were prepared using 10 ml (A), 5 ml (B), and 2.5 ml (C) of matcha extract per 100 ml of beverage. Physicochemical properties, mineral content (K^+, Na^+) and antioxidant activity (DPPH) were analyzed. Microbiological quality was assessed after 48h by determining total aerobic mesophilic flora (FMAT), total and fecal coliforms, Salmonella spp., Staphylococcus aureus, yeasts, and molds. Sensory test was evaluated by 30 panelists. **Results:** The addition of matcha extract significantly affected the physicochemical, antioxidant, and sensory characteristics of whey-based *cherbet*. Compared with the latter, matcha-enriched formulations showed a decrease in pH from 2.81 to 2.55 and an increase in titratable acidity up to 0.9 g/L. Dry matter increased from 5.7% to 6.4%, while ash content rose from 0.20% to 0.73%, indicating improved mineral contribution. Potassium and sodium contents reached 21.94 mg/L and 23.26 mg/L, respectively, in the enriched beverages. Antioxidant activity was enhanced by matcha incorporation, with DPPH radical

inhibition increasing from 65.45% to 68.05%. Sensory evaluation demonstrated that formulation B achieved the highest overall acceptability, particularly in terms of homogeneity, color, and taste. Microbiological analyses revealed the absence of total aerobic mesophilic flora (FMAT), total and fecal coliforms, *Salmonella* spp., *Staphylococcus aureus*, yeasts, and molds in both whey cherbet and matcha-enriched samples, confirming the microbiological safety of the beverages. **Conclusions:** Matcha-enriched *cherbet* therefore represents a promising functional beverage suitable for industrial development.

Keywords: Cherbet; Whey; Matcha; Physicochemical Analyses; Microbiological Analyses.

Formulation and Characterization of Functional Gummies Enriched with Bioactive Compounds: Towards a Health-Oriented Confectionery

Amal Kahlouche [1], Haifa Bouziane [1], Hayat Himed [2], Mouhamed Mesnoua [2]

[1] *Higher School of Food Sciences and Agri-Food Industries - ESSAIA - Algiers, Algeria*

[2] *Scientific and Technical Research Center on Arid Regions -CRSTRA- Biskra, Algeria*

ABSTRACT

Background: In a context marked by the rapid expansion of the functional food market, the development of novel formulations based on natural, locally available bioactive ingredients has become a strategic research priority. **Aims:** In this regard, the present study proposes an innovative formulation and comprehensive characterization of functional gummies incorporating hibiscus infusion (*Hibiscus sabdariffa*), moringa powder (*Moringa oleifera*), and date molasses as a natural sweetening and nutritional matrix. This combination is original and was designed to exploit the complementary and synergistic nutritional and functional properties of these plant-based ingredients, particularly their antioxidant potential and micronutrient richness. **Methods:** The formulation process was optimized through a series of preliminary trials aimed at identifying optimal ingredient ratios while maintaining desirable physicochemical stability and sensory quality. A standardized production protocol, including controlled mixing, cooking, and molding steps, was established to ensure product homogeneity, stability, and reproducibility. A multidisciplinary quality assessment was conducted, encompassing physicochemical and biochemical analyses such as sugar content, hydroxymethylfurfural (HMF) content, pH, ash content, total polyphenols, flavonoids, antioxidant activity, mineral composition (Mg, Ca, K, Na), and dispersion time. Furthermore, consumer-based sensory evaluation was performed to assess overall acceptability, focusing on taste, texture, appearance, and odor. **Results:** The findings demonstrate that the developed gummies exhibit a balanced nutritional–functional profile with enhanced antioxidant properties, while promoting the valorization of underexploited local natural resources. **Conclusions:** This work highlights a sustainable and eco-innovative strategy for the development of functional confectionery with potential applications in the health-oriented food sector.

Keywords: Functional Gummies; *Hibiscus sabdariffa*; *Moringa oleifera*; Date Molasses; Bioactive Compounds.

Effect of Bay Leaf and Basil as Natural Preservatives on the Physicochemical, Microbiological, and Sensory Properties of Butter

Farida Kehal [1,2] , Loucif Chemache [2], Yahia Guouaidia [3], Diaa Eddine Bellarguet [3], Malika Barkat [1]

[1] *Laboratoire de recherche en Sciences Alimentaires, Formulation Innovation Valorisation et Intelligence Artificielle (SAFIVIA), Institut de la Nutrition, de l'Alimentation et des Technologies Agro-Alimentaires (INATAA), Université Frères Mentouri Constantine 1, Constantine, Algeria*

[2] *Laboratoire de Nutrition et Technologie Alimentaire (LNTA), Institut de la Nutrition, de l'Alimentation et des Technologies Agro-Alimentaires (INATAA), Université Frères Mentouri Constantine 1, Constantine, Algeria*

[3] *Institut de la Nutrition, de l'Alimentation et des Technologies Agro-Alimentaires (INATAA), Université Frères Mentouri Constantine 1, Constantine, Algeria*

ABSTRACT

Background: Aromatic plants are known for their antimicrobial and antioxidant properties, making them promising natural preservatives in food. **Aims:** This study investigated the effect of incorporating bay leaf (*Laurus nobilis*) and basil (*Ocimum basilicum*) into butter. **Methods:** We analyzed physicochemical properties such as fat content, pH, moisture, and photosynthetic pigments (chlorophyll a and b). Microbiological safety was assessed by monitoring total aerobic bacteria, coliforms, *Staphylococcus aureus*, and *Salmonella*. Sensory evaluation was performed using a trained panel and a hedonic test. **Results:** Adding 2% bay leaf or basil maintained a high fat content (65 ± 4.04 mg/100 g for bay leaf, 62 ± 3.05 mg/100 g for basil) and significant levels of chlorophyll a and b. Microbiological tests confirmed product safety and reduced spoilage, while sensory scores indicated that these additions improved acceptability compared to the control. **Conclusions:** Overall, bay leaf and basil appear to be effective natural preservatives with real potential for enhancing the quality and shelf life of dairy products.

Keywords: *Laurus Nobilis; Ocimum basilicum;* Butter*;* Natural Preservatives*;* Microbiological Quality.

Influence of Ethanolic Stress on the Lipase Activity of *Yarrowia lipolytica* Cultivated on Olive Mill Wastewater and Used Frying Oil

Amina Laribi [1], Doria Naila Bouchedja [1], Bartłomiej Zieniuk [2], Madjda Bouchedja [1]

[1] *Laboratory of Food Sciences, Formulation, Innovation, Valorization & Artificial Intelligence (SAFIVIA) Biomass Production Modeling & Enzyme Valorization Team/Institute of Nutrition and AgrI-Food Technologies (INATAA), University Constantine 1 – Frères Mentouri (UFMC1), Constantine, Algeria*

[2] *Department of Chemistry, Institute of Food Sciences, Warsaw University of Life Sciences-SGGW, Warsaw, Poland*

ABSTRACT

Background: The ability of *Yarrowia lipolytica* to produce extracellular lipases in the presence of agro-industrial substrates represents an asset for the valorization of residues. **Aims:** This study examines the lipase activity of the strain *Y. lipolytica* L2 cultivated in two distinct media, used frying oil (WFO) and olive mill wastewater (OMW), subjected to increasing ethanolic stress (0%, 3%, 5%, and 7%, v/v). **Methods:**

Enzymatic activity was determined using p-nitrophenyl laurate after 48, 72, and 96 h of incubation. The study compared the production profiles in both used frying oil and olive mill wastewater under varying concentrations of ethanol. **Results:** The results reveal a markedly faster induction in olive mill wastewater, where activity reached 0.55 ± 0.11 U mL^{-1} at 5% ethanol after 48 h, whereas the used oil medium remained weakly active (p < 0.05 U mL^{-1}). At 72 h, a pronounced increase was observed with used oil, peaking at 0.32 ± 0.01 U mL^{-1} at 3% ethanol, while olive mill wastewater showed a slight decrease, particularly at 7% (0.08 ± 0.01 U mL^{-1}). After 96 h, olive mill wastewater maintained high activity under 3% ethanol (0.44 ± 0.05 U mL^{-1}), unlike the oily medium, which remained low (0.05 – 0.09 U mL^{-1}). In both media, 7% ethanol exerted a pronounced inhibitory effect. **Conclusions:** These results show that olive mill wastewater constitutes a more favorable substrate for rapid and sustained lipase production and that moderate ethanol concentrations stimulate enzymatic expression, unlike 7%, which leads to significant inhibition. This differential behavior highlights the interest of olive mill wastewater for biotechnological applications involving *Y. lipolytica* under controlled stress.

Keywords: *Yarrowia Lipolytica;* Lipase Activity; Ethanolic Stress; Olive Mill Wastewater; Used Frying Oil.

Study of Enzymatic Activities and Exopolysaccharide Production by Actinobacteria Isolates

Nassima Leulmi [1,2] Ryma Merabti [3], Nozha Mayouf [1]
[1] *Department of Cellular and Molecular Biology, University Abbes Laghrour, Khenchela, Algeria*
[2] *Laboratory of Mycology, Biotechnology and Microbial Activity. University of constantine 1, Algeria*
[3] *Laboratory of Biotechnology and Food Quality, Institute of Nutrition, Food and Agri-Food Technologies (INATAA), University of Constantine 1, Algeria*

ABSTRACT
Background: Actinobacteria are Gram-positive bacteria characterized by their production of bioactive molecules of great importance in the biotechnological field. The study focused on the degradation capacity of five different substrate isolates and their ability to produce EPS (simplified polystyrene) from a submerged environment. **Aims:** This work demonstrates the antimicrobial activity specifically, the antifungal and antibacterial activity of actinobacteria isolates coded AB1 to AB5 from the semi-arid soil of the Tébessa province. **Methods:** The enzymatic activity of the actinobacteria isolates was evaluated to test their capacity for producing hydrolytic enzymes (amylases, proteases, pectinases, cellulases, xylanases, and gelatinases). The study also measured the emulsifying power of the produced exopolysaccharides (EPS) to determine their potential for industrial applications. **Results:** The enzymatic activity of the actinobacteria isolates showed that all five isolates possess a good capacity for producing hydrolytic enzymes, including amylases, proteases, pectinases, cellulases, xylanases, and gelatinases. Among them, isolate AB3 proved to be potentially very active. The exopolysaccharides (EPS) produced by our isolates exhibit strong emulsifying power, which makes them particularly interesting in various industrial applications, especially in the food sector. In particular, the EPS of isolate AB4 stood out with a high emulsification index of 92.3%, indicating high efficiency in stabilizing emulsions. **Conclusions:** These results suggest that these EPS could be used as natural emulsifying agents in the agri-food and biotechnological sectors. The isolation of these strains from the semi-arid soil of Tébessa highlights the potential of local biodiversity for discovering high-performance bioactive molecules.

Keywords: Enzymatic Activity; EPS Production; Soil; *Actinobacteria*.

Contribution of Corn Silk Valorization to Sustainable Development and Food Innovation: Optimization and Application Strategies

Bilal Madagh [1], Noureddine Touati [1,2], Soraya Hihat [2,3]
[1] *Laboratory of Health and Environment, University Mohamed El Bachir El Ibrahimi of Bordj Bou Arreridj, Algeria*
[2] *Department of Food sciences, Faculty of Life and Natural Sciences and Earth and Universe Sciences, University Mohamed El Bachir El Ibrahimi of Bordj Bou Arreridj, Algeria*
[3] *Biochemistry Biophysics Biomathematics and Scientometry Laboratory (L3BS), University of Bejaia, Algeria*

ABSTRACT
Background: Natural products have gained great importance for the medicine and food industries due to their effective antioxidant activity. Natural sources such as plants, herbs, fruits, and vegetables contain various antioxidant compounds that can be extracted. In humans, these compounds aid in preventing oxidative stress diseases and counteracting oxidation processes. Some of these natural products will be consumed, but a large part will be lost. The reduction of postharvest losses is a fundamental challenge for sustainable development and innovation in the food sector. Corn silk, a major agricultural by-product generated during maize production, represents an undervalued resource with significant potential for transformation. **Aims:** This review will examine extraction, optimization (using unifactorial design and response surface methodology), and characterization strategies for bioactive compounds in corn silk, including antioxidants, flavonoids, and dietary fibers. The applications of extracted compounds in food, nutraceuticals, and health products are examined, with an emphasis on enhancing nutritional quality and minimizing environmental impact. **Methods:** Integrative approaches that combine technological innovation, green chemistry, and circular economy models are discussed as pathways to promote waste reduction, resource efficiency, and food security. The study reviews optimization techniques, specifically unifactorial design and response surface methodology (RSM), to maximize the recovery of functional components. **Results:** The review identifies corn silk as a significant source of bioactive compounds, including antioxidants, flavonoids, and dietary fibers. Strategies for characterization and extraction are highlighted, emphasizing the transition from an agricultural by-product to a high-value resource for functional applications. **Conclusions:** These findings underline the importance of reimagining by-product management as a driver of sustainable, healthy, and resilient food systems. Corn silk represents a strategic resource for food security and the nutraceutical industry through the application of green chemistry and circular economy principles.

Keywords: Sustainable Development; Corn Silk; Food Waste Reduction; Food Innovation; Circular Economy.

Actinobacterial Exopolysaccharides as Natural Biosurfactants: Production and Emulsifying Activity

Ryma Merabti [1], Nassima Leulmi [2,3], Ilhem Sellaoui [2], Chirine Sabeg [2], Bahri Fathia [1]

[1] *Laboratory of Biotechnology and Food Quality (Bioqual), Institute of Nutrition, Food and Agri-Food Technologies (INATAA), University Constantine 1, Algeria*

[2] *Department of Molecular and Cellular Biology, Faculty of Nature and Life Sciences, Abbes Laghrour University, Khenchela, Algeria*

[3] *Laboratory of Mycology, Biotechnology and Antimicrobial Activity, University Mentouri of Constantine. Ain Elbey, Constantine, Algeria*

ABSTRACT

Background: Growing environmental and health concerns regarding synthetic surfactants have intensified interest in microbially derived surface-active compounds, valued for their low toxicity, biodegradability, and biocompatibility. While biosurfactants are currently used mainly in pollutant remediation, their emulsifying, antiadhesive, antioxidant, anti-inflammatory, and antimicrobial properties offer promising opportunities in food processing and formulation. Actinobacteria are well-known producers of diverse bioactive metabolites, and their exopolysaccharides (EPS) have attracted particular attention due to their structural diversity and multifunctionality, notably as natural biosurfactants and emulsifiers. **Aims:** In the present study, five actinobacterial isolates previously obtained from semi-arid soils in eastern Algeria were cultured under controlled fermentation conditions to evaluate their ability to synthesize biosurfactant-active EPS for potential food industry applications. **Methods:** EPS produced after seven days were recovered by ethanol precipitation following biomass removal by centrifugation. Their biosurfactant and emulsifying properties were evaluated through emulsification assays in an EPS–benzene system, using Triton X-100 and PBS as positive and negative controls. **Results:** All isolates produced EPS, although yields varied among strains. Isolate AB6 produced the highest EPS quantity and exhibited a strong emulsification index (92.85%), indicating notable biosurfactant potential. Conversely, AB7 showed the lowest EPS production and a modest emulsification index (50%), while AB8, AB9, and AB10 demonstrated intermediate performance. **Conclusions:** Overall, these findings highlight the considerable biotechnological potential of actinobacteria from Algerian semi-arid soils. Their ability to synthesize biosurfactant-active EPS emphasizes the need for further investigations to more accurately assess their application potential, especially for food industry applications where they may enhance safety, functionality, and health benefits.

Keywords: Actinobacteria; Biosurfactant; Emulsifying Agent; Food Industry; Additives.

When Solanaceae Challenge Foodborne Microbes: the Case of 'Night Jasmine' (*Cestrum parqui*): *in vitro* Trials on Major Food Bacteria

Selma Nakkab [1], Yahia Nakkab [2], Hamida Mallem [3], Ghania Tail[1], Fatima Zohra Kara [1], Fairouz Saidi [1]

[1] *Biotechnology, Environment and Health Laboratory, Faculty of Natural and Life Sciences, University of Blida 1, Algeria*

[2] *Bioactive Molecules and Chiral Separation Laboratory, Faculty of Exact Sciences, University Tahri Mohamed of Bechar, Algeria*

[3] *Mechanics Laboratory, Natural Resources and Environment, Faculty of Science, Amar Telidji University of Laghouat, Algeria*

ABSTRACT

Background: Contamination from food is a major public health issue today, made worse by the growing resistance of microorganisms to synthetic antimicrobials. In this context, natural plant-derived substances offer a promising approach for the development of safer and more environmentally responsible alternatives. Night-herb-jasmine (*Cestrum parqui*), a species of the Solanaceae family, is known for its richness in bioactive compounds, particularly alkaloids, terpenes, and saponins. **Aims:** The study aims to evaluate the antimicrobial activity of *Cestrum parqui* leaf extract against bacterial strains responsible for food intoxication in Algeria. **Methods:** The bioactive compounds were extracted with ethanol using the solid-liquid V-method (1:10), and a leaf extract called EE-F was selected for this activity. The antimicrobial activity was evaluated using the agar diffusion method. The bacterial support consists of ten bacterial strains responsible for the principal cases of food intoxication in Algeria: *Escherichia coli* ATCC 25922, *Pseudomonas aeruginosa* ATCC 27853, *Klebsiella pneumoniae* ATCC 4352, *Salmonella paratyphi* ATCC 14028, *Enterococcus faecalis* ATCC 2035, *Bacillus subtilis* ATCC 9372, *Bacillus cereus* ATCC 10876, *Micrococcus leuteus* ATCC 533, *Staphylococcus aureus* ATCC 6538, and *Listeria monocytogenes* CIP 78-38. Ciprofloxacin and cefazolin were used as control standards. **Results:** The polar ethanol fraction showed significant inhibitory power against faecal strains (*Klebsiella pneumoniae*) and two species of the genus *Bacillus* (the major contaminants of dehydrated foods and cereals), and a notable antibacterial effect was observed against *Staphylococcus aureus*. **Conclusions:** The results suggest that the leaf extract of *Cestrum parqui* serves as a promising natural alternative for inhibiting key foodborne pathogens, particularly *Klebsiella*, *Bacillus*, and *Staphylococcus* species.

Keywords: *Cestrum parqui*; Leaf Extract; Food Intoxication; *In Vitro* Antimicrobial Activity; Food Bacteria.

Antibacterial Activity of Some Saharan Bacterial Strains

Kounouz Rachedi [1,2], Nassima Bensaha [1], Ouiame Chenafi [1], Amel Ait Kaki [1,2], Faiza Boughachiche [1,2], Habiba Zerizer [1,2], Karima Kharroub [1,2]

[1] *Département de Biotechnologie, Institut de la Nutrition, de l'Alimentation et des Technologies Agro-Alimentaires (INATAA), Université Constantine 1, Frères Mentouri (UC1FM), Constantine, Algeria*

[2] *Laboratoire de Biotechnologies et Qualité des Aliments (BIOQUAL, INATAA, UC1FM), Constantine, Algeria*

ABSTRACT

Background: The constant evolution of bacterial resistance to antibiotics is a major issue in human health. To address this increasingly worrying situation, numerous research projects are being implemented. **Aims:** This work focused primarily on demonstrating the antibacterial capacity of three bacterial strains (S1, S2 and S3), isolated from soil samples in different regions of the Algerian Sahara. **Methods:** The influence of the culture medium composition on the production of antibacterial compounds by strain S1 was evaluated using four different agar media. **Results:** The isolates showed the ability to inhibit the growth of at least two of the tested strains. Strains S1 and S2 exhibited broad-spectrum activity, inhibiting the growth of Gram-positive bacteria (*Staphylococcus aureus* and *Bacillus cereus*) as well as

Gram-negative bacteria (*Escherichia coli* and *Pseudomonas aeruginosa*). Strain S3 was active against two bacteria belonging to different Gram types (*S. aureus* and *E. coli*). The evaluation of different culture media revealed that PCA and GBA agars best favored the expression of the bioactivity of strain S1. **Conclusions:** These results are promising and encourage further research, particularly in the characterization of the bioactive molecules produced and the molecular identification of the bioactive strains.

Keywords: Saharan Bacterial Strains; Agar Cylinder Technique; Antibacterial Activity.

Cymbopogon schoenanthus: Natural Solution for the Protection of Stored Grains

Meriem Retimi, Naima Hadjadj
Department of Food Sciences, Saad Dahleb University Blida 1, B.P 270 Route de Soumâa, Blida, Algeria

ABSTRACT

Background: Post-harvest losses related to insects in stored products represent a major challenge for food security due to the quantitative and qualitative degradation of grains, contamination, and the massive use of synthetic insecticides. In this context, this study evaluates the insecticidal potential of the essential oil of *Cymbopogon schoenanthus* (CS) originating from Algeria, used as a natural alternative for the protection of cereals against the rice weevil *Sitophilus oryzae*. **Aims:** This study aims to assess the insecticidal effectiveness of CS essential oil in order to propose a natural and sustainable solution for the control of harmful insects. **Methods:** The essential oil was obtained by hydrodistillation and characterized by gas chromatography coupled with mass spectrometry (GC-MS). The insecticidal activity was studied using two methods, contact toxicity and fumigation toxicity, by exposing adults of S. oryzae to a range of increasing doses of essential oil. **Results:** GC-MS analysis of CS essential oil revealed a predominance of piperitone among oxygenated monoterpenes. Contact toxicity tests made it possible to determine an LD_{50} of 1.73 µL/mL after 144 h of exposure, indicating strong effectiveness of the essential oil at low concentration. In parallel, fumigation tests showed an LT_{50} of 51.78 h at the dose of 0.048 µL/cm³, reflecting rapid insect mortality in a confined atmosphere. The essential oil of *CS* thus causes a direct lethal effect on adults of *S. oryzae*, which suggests a neurotoxic mode of action and a disruption of physiological functions, consistent with its richness in bioactive monoterpenes such as piperitone. **Conclusions:** These insecticidal performances highlight the relevance of Cymbopogon schoenanthus essential oil as a potential biopesticide for the protection of stored grains, as a partial or total substitute for conventional chemical insecticides.

Keywords: *Cymbopogon schoenanthus*; Insecticidal Activity; *Sitophilus Oryzae*; Biopesticide; Stored Grains.

Origanum floribundum: A Natural Preservative Against Microbial Contamination

Retimi Meriem, Hadjadj Naima
Department of Food Sciences, Saad Dahleb University Blida 1, B.P 270 Route de Soumâa - Blida, Algeria

ABSTRACT

Background: Microbial contamination poses a major food safety challenge due to health risks and reliance on synthetic preservatives. This study investigates the antimicrobial activity of the essential oil (EO) and ethanolic extract (EE) of Origanum floribundum, an Algerian native species, as natural alternatives for preserving food against pathogenic and spoilage microorganisms. **Aims:** This study aims to assess the effectiveness of the EO and EE of O. *floribundum* in inhibiting the growth of different microbial strains (Gram-positive bacteria, Gram-negative bacteria, and fungi) in order to propose a natural and sustainable solution for food preservation. **Methods:** EO was extracted by hydrodistillation of dried leaves and then characterized by gas chromatography coupled with mass spectrometry (GC-MS), highlighting the predominance of p-cymene, thymol, and carvacrol. EE was obtained by Soxhlet extraction with ethanol. Antimicrobial activity was evaluated using the disk diffusion method and measurement of inhibition zone diameters, as well as determination of MIC (minimum inhibitory concentration) and MBC (minimum bactericidal concentration) values. **Results:** The essential oil of OF shows strong antimicrobial activity, with large inhibition zones, notably greater than 50 mm for Gram-positive bacteria and certain fungi, and around 25–30 mm for the most sensitive Gram-negative bacteria. MIC values remain generally low, particularly against *Staphylococcus aureus*, *Bacillus subtilis,* and *Candida albicans*, which confirms effective action at low concentrations. The ethanolic extract shows more moderate activity, with inhibition diameters generally lower than those of the essential oil, but it remains of interest against several bacterial strains. These results position the essential oil as the main natural preservative candidate, with the ethanolic extract playing a complementary role. **Conclusions:** These findings confirm the potential of the essential oil of *Origanum floribundum*, and to a lesser extent its ethanolic extract, as natural antimicrobial preservatives, likely to partially or totally replace synthetic agents in the food industry.

Keywords: *Origanum floribundum*; Essential Oil; Ethanolic Extract; Antimicrobial Activity; Food Preservative.

Identification of Aroma Compounds in Camel Milk and its Traditional Derivative *Elgares*

Mohamed Saleh Salem El Hadj [1], Abdallah Bouasla [1], Agnieszka Wójtowicz [2], Meghit Boumediene Khaled [3], Marek Gancarz [4]
[1] *Laboratory of Agro-Food Engineering (GéniAAl), Institute of Nutrition, Food and Agri-Food Technologies (INATAA), Frères Mentouri Constantine 1 University, Constantine, Algeria.*
[2] *Department of Food Process Engineering, University of Life Sciences in Lublin, Lublin, Poland.*
[3] *Department of Biology, Djillali Liabes University of Sidi Bel Abbes, Laboratoire de Nutrition, Pathologie, Agro-Biotechnologie & Santé, Sidi-Bel-Abbes, Algeria*
[4] *Institute of Agrophysics, Lublin, Poland.*

ABSTRACT

Background: The transformation of camel milk into *Elgares*, a traditional fermented derivative, induces significant modifications in its volatile profile. These aromatic properties are governed by complex biochemical pathways that contribute to a distinct sensory identity, marking a sophisticated transition from the raw substrate to the fermented end-product. **Aims:** This study aimed to characterize and compare the volatile organic compound (VOC) profiles of raw camel milk and its traditionally processed derivative, *Elgares*, to elucidate the chemical shifts occurring during fermentation. **Methods:** Samples of

camel milk were partitioned; one fraction underwent lyophilization (freeze-drying) for baseline analysis, while the second was subjected to traditional fermentation to produce *Elgares*. The identification of aroma-active constituents was conducted utilizing electronic nose (e-nose) technology, allowing for the precise detection and categorization of prevalent VOCs. **Results:** Chromatographic analysis identified 15 primary compounds in raw camel milk, dominated by aldehydes and ketones, specifically acetone (8.78%), hexanal (5.98%), and heptanal (3.08%). In contrast, *Elgares* exhibited a more complex aromatic matrix comprising 21 identified compounds. The fermented profile was characterized by a high prevalence of 3-methyl-1-butanol (16.38%), ethyl acetate (3.86%), and butan-2-one (2.80%). While eight chemical groups were common to both matrices, a fundamental shift was observed: aldehydes were the predominant functional group in raw milk, whereas higher alcohols became the most representative group in Elgares. **Conclusions:** The findings demonstrate that the traditional processing of camel milk into *Elgares* significantly enriches and diversifies its aromatic composition. The transition from an aldehyde-dominant profile to one characterized by higher alcohols underscores the profound impact of spontaneous fermentation on the final organoleptic and sensory characteristics of this traditional product.

Keywords: Camel Milk; *Elgares*; Aroma Compounds.

FTIR Spectrum, Nutritional Properties and Antioxidant Evaluation of Freeze-Dried *Beta vulgaris* Powders by *In-Vitro* and Cyclic Voltammetry Methods: Prospects for Use as a Natural Colorant

Rim Salhi [1], Nadia Amessis-Ouchemoukh [1], Rabha Ayad [1], Rania Agabi [1], Roukia Bouizar [1], Nawel Guenaoui [2], Abel Zenati [1], Salim Ouchemoukh [2]

[1] *Laboratoire de Biomathématiques Biophysique Biochimie et Scientométrie, Faculté des Sciences de la Nature et de la Vie Université A. MIRA de Bejaia, Algeria*

[2] *Laboratoire de biochimie appliquée, Faculté des Sciences de la Nature et de la Vie, Université A. MIRA de Bejaia, Algeria*

ABSTRACT

Background: Beetroot is one of the most widely used sources of colorants in powder or extract form as a natural red colorant in dry mixes, candies, jams, and jellies, serving as an alternative to synthetic dyes whose consumption has been linked to various side effects. **Aims:** This study highlights the antioxidant potential of freeze-dried *Beta vulgaris* powders. The goal is to evaluate their suitability as a natural alternative to synthetic food colorants through nutritional, physicochemical, and bioactive characterization. **Methods:** The nutritional and physicochemical properties of the powders (water, sugar, fiber, fat, and ash content) were evaluated. Total phenol and flavonoid content were estimated using the Folin-Ciocalteu and $AlCl_3$ methods. Antioxidant activity was assessed in vitro using DPPH, ABTS, and iron ion chelation capacity. Furthermore, a novel instrumental tool, cyclic voltammetry, was used to assess electrochemical properties and redox potential. Functional groups were evaluated using an ATR-FTIR spectrometer in a spectral range of 400 to 4000 cm^{-1}. **Results:** The FTIR spectrum revealed the presence of important functional groups such as hydroxyl and carbonyl fractions, indicating the presence of bioactive compounds, including phenolic compounds and betalains. The freeze-dried beet powders exhibited remarkable levels of radical scavenging and considerable metal chelation capacity. Furthermore, the voltammogram of the powders indicates their ability to donate electrons around the anodic wave potential. The evaluated nutritional properties revealed low moisture content, indicating efficient drying, and satisfactory nutritional values. **Conclusions:** These results demonstrate the effectiveness of these powders in mitigating oxidative stress. The nutritional and bioactive profile makes beetroot powder an ideal food additive, rich in nutrients and compounds, making it a suitable alternative to synthetic food colorants.

Keywords: *Beta vulgaris*; FTIR; Cyclic Voltammetry; Food Colorant.

Artemisia herba alba and *Rosmarinus officinalis* Extracts: Natural Alternatives for Improving the Preservation, Nutritional Quality, and Sensory Properties of Chicken and Beef

Ismahene Sisbane [1], Nour Elhouda Menasria [2], Abed Arabi [1]

[1] *Department of Food Sciences. Laboratory of Agrobiotechnology, Genetic Resources, and Modelling, Faculty of Natural Science and Life, Abdelhamid Ibn Badis University, Mostaganem, Algeria*

[2] *Department of Biological Sciences. Laboratory of Agrobiotechnology, Genetic Resources, and Modelling, Faculty of Natural Science and Life, Abdelhamid Ibn Badis University, Mostaganem, Algeria*

ABSTRACT

Background: Meat products are highly susceptible to lipid oxidation, leading to safety and quality concerns. Plant extracts have demonstrated promising potential as natural antioxidants and preservatives in meat products. **Aims:** The primary objective of this study was to evaluate the effects of separately adding *Artemisia herba alba* and *Rosmarinus officinalis* extracts on the nutritional quality, oxidative stability, and sensory characteristics of chicken and beef (both minced and in sausage form). **Methods :** Meat samples, with or without additives (plant extract or Vitamin C), were stored under two different temperature conditions: at 4°C for 7 days (refrigeration) and at -18°C for 21 days (freezing). Oxidative stability was monitored by measuring MDA (Malondialdehyde) levels and TBA (Thiobarbituric acid) values. Sensory characteristics including flavor, texture, juiciness, and color were also evaluated. **Results:** Results revealed that meats preserved with white wormwood (*Artemisia herba alba*) exhibited superior nutritional characteristics, particularly in terms of lipid content, with less pronounced MDA levels observed compared to those preserved with Vitamin C or without additives. TBA values recorded after the freezing period were 0.02 and 0.32 mg MDA equivalent/kg for chicken and beef meats supplemented with *Artemisia herba alba* extract, respectively. These values contrasted favorably with control samples (0.06 and 0.46 mg MDA equivalent/kg) and those treated with Vitamin C. *Rosmarinus officinalis* extract also demonstrated high water retention capacity and significant lipid content preservation. From a sensory perspective, beef sausages treated with *Artemisia herba alba* extract exhibited improved flavor, texture, and juiciness, as well as a more appealing color. **Conclusions:** *Artemisia herba alba* and *Rosmarinus officinalis* plant extracts have proven to be effective alternative preservatives in meat products, particularly as potent antioxidant agents. These findings support the use of natural extracts to enhance overall gustatory appreciation while maintaining nutritional quality and extending shelf life.

Keywords: Meats; *Artemisia herba alba*; *Rosmarinus officinalis*; Preservation; Nutritional Quality.

Innovative Gluten-Free Energy Bar Enriched with Carob, Moringa Leaves, and Pumpkin Seeds

Louiza Tarfaoui [1,2], Sara Mellali [3], Noureddine Menadi [1], Samira Meziani S [1], Chougrani H [3], Cherite K [3]

[1] *Laboratory of Biotoxicology, Department of Biological Sciences, Faculty of Natural and Life Sciences Djilali Liabes University, Sidi Belabbes, Algeria*

[2] *Department of Biology, Faculty of Science, Mhamed Bouguerra University, Boumerdes, Algeria*

[3] *Environment and Sustainable Development Laboratory, Department of Biological Sciences, Faculty of Natural and Life Sciences ‹University of Ahmed Zabana, Relizane, Algeria*

ABSTRACT

Background: In an era where demand for healthy and functional foods is rapidly growing, developing innovative products derived from natural ingredients is vital. This study leverages local natural resources, specifically carob (*Ceratonia silique* L.) from Relizane, moringa leaves (*Moringa oleifera* L.) from Blida, and pumpkin seeds (*Cucurbita pepo* L.) from Sidi Bel Abbès. These ingredients are rich in bioactive compounds such as polyphenols, flavonoids, proteins, fibers, and minerals. **Aims:** This study investigates the formulation of a gluten-free energy bar with exceptional nutritional and bioactive properties. The formulation was meticulously optimized to produce a balanced product tailored for consumers seeking natural, gluten-free, and health-promoting options. **Methods:** The final product underwent comprehensive nutritional analysis and phytochemical screening to identify secondary metabolites. Antioxidant activity was evaluated via the DPPH assay. Finally, sensory testing was conducted to determine consumer acceptability of the optimized formulation. **Results:** Results demonstrated a nutrient-dense bar containing 48 g/100 g carbohydrates, 9 g/100 g proteins, and 23 g/100 g fats, delivering 449 Kcal/100 g. The bioactive profiling confirmed high polyphenol and flavonoid levels accompanied by strong antioxidant capacity. Sensory testing highlighted the promising functional and sensory attributes of the developed energy bar. **Conclusions:** These findings underscore the valuable role of leveraging local natural resources for creating innovative, health-enhancing food products. The developed energy bar represents a successful functional food application that combines high nutritional value with strong bioactive potential, suitable for the gluten-free market.

Keywords: Gluten-Free Energy Bar; Carob; Moringa; Pumpkin Seeds; Antioxidants.

Physicochemical Analysis, Phytochemical Study and Antimicrobial Activity of Propolis and its Incorporation in Confectionery Product

Noureddine Touati [1,2], Soraya Hihat [1,3], Nasreddine Mekhoukh [2], Bilal Madagh [2]

[1] *Département des Sciences Alimentaires, Faculté des Sciences de la Nature et de la Vie et des Sciences de la Terre et de l'Univers, Université Mohamed el Bachir el Ibrahimi, Bordj Bou Arreridj, Algeria*

[2] *Laboratoire Santé et Environnement, Faculté des Sciences de la Nature et de la Vie et des Sciences de la Terre et de l'Univers, Université Mohamed el Bachir el Ibrahimi, Bordj Bou Arreridj, Algeria*

[3] *Laboratoire de Biomathématiques, Biophysique, Biochimie, et Scientométrie (L3BS), Faculté des Sciences de la Nature et de la Vie, Université de Bejaia, Bejaia, Algeria*

ABSTRACT

Background: Propolis is known for its significant therapeutic properties, which are directly linked to its diverse chemical composition. To promote this natural product and give it a distinct identity, this study examined the physicochemical and biochemical characteristics, as well as the antioxidant activity, of a local propolis sample. **Aims:** The research was carried out in two main phases. The first phase focused on the experimental analysis of propolis properties, while the second phase involved developing an innovative recipe for propolis-based candy, in accordance with food quality and safety standards. **Methods:** The study analyzed pH, acidity, phenolic compounds, flavonoids, dry matter, and moisture content. The antimicrobial activity of the ethanolic extract was tested against several strains, including *Escherichia coli*. For the product development, natural ingredients were used, and the final candy underwent sensory evaluation and stability testing to assess consumer acceptance and product durability. **Results:** Experimental analysis showed that propolis is acidic, with a natural pH of 5.6 and an acidity level of 4%. It is rich in phenolic compounds and flavonoids and contains 93% dry matter with a moisture content of 8.15%. The ethanolic extract demonstrated remarkable antimicrobial activity against several strains, except for *Escherichia coli*, which showed no sensitivity. The taste tests for the propolis-based candy indicated a high level of approval, confirming the project's success in combining flavor with nutritional value. **Conclusions:** In conclusion, the study provides recommendations for expanding candy production and outlines directions for future research on additional applications of propolis in the food and health sectors. This work represents a meaningful step toward promoting natural ingredients to improve public health and enhance food product quality.

Keywords: Propolis; Physicochemical Analysis; Phytochemical Screening; Antioxidant Acticity; Antimicrobial Activity.

Synergistic Impact of Laccase and Sourdough on the Quality Attributes of Gluten-Based Bread

Djihane Faten Yahia, Hayat Bourekoua

Equipe FNPAA, Laboratoire de Nutrition et Technologie Alimentaire (L.N.T.A.), Institut de la Nutrition, de l'Alimentation et des Technologies Agro-Alimentaires (I.N.A.T.A.-A.), Université Constantine 1 Frères Mentouri, Route de Ain El-Bey, Constantine, Algeria

ABSTRACT

Background: Bread quality is strongly influenced by both formulation and processing, including the use of sourdough and enzymes. Considering the high global consumption of bread, and especially in regions such as Algeria, this formulation strategy offers the opportunity to produce breads that are healthier, more appealing, and free from synthetic additives. **Aims:** The aim of this study was to evaluate the effect of combining sourdough fermentation with the enzyme laccase on the quality attributes of gluten-based bread. This approach provides a practical route for developing high-fiber, clean-label breads with superior sensory and structural quality. **Methods:** Three sourdoughs were prepared, and after preliminary trials, an incorporation level of 40 % sourdough was selected. Laccase (10 or 20 ppm) was added to the formulation to assess its impact on bread crumb texture, moisture, and overall quality. **Results:** Results showed that in wholemeal wheat sourdough breads, laccase significantly improved crumb softness: hardness decreased from 33.21 N (control) to 23.24 N (10 ppm) and

to 12.97 N (20 ppm). Chewiness and gumminess also declined markedly. In white wheat sourdough breads, laccase had a modest effect, with crumb hardness slightly increasing from 17.22 N to ~18.6 N at 20 ppm. In barley sourdough breads, laccase produced only moderate improvements. The treatment reduced hardness, chewiness, and gumminess while preserving cohesiveness and springiness, producing a soft, cohesive crumb with improved moisture retention. **Conclusions:** The beneficial effect in wholemeal breads is attributed to laccase-catalyzed oxidative cross-linking of phenolic compounds within the fiber-rich matrix under acidic sourdough conditions, strengthening the gluten network and improving crumb structure. These findings demonstrate that combining sourdough fermentation with targeted enzymatic treatment specifically laccase can significantly enhance bread texture, particularly in wholemeal sourdough breads.

Keywords: Sourdough; Laccase; Texture, Quality; Fermentation.

Development and Optimization of an Innovative Biscuit Recipe Based on Legumes

Siham Ydjedd [1,2], Makhlouf Chaalal [2,3], Afaf Chebout [2,3], Amani Zidani [2], Besma Khirouani [2]

[1] *Laboratoire GENIAAL, Constantine, Algeria*
[2] *Laboratoire SAFIVIA, Constantine, Algeria*
[3] *Laboratoire BIOQUAL, Institut de la Nutrition, de l'Alimentation et des Technologies Agro-Alimentaires (INATAA), Université Constantine 1 Frères Mentouri, Route de Ain-El-Bey 25000, Constantine, Algeria*

ABSTRACT

Background: Biscuits are a category of widely consumed products for which nutritional innovation is increasingly sought. The present study aimed to develop and optimize an innovative biscuit based on durum wheat and legumes (lentils and chickpeas), evaluating its antioxidant potential and sensory characteristics. **Aims:** The study aimed to find the optimal proportions of durum wheat, lentils, and chickpeas to create a biscuit that balances high antioxidant potential with desirable sensory characteristics. **Methods:** The biscuits were prepared according to a traditional recipe, with flour blends formulated using an optimal mixture design in the JMP statistical software. Phytochemical analyses were performed, including the determination of total phenolic compounds, flavonoids, and carotenoids, as well as the evaluation of antioxidant activity using FRAP and ammonium phosphomolybdate assays. Sensory analysis was also conducted to assess color, odor, texture, aroma, taste, and aftertaste. **Results:** The results showed that the optimal ingredient proportions were 57.8 % durum wheat, 24.3 % lentils, and 17.8 % chickpeas, with total phenolics, flavonoids, and carotenoids contents of 194.33 mg GAE/100 g, 129.15 mg QE/100 g, and 13.48 mg βC/100 g, respectively. Antioxidant activity values were 484.64 mg AAE/100 g for FRAP and 90.24 mg AAE/100 g for the phosphomolybdate assay, respectively. Sensory analysis revealed that the legume-enriched biscuits were well accepted, particularly for their taste. **Conclusions:** In conclusion, incorporating legumes into biscuits not only improves their nutritional and antioxidant profile but also produces a sensorially attractive product, offering promising prospects for the development of healthy and innovative snacks.

Keywords: Innovative biscuit; Optimization; Legumes; Antioxidant activity; Sensory analysis.

Use of Kefir Grains for Natural Coagulation in Fresh Cow's and Goat's Milk Cheese Production

Habiba Zerizer, Wissem Ahmia, Sérine Kharoubi, Amel Ait Kaki, Kounouz Rachedi, Faiza Boughachiche.

Laboratory for Biotechnology and Food Quality (BIOQUAL), Institute of Nutrition, Food and Agro-Food Technologies, Constantine 1-Mentouri Brothers University, Constantine, Algeria

ABSTRACT

Background: This study examined the use of kefir grains in producing fresh cheeses from cow's and goat's milk, confirming kefir as an effective natural fermentation agent whose optimized dosage could further enhance cheese quality and performance. **Aims:** Three inoculation levels of kefir grains (1%, 2%, and 3%) were tested with the two varieties of milk in order to determine the effect of the type of milk and the percentage of kefir grains on the yield and quality of fresh cheese. **Methods:** The resulting cheeses were evaluated on days J1, J7, and J15 of storage through physicochemical (pH, acidity, moisture, ash, etc.) and microbiological analyses (search for *Escherichia coli*, coagulase-positive *Staphylococci*, and *Salmonella*). Statistical analysis (ANOVA) was used to analyze the results. A hedonic test was conducted with 30 untrained panelists for sensory analysis compared to fresh cheese coagulated with rennet. **Results:** Fresh cheese processing using kefir grains revealed a significant influence of the milk and the percentage of grains used. Cow's milk, particularly with 2% kefir grains, offered the best yield (33.13 g), compared to goat's milk (28.87 g). The evolution of physicochemical parameters showed rapid acidification followed by a slight increase in pH. Moisture decreased over time, causing an increase in dry matter and ash content. Microbiological analysis revealed stability until day 15, after which there was *E. coli* proliferation. Comparative sensory analysis shows that kefir-based cheese has a more favorable organoleptic profile than rennet-coagulated cheese, particularly in terms of texture and aroma. **Conclusions:** Fresh cheese made with kefir grains is strongly affected by milk type and grain percentage. Compared to rennet, kefir enhances flavor and texture but limits shelf life to 15 days due to microbial spoilage. Using cow's milk with an optimized 2% kefir dosage shows promise as a natural alternative for developing innovative dairy products.

Keywords: Kefir Grains; Fermentation; Cow's Milk; Goat's Milk; Fresh Cheese.

Natural Product–Based NMT Inhibitors: Novel Strategies for Developing Anti-Leishmanial Therapeutic Candidates

Bouchra Fercha [1], Souheila Benirbah [1], Assia Guendouze [2], El Hassen Mokrani [2]

[1] *Department of Biochemistry and Cellular and Molecular Biology, Faculty of Natural and Life Sciences, University of Mentouri Brothers Constantine 1. Constantine, Algeria*
[2] *Laboratory of Applied Biochemistry, Department of Biochemistry and Cellular and Molecular Biology, Faculty of Natural and Life Sciences, University of Mentouri Brothers Constantine 1. Constantine, Algeria*

ABSTRACT

Background: Leishmaniasis is a major neglected tropical disease caused by protozoan parasites of the genus *Leishmania*. Despite decades of

research, current therapies remain limited by toxicity, the emergence of resistance, and high treatment costs, underscoring the urgent need for new, effective, and safer therapeutic strategies. Among the validated molecular targets in *Leishmania*, N-myristoyltransferase (NMT)—an enzyme responsible for the co-translational myristoylation of essential proteins—has emerged as a particularly promising target due to its crucial role in parasite survival and the absence of functional redundancy. **Aims:** The objective of this study is to identify natural compounds with strong predicted inhibitory activity against *Leishmania* NMT and evaluate their potential as lead molecules for the development of new therapeutic agents. **Methods:** A large-scale virtual screening of 6,910 natural compounds was performed using molecular docking to evaluate their binding affinity with *Leishmania* NMT. The docking workflow enabled the identification of molecules exhibiting better interaction energies than the known reference inhibitor. Further evaluation of physicochemical parameters, ADME properties, and *in silico* toxicological profiles was conducted to assess drug-likeness, oral bioavailability, and potential toxicity. **Results:** Seventy-one molecules demonstrated better interaction energies than the reference inhibitor, highlighting their potential to interfere with the enzyme's catalytic site. Among these, Teucrol_001 and N-E-caffeoyl tyramine were the most promising candidates, with binding energies of −29.1138 kJ mol^{-1} and −28.7406 kJ mol^{-1}, respectively, demonstrating strong predicted affinity and favorable interaction profiles. Both compounds exhibited drug-like characteristics, acceptable oral bioavailability predictions, and no major toxicity alerts. **Conclusions:** This study highlights two natural molecules with strong predicted inhibitory activity against *Leishmania* NMT, providing a valuable starting point for the development of innovative therapeutic agents against leishmaniasis. These findings pave the way for subsequent steps, including molecular dynamics simulations, chemical optimization, and experimental validation.

Keywords: *Leishmaniasis*; N-myristoyltransferase; Inhibitors; Molecular Docking; Binding Energy.

Darcy-Brinkman Modeling for the Characterization of Grape Drying Kinetics

Soraya Kebout [1], Nadir Attaf [2]

[1] *Department of Physics, Faculty of Exact Sciences, Frères Mentouri University Constantine 1, Algeria*

[2] *Department or Physics, Faculty of Exact Sciences, Phase Transformation Laboratory, Frères Mentouri University Constantine 1, Algeria*

ABSTRACT

Background and Aims: The drying kinetics of grapes were studied using a hot air circulation system with fixed and controlled properties: air velocity ranging from 2.5 to 5 m/s, relative humidity between 20% and 40%, and temperature varying from 40 to 65°C. **Methods:** The grape desorption isotherms were determined at different temperatures (40, 50, and 65°C), and the Darcy-Brinkman model was used to describe them. **Results:** The results show, firstly, that there is no constant-velocity drying phase and secondly, that temperature, concentration, and air velocity are the parameters that most influence drying time under the studied conditions. All the numerical results are represented by the drying characteristic curves. The Darcy-Brinkman model proved satisfactory for describing the desorption isotherms. **Conclusions:** Temperature, concentration, and air velocity are the key parameters affecting grape drying, and the Darcy-Brinkman model is appropriate for representing grape desorption isotherms under the studied conditions.

Keywords: Grapes; Darcy-Brinkman Model; Drying Kinetics; Modeling.

Cattle Farming in the Digital Age: The Contribution of Artificial Intelligence for Optimized Animal Husbandry

Fatima Meriah [1,2], Rym Nouria Benamara [1,3], Meryem Benahmed Chekroun [3,4], Zohra Madani [1,2], Nasria Benamara [5]

[1] *Faculty of Natural and Life Sciences, Mustapha Stambouli University, Mascara, Algeria*

[2] *Laboratory Research on Biological Systems and Geomatics, Faculty of Nature and Life Sciences, Mustapha Stambouli University of Mascara, Algeria*

[3] *Laboratory of Applied Microbiology for the Agri-food and Environmental Sectors (LAMAABE), Faculty of Natural Sciences and Earth Sciences, University of Tlemcen, Algeria*

[4] *Ain Temouchent University, Algeria*

[5] *Laboratory for the Valorization of Biological and Natural Resources (VRBN), Farhat Abbas University, Sétif 1, Algeria*

ABSTRACT

Background: Cattle farming is undergoing significant intensification, with an increasing number of cows per farm, making herd management increasingly complex. At the same time, growing interest in animal welfare, health, and product quality underscores the importance of systems and technological innovations that enable effective monitoring, both at the individual and herd levels. In this context, precision livestock farming has become essential. **Aims:** This study focuses on the role of Artificial Intelligence (AI) and connected technologies in precision livestock farming to improve cattle health, welfare, and overall herd management. **Methods:** Precision livestock farming relies on Artificial Intelligence (AI) and connected technologies, including advanced sensors, the Internet of Things (IoT), and computer vision, to collect and analyze behavioral, physiological, and environmental data in real time. Machine learning algorithms enable the early detection of anomalies such as disease, estrus, or stress. **Results:** These technologies contribute to the optimization of cattle health, nutrition, and reproduction, while improving overall herd management. The digitization of livestock farming also raises ethical issues concerning animal privacy, autonomy, and the human-animal relationship. Despite their promise, several challenges remain, such as data standardization, implementation costs, and accessibility for small farms. **Conclusions:** Advances in precision livestock farming should promote a tangible improvement in animal welfare indicators, the creation of standardized databases, and the development of precision animal husbandry, combining economic performance, environmental sustainability, and respect for animal welfare, while placing Artificial Intelligence (AI) as a central lever of the agroecological transition.

Keywords: Artificial Intelligence; Animal Welfare; Precision Farming; Sensors and Iot; Sustainability.

Impacts of Artificial Intelligence on Recent Developments in Modern Packaging Technology Using Bioactive Compounds

Makhlouf Chaalal [1,2], Siham Ydjedd [1,3], Afaf Chebout [2], Sylia Amrane [4]

[1] *Laboratoire SAFIVIA, Constantine, Algeria*
[2] *Laboratoire BIOQUAL, Constantine, Algeria*
[3] *Laboratoire GENIAAL, Institut de la Nutrition, de l'Alimentation et des Technologies Agro-Alimentaires (INATAA), Université Constantine 1 Frères Mentouri, Constantine, Algeria*
[4] *Laboratoire de Biochimie Appliquée, Faculté des Sciences de la Nature et de la Vie, Université de Bejaia, Bejaia, Algeria*

ABSTRACT

Background: Preserving food quality and safety is a critical challenge in the modern food industry, directly affecting consumer health. Recent advances in Artificial Intelligence (AI) have significantly influenced packaging technology, enabling the development of smart systems that integrate bioactive compounds as functional biomarkers to monitor food freshness and quality. **Aims:** This study focuses on the development of biodegradable active packaging enriched with bioactive compounds from plant sources and agro-industrial by-products, such as fruit peels, and their integration with AI to enhance food safety, quality, and sustainability. **Methods:** Bioactive compounds are incorporated into biopolymer matrices such as polysaccharides and proteins, combining antimicrobial and antioxidant properties with real-time intelligence, effectively acting as AI-enabled packaging. Advanced extraction techniques, including ultrasound-assisted and supercritical fluid methods, are used to ensure efficient recovery of bioactive compounds while preserving their bioactivity. **Results:** The resulting packaging acts as a smart system capable of predicting shelf-life, signaling spoilage, and reducing environmental impact. The incorporation of bioactive compounds not only improves mechanical and barrier properties but also provides functional signals indicating oxidative changes or microbial growth. **Conclusions:** The integration of AI principles with biodegradable active packaging represents a transformative approach for the food sector. Intelligent systems enhance traceability, optimize supply chain management, improve safety and quality, and increase consumer satisfaction, while supporting sustainability and circular economy practices. Using bioactive compounds as biomarkers bridges technological innovation with eco-friendly materials, offering a functional, intelligent, and sustainable solution for next-generation food packaging.

Keywords: AI; Bioactive Compounds; Smart Packaging; Biodegradable Packaging; Food Quality and Safety.

A Review of Artificial Intelligence and Digital Technologies in Food Safety and Preservation

Siham Nouichi [1], Lynda Mezali [2]

[1] *Institute of Natural and Life Sciences, Mila University, Algeria*
[2] *High National Veterinary School, Rabie Bouchama, Oued Smar, Algiers, Algeria*

ABSTRACT

Background: The rapid emergence of Artificial Intelligence (AI) and digital technologies is transforming food safety and preservation practices. This communication examines recent advances in the integration of smart sensors, the Internet of Things (IoT), computer vision, machine learning, and blockchain within modern food supply chains. **Methods:** The review focuses on three major application domains: (1) Real-time monitoring and control systems: The combined use of IoT sensors, smart cameras and electronic noses enables early detection of temperature deviations, contamination events and product spoilage indicators, allowing timely corrective actions and limiting microbial risks; (2) Intelligent traceability: Blockchain technology and advanced RFID/QR code systems ensure transparency and immutability of information throughout the food journey, from production to consumption. AI algorithms enhance these systems by correlating sensor data with traceability records to rapidly identify critical points and support root-cause analysis during food safety incidents; and (3) Prediction, preventive maintenance, and logistics optimization: Machine learning models estimate product shelf life using time–temperature history and compositional data, while predictive maintenance tools monitor refrigeration systems to prevent cold-chain disruptions. AI-driven logistics optimization further improves transport routing, inventory prioritization based on residual quality, and surplus redistribution to reduce food waste. **Results:** The integration of these technologies marks a decisive shift from reactive control to predictive and data-driven management of food safety. Real-time monitoring, intelligent traceability, and predictive maintenance collectively enhance the ability to detect risks early, prevent failures, and optimize the supply chain. **Conclusions:** The convergence of AI, IoT, and digital analytics enables safer, more transparent, and more efficient food systems, strengthening consumer trust and supporting sustainability across the entire food supply chain.

Keywords: Food safety; Digital technologies; Traceability; Shelf life.

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