Centro Tecnológico Nacional de la Conserva y Alimentación

MURCIA Food 25

INTERNATIONAL SYMPOSIUM FOOD TECHNOLOGY

Auditorio Victor Villegas Edificio Anexo
20th / 21st May 2025 · Murcia · Spain

Dirigido a empresas e investigadores
Aimed at companies and researchers

info INSTITUTO DE FOMENTO REGIÓN DE MURCIA

Región de Murcia

Centro Tecnológico Nacional de la Conserva y Alimentación

nutrialitec

Proyecto
INFO RENOVA,
Modalidad 2 Exp. nº 2024.08.CT02.000001

INTRODUCTION

The **National Technological Center for the Food and Canning Industry CTNC**, in collaboration with the Development Agency of the Region of Murcia INFO, continues its commitment to monitoring, foresight, and technology transfer in the agri-food sector. In this context, it has organized, in collaboration with INFO, the International Symposium on Food Technologies every two years since 2003, consolidating its position as a benchmark in innovation and development in the sector.

In its 12th edition, this event is presented in a hybrid format (in-person and online), with the support of an **Organizing Committee** made up of leading national and international institutions. These include the Institute for **Food Bioresources IBA in Bucharest**, **METROFOOD** in Italy, the **Egyptian National Research Center**, and at national level: **regional Ministry of Health**, **INFO**, the **Agri-Food Cluster Foundation**, and the **Academy of Veterinary Sciences of the Region of Murcia**, along with the **Food4Life Spain Platform**, the **Mare Nostrum Campus**, the National Reference Center for the Food Industry – Vegetable Canning Area and **CTNC**.

This meeting would not be possible without the effort and dedication of the Technical Committee, made up of representatives from leading companies in the sector such as **ALLFOODEXPERTS, VICKYFOODS, HERO ESPAÑA SA, MARÍN GIMÉNEZ HERMANOS SA, CYNARA EU, POSTRES REINA,** and **VEGYTECH** SL. To all of them, our sincere thanks for their valuable contributions.

This year's Symposium will address three key topics of great relevance to the sector: Technologies for Healthy Eating (**NUTRIALITEC Ecosystem** - ECO-20241004), Sustainability (**OASIS Project**), and **Trends in the Agri-Food Sector.**

These topics have been carefully selected to offer innovative solutions that boost competitiveness, sustainability, and the sector's adaptation to new market and consumer demands.

The event will bring together experts and professionals from different countries, providing an ideal platform for the exchange of knowledge, experiences, and the identification of new opportunities for collaboration. From the CTNC, we would like to express our deepest gratitude to all the participants and collaborating entities, whose contributions are key to the success of this meeting.

We hope this Symposium will become a **benchmark for the sector**, facilitating the creation of strategic alliances and the exchange of experiences that drive growth, innovation, and sustainability in the food industry.

José García Gómez
President

El **Centro Tecnológico Nacional de la Conserva y Alimentación**, en colaboración con el **Instituto de Fomento de la Región de Murcia**, continúa su compromiso con la vigilancia, prospectiva y transferencia tecnológica en el sector agroalimentario. En este contexto, desde 2003 y con una periodicidad bianual, organiza el Symposium Internacional sobre Tecnologías Alimentarias, consolidándose como un referente en la innovación y el desarrollo del sector.

En su XII edición, este evento se presenta en un formato híbrido (presencial y online), contando con el respaldo de un **Comité Organizador** compuesto por destacadas instituciones nacionales e internacionales. Entre ellas se encuentran el **Instituto de Biorecursos Alimentarios IBA de Bucarest**, el **Centro Nacional de Investigación de Egipto**, la Consejería de Salud, el **Instituto de Fomento INFO,** la **Fundación Clúster Agroalimentario** y la **Academia de Ciencias Veterinarias de la Región de Murcia,** junto con la Plataforma **Food4Life Spain**, el **Campus Mare Nostrum**, el Centro de Referencia Nacional de Industria Alimentaria – Área de Conservas Vegetales, **METROFOOD** Italia y el **CTNC**.

Este encuentro no sería posible sin el esfuerzo y la dedicación del **Comité Técnico**, conformado por representantes de empresas líderes del sector como **ALLFOODEXPERTS, VICKYFOODS, HERO ESPAÑA SA, MARÍN GIMÉNEZ HERMANOS SA, CYNARA EU, POSTRES REINA** y **VEGYTECH** SL. A todos ellos, nuestro más sincero agradecimiento por su valiosa contribución.

En esta edición, el Simposio abordará tres ejes temáticos de gran relevancia para el sector: Tecnologías para una alimentación saludable (**Ecosistema NUTRIALITEC**- ECO-20241004), Sostenibilidad (**Proyecto OASIS**) y **Tendencias en el sector agroalimentario**.

Estos temas han sido cuidadosamente seleccionados para ofrecer soluciones innovadoras que impulsan la competitividad, la sostenibilidad y la adaptación del sector a las nuevas demandas del mercado y del consumidor.

El evento reunirá a expertos y profesionales de distintos países, brindando una plataforma ideal para el intercambio de conocimientos, experiencias y la identificación de nuevas oportunidades de colaboración. Desde el CTNC, queremos expresar nuestro más profundo agradecimiento a todos los participantes y entidades colaboradoras, cuya contribución es clave para el éxito de este encuentro.

Esperamos que este Simposio se convierta en un **espacio de referencia para el sector**, facilitando la creación de alianzas estratégicas y el intercambio de experiencias que impulsen el crecimiento, la innovación y la sostenibilidad de la industria alimentaria.

José García Gómez
Presidente

PROGRAMME XII International Symposium on Food Technologies

20 Y 21 DE MAYO
20th AND 21st MAY

SESIÓN DE POSTERS
POSTER SESSION

8.30 / 9.00	**Registro/Registration**
9.00 / 9.15	**Opening Act**
9.15 / 9.30	**OPENING CONFERENCE** **Impulsando la innovación en el sector agroalimentario: soluciones y beneficios de METROFOOD-RI /** Driving innovation in agrifood: METROFOOD-RI solutions and benefits. **Claudia Zoani, ENEA Italy**

Primera Sesión / First Session **20 de Mayo /** 20th May 2025

TECNOLOGÍAS PARA UNA ALIMENTACIÓN SALUDABLE "ECOSISTEMA NUTRIALITEC"
TECHNOLOGIES FOR HEALTHY FOOD "NUTRIALITEC ECOSYSTEM"

MODERADORES / CHAIRS: **NASTASIA BELC , PRESENTACIÓN GARCÍA**

9.30 / 9.45	**Metabolómica y metagenómica en nutrición personalizada** Metabolomics and metagenomics in personalized nutrition. Francisco Tomás Barberán, CEBAS CSIC.
9.45 / 10.00	**Aplicación de biotecnologías microbianas para la bioconservación del pan** Application of microbial biotechnologies for bread biopreservation. Giuseppe Meca de Caro, UNIVERSITY OF VALENCIA.
10.00 / 10.15	**Subproductos de la elaboración de cerveza y de vino como fuente de compuestos bioactivos desde una perspectiva de bioeconomía circular** Brewing and winery by-products as source of bioactive compounds from a circular bioeconomy perspective**.** Adriana Dabija, Amelia Buculei, STEFAN CEL MARE UNIVERSITY OF SUCEAVA, Romania.
10.15 / 10.30	**Tecnologías innovadoras de liberación de sustancias activas para el desarrollo de alimentos funcionales** Innovative active substance release technologies for functional foods development. Antonio García, MARNYS
10.30 / 10.45	**Tecnologías al servicio de propuestas de valor para el plant based saludable** Technologies for healthy plant-based products value propositions. Belén Blanco Espeso, CARTIF
10.45 / 11.00	**Foodturo de los ingredientes: Foodtech, Innovación, Sostenibilidad y Nuevos Mercados** Foodture of ingredients: Foodtech, Innovation, Sustainability and New Markets. Pedro Prieto Hontoria
11.00 / 11.30	**DESCANSO / BREAK**

Segunda Sesión / Second Session **20 de Mayo /** 20th May 2025

SOSTENIBILIDAD, PROYECTO OASIS SUSTAINABILITY, OASIS PROJECT

MODERADORES / CHAIRS: **JAVIER CEGARRA, FRANCISCO SERRANO**

11.30/ 11.45	**Clúster innovador y sostenible para la cadena de valor de la aceituna, proyecto OASIS /** Innovative and sustainable cluster for the olive value chain, OASIS project. İbrahim Serdar Koçar, İZMIR TICARET BORSASI, Türkiye.
11.45 / 12.00	**Alternativas sostenibles al tratamiento del orujo de aceituna** Sustainable alternatives to the treatment of olive pomace Jose Calama, TROIL VEGAS ALTAS.
12.00 / 12.15	**Nuevos recubrimientos y envases antimicrobianos en el Mediterráneo.** NOVAPACK / Novel Antimicrobial coatings and packaging in the Mediterranean. NOVAPACK. Manuela Pintado, Centre for Biotechnology and Fine Chemistry (CBQF) - UNIVERSIDADE CATÓLICA PORTUGUESA.
12.15/ 12.30	**Estrategias de bioconversión en la agroindustria: GO DEMOEXTRACT y otros casos de éxito** Bioconversion strategies in agroindustry: OG DEMOEXTRACT and other success stories. Rebeca Ramos, TECNOVA
12.30 / 12.45	**Tecnologías de microondas y radiofrecuencia para un procesamiento eficiente de alimentos** Harnessing microwave and radiofrequency technologies for efficient food processing. Josep Maria Darne, BEMENS.
12.45 / 13.00	**Proyectos industriales para la valorización de residuos y subproductos orgánicos en bioetanol, bioproductos y bioenergía sostenibles** Industrial projects for the valorisation of organic waste and by-products into sustainable bioethanol, bioproducts and bioenergy. Caterina Coll. PERSEO BIOTECHNOLOGY S.L. CEO.
13.00 / 14.30	**DESCANSO / BREAK**

Tercera Sesión / Third Session **20 de Mayo /** 20th May 2025

TENDENCIAS EN EL SECTOR AGROLIMENTARIO TRENDS IN THE FOOD SECTOR

MODERADORES / CHAIRS: **EDUARDO COTILLAS, IVÁN PÉREZ**

14.30/ 14.45	**Soluciones integradas de autenticidad y trazabilidad para mejorar la competitividad de las cadenas de suministro agroalimentarias** Integrated solutions for authenticity and traceability to enhance the competitiveness of agrifood supply chains. Maurizio Notarfonso, ENEA, Italy.
14.45 / 15.00	**Investigación sobre el desarrollo de un sistema de certificación de la cadena alimentaria según el concepto Una Salud** Research on the development of a certification scheme on the food chain according to the One Health concept. Nastasia Belc, IBA Bucharest, Romania.
15.00 / 15.15	**Digitalización y visión AI: Claves para competir** Digitalization & Vision AI: Keys to compete**.** Jorge Conde, UST.
15.15 / 16.00	**MESA REDONDA** ROUNDTABLE MODERADOR / MODERATOR: **Iván Pérez** **INTELIGENCIA ARTIFICIAL: OPORTUNIDADES PARA LA INDUSTRIA ALIMENTARIA** ARTIFICIAL INTELLIGENCE: OPPORTUNITIES FOR THE FOOD INDUSTRY **PANELISTAS** PANELIST Francisco Javier Gutiérrez Pecharromán. UNIVERSIDAD EUROPEA MIGUEL DE CERVANTES Valladolid. Angel Alba Pérez. INNOLANDIA. Emilio Soria-Olivas, IDAL, Escuela Superior de Ingeniería, UNIVERSIDAD DE VALENCIA.

PREGUNTAS Y CLAUSURA QUESTIONS AND CLOSING

Miércoles 21 de mayo Wednesday 21st May 2025

JORNADA DE PUERTAS ABIERTAS OPEN DAY AND TECHNOLOGICAL DEMONSTRATION AT CTNC

National Technological Centre for the Food and Canning Industry Location: C/Concordia s/n 30500 Molina de Segura, Murcia, Spain

NO TRANSPORTATION IS PROVIDED.
Previous registration is required:
sese@ctnc.es

TECNOLOGÍAS DE PROCESADO: DESHIDRATACIÓN (ATOMIZACIÓN Y LIOFILIZACIÓN), ENCAPSULACIÓN Y MICROENCAPSULACIÓN, LÍNEA DE PROCESADO Y ENVASADO ASÉPTICO MULTIPRODUCTO, LÍNEA DE PASTEURIZACIÓN Y ESTERILIZACIÓN CONVENCIONAL, TECNOLOGÍA DE PROCESADO PARA ALIMENTOS REFRIGERADOS Y PLATOS PREPARADOS, LÍNEA DE CONGELACIÓN.PROCESSING TECHNOLOGIES: DEHYDRATION (ATOMIZATION AND FREEZE-DRYING), ENCAPSULATION AND MICROENCAPSULATION, MULTI-PRODUCT ASEPTIC PROCESSING AND PACKAGING LINE, CONVENTIONAL PASTEURIZATION AND STERILIZATION LINE, PROCESSING TECHNOLOGY FOR REFRIGERATED FOODS AND READY MEALS, FREEZING LINE. **EXTRACCIÓN DE COMPUESTOS DE INTERÉS CON TÉCNICAS VERDES: ENZIMÁTICA, ASISTIDA POR ULTRASONIDOS, MECÁNICA, SUBCRÍTICA, CO2 SUPERCRÍTICO, MÉTODOS DE ADSORCIÓN-DESORCIÓN Y ASISTIDA POR MICROONDAS** EXTRACTION OF COMPOUNDS OF INTEREST WITH GREEN TECHNIQUES: ENZYMATIC, ULTRASONIC ASSISTED, MECHANICAL, SUBCRITICAL, SUPERCRITICAL CO2, ADSORPTION-DESORPTION METHODS, MICROWAVE ASSISTED...
PROCESOS BIOTECNOLÓGICOS: FERMENTACIONES, CAPACIDAD ANTIOXIDANTE IN VIVO BIOTECHNOLOGICAL PROCESSES: FERMENTATIONS, ANTIOXIDANT CAPACITY IN VIVO...

XII INTERNATIONAL SYMPOSIUM FOOD TECHNOLOGY

Dirigido a empresas e investigadores
Aimed at companies and researchers

Comité técnico
Technical Committee

Francisco Alberto Serrano Sánchez
Allfoodexperts

Isabel Puerta Lozano
Postres Reina

Andrés Fernández Parguiña
Marín Giménez Hermanos S.A.

Iván Pérez Lluch
Vicky Foods

Pedro Abellán Ballesta
Veg y Tech S.L.

Javier Cegarra Páez
Presentación García Gómez
Miguel Ayuso García
David Quintín Martínez
Centro Tecnológico Nacional de la Conserva y Alimentación

Eugenia Ferrández García
Hero España, S.A.

Francisco Puerta Puerta
Cynara EU

Comité organizador
Organizing Committee

Nastasia Belc
Sorin Iorga
IBA Bucarest, Rumania

Ana Belén Morales Moreno
Fundación Cluster Agroalimentario de la Región de Murcia

Pablo Flores Ruiz
Francisco Gálvez Caravaca
Ángel Martínez Sanmartín
Centro Tecnológico Nacional de la Conserva y Alimentación

Pedro Antonio Balanza Vicente
Consejería de Sanidad de la Región de Murcia

Pedro Angosto Cano
Centro de Referencia Nacional en Industria Alimentaria, Área de Conservas Vegetales. CIFEA / CRN

Eduardo Cotillas Provencio
Juan Martínez Gironella
Plataforma Tecnológica Food for Life Spain

Blas Marsilla de Pascual
Academia de Ciencias Veterinarias de la Región de Murcia

Elsayed Elhabasha
National Research Centre Egypt

Claudia Zoani
Metro Food, ENEA, Italy

Antonio Romero Navarro
Victoria Díaz Pacheco
Instituto de Fomento de la Región de Murcia

Mª Jesús Periago Castón
Campus Mare Nostrum

¡Mejorar no es suficiente... innova!
Improving is not enough... innovate!

XII SYMPOSIUM INTERNACIONAL SOBRE TECNOLOGÍAS ALIMENTARIAS
XII INTERNATIONAL SYMPOSIUM FOOD TECHNOLOGY

Fondo Europeo de Desarrollo Regional (FEDER)
European Regional Development Fund (ERDF)

Editado por / Edited by: Centro Tecnológico Nacional de la Conserva y Alimentación (CTNC)
C/. Concordia, s/n., 30500 MOLINA DE SEGURA (Murcia-Spain)
Teléfono: 34 968 389011
Fax: 34 968 613401
http://www.ctnc.es

Coordinado por / Coordinated by: OTRI CTNC

Primera edición / First Edition: Mayo 2025 / May 2025

ISBN: 978-84-09-72681-3
Depósito Legal: DL MU 599-2025

MARTES 20 DE MAYO

TUESDAY 20th MAY 2025

OPENING CONFERENCE

DRIVING INNOVATION IN AGRIFOOD: METROFOOD-RI SOLUTIONS AND BENEFITS

Claudia Zoani

*Contact: claudia.zoani@enea.it

Claudia Zoani *is researcher at the Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA) - Dept. for Sustainability - Biotechnology and Agroindustry Division (SSPT-BIOAG). She is graduated in Chemistry with a PhD in Analytical Chemistry, she concluded the research activities of a second PhD in Agriculture, Food and Environment. Specialist on atomic spectroscopic and mass spectrometry techniques and Metrology, she conducts R&D activities on Reference Materials and Methods; measurement uncertainty; food quality, safety and traceability; sustainability of agrifood systems; chemical risk assessment. Scientific Secretary of the IMEKO TC23 Metrology in Food and Nutrition and member of the Eurachem WG on Reference Materials UNI Committee General Metrology. She is one of the 10 Italian experts on Circular Economy selected by the Italian Ministry for the Foreign Affairs and International Cooperation (MAECI) for the participation to the Comité des Dix-Italie - Sommet des Deux Rives initiative. Awarded with the Premio Leonardo UGIS for "research and its communication" on 2014. She is the Coordinator of the Research Infrastructure METROFOOD-RI – Infrastructure for Promoting Metrology in Food and Nutrition, included in the ESFRI Roadmap for the Domain Health and Food, which recently concluded its Preparatory Phase upon the H2020 project METROFOOD-PP. She is engaged as PI for ENEA in several national and European ongoing projects, such as the HEu AgroServ, FHERITALE, DGR4Food and EOSC-Beyond, the H2020 FNS-Cloud, iNEXT-Discovery and FoodSafety4EU and the ERANET SUSFOOD CORE ORGANIC "PROVIDE". In the frame of the Italian National Plan for Recovery and Resilience, she coordinates the project METROFOOD-IT, focused on "Strengthening of the Italian RI for Metrology and Open Access Data in support to the Agrifood".*

Abstract

METROFOOD-RI - the Research Infrastructure for Promoting Metrology in Food and Nutrition (ESFRI Roadmap, domain Health and Food) is designed to support innovation, traceability, and sustainability in the agrifood sector through the integration of high-level physical and digital services. Built as a distributed infrastructure, METROFOOD-RI offers access to a wide spectrum of analytical capabilities, pilot-scale facilities, digital platforms, and training programmes, spanning the entire food value chain - from primary production to consumer health.

The **METROFOOD-RI's** service offer is structured across four main categories – Research services, ICT & Data services, Advisory services, and Education & Training – each encompassing

a wide range of specific and integrated services designed to meet the needs of diverse user groups, from scientific research to industry applications and policy support.

The infrastructure plays a strategic role in driving interdisciplinary research and innovation, fostering collaborations between academia, industry, policymakers, and society. Strong cooperation with businesses and technology transfer are key pillars of **METROFOOD-RI's** mission, facilitating the translation of scientific research into practical solutions for the market and strengthening the competitiveness of the agrifood industry. The user-centric approach enables the co-creation of solutions in areas such as food quality and safety, authenticity, novel food systems, circular bioeconomy, and the digital transformation of agrifood. Integrated services, Living Labs, and virtual access tools are tailored to support emerging challenges, while alignment with the FAIR principles and EOSC integration ensures data quality, interoperability, and reusability.

This presentation will highlight **METROFOOD-RI's** unique value proposition, practical applications, and key benefits for the scientific community and the agrifood industry. It will also showcase recent advancements in service provision, stakeholder engagement, and cross-RI cooperation, demonstrating how **METROFOOD-RI** contributes to building resilient, sustainable, and innovation-driven food systems in line with European and global strategic agendas.

MARTES 20 DE MAYO

TUESDAY 20th MAY 2025

PRIMERA SESIÓN / FIRST SESSION

TECNOLOGÍAS PARA UNA ALIMENTACIÓN SALUDABLE "ECOSISTEMA NUTRIALITEC"
TECHNOLOGIES FOR HEALTHY FOOD "NUTRIALITEC ECOSYSTEM"

MODERADORES / CHAIRS:
NASTASIA BELC, PRESENTACIÓN GARCÍA

1.1
METABOLOMICS AND METAGENOMICS IN PERSONALIZED NUTRITION

Francisco A. Tomás-Barberán*, Rocío García-Villalba and Carlos J. García.
CSIC-CEBAS, Murcia, Spain.
*Contact: fatomas@cebas.csic.es

Francisco A. Tomás-Barberán *is a Research Professor at CEBAS (Murcia) belonging to the Spanish National Research Council (CSIC). He heads the Research Group on Quality, Safety, and Bioactivity of Plant-Based Foods. His research focuses on the role of polyphenols and other phytochemical compounds in human health, their interaction with the gut microbiota, their potential in personalized nutrition, and the development of new foods and ingredients, using a metabolomic approach. Some of his research results have been transferred to industry (six patents, three of which have been licensed to companies and have led to products currently on the market). He is the author of more than 400 publications in scientific journals in the fields of phytochemistry, food science, and nutrition.*

Abstract

The complexity of the gut microbiome, its interindividual variability, and the family of metabolites produced in the gastrointestinal tract after the intake of foods rich in fiber and polyphenols must be considered in nutritional studies and the design of functional foods and nutraceuticals. The application of metabolomics and metagenomics can help address challenges in the food industry, as well as inform the design of foods and nutraceuticals for personalized nutrition. We have conducted studies that demonstrate the potential of metabolomics and metagenomics for this purpose.

- The search of **orange juice** biomarkers of processing using untargeted metabolomics. Urine analysis of the orange juice phytochemical metabolites indicates that there are differences between the freshly squeezed juice and those subjected to different technological treatments.
- The discovery of markers of processing **strawberry and apple** in an industrial setup using untargeted metabolomics reveals markers for thermal processing and storage.
- Untargeted metabolomics to identify metabolites that are biomarkers for the lettuce susceptibility to browning in **fresh-cut lettuce**.
- Untargeted metabolomics for the discovery of potentially neuroactive metabolites from **saffron apocarotenoids**.

- Targeted metabolomics to discover plant-derived gut microbiota metabolites in different **animal milk**.
- Metataxonomics and microbiota changes during **fermentation processes** and identification of gut microbiota metabotypes.
- Multiple mieloma therapy with gut microbiota ellagitannin metabolites from **walnuts, strawberry, raspberry and pomegranate**, urolithins.

These metabolomics and metataxonomic studies will help elucidate the role of gut microbiota in interindividual variability in response to dietary and nutraceutical interventions, with direct application in personalized nutrition.

1.2

APPLICATION OF MICROBIAL BIOTECHNOLOGIES FOR BREAD BIOPRESERVATION

Dopazo V, Calpe J, Moreno A, Vazquez R, Hernandez S, Soriano E, Meca G*

Laboratorio de Química de los Alimentos y Toxicología, Facultad de Farmacia. Universidad de Valencia. Spain.

*Contact: Giuseppe.Meca@uv.es

Giuseppe Meca de Caro *is full professor of the Department of Preventive Medicine of the University of Valencia, Faculty of Pharmacy. He is the coordinator of BiotechAgrifood Lab group, and his research activity is based on the development of biotechnological strategies to produce innovative products that could be applied on the agricultural, nutraceutical and food markets. Around his career he published more than 150 publications in high impact factor journals and he is also the founder of MicrolabBiotech SL, spin-off of the University of Valencia.*

Abstract

Two of the major challenges faced by the food industry are the high generation of waste throughout the entire food manufacturing process and fungal contamination. This study developed a methodology to address both issues by creating an active ingredient against fungal growth, based on rice bran fermented by lactic acid bacteria. In vitro assays demonstrated that fermented culture media based on rice bran inhibited the growth of *A. flavus*, *P. commune*, and *A. alternata*. Quantification of antifungal metabolites revealed an increase in their presence as more rice bran was added to the culture medium, with a significant rise in phenyllactic acid and lactic acid levels compared to a control medium without rice bran. Following the evaluation process, the optimal bacteria and culture medium were selected for the development of the active ingredient for bread application. Shelf-life tests showed that bread containing 20% of the active ingredient delayed the growth of *A. flavus* and *P. commune* for the same duration as control bread containing propionate (the most commonly used antifungal additive in the industry) and for an average of three additional days compared to a control bread without additives. Furthermore, the study on mycotoxin metabolism demonstrated that the active ingredient reduced their occurrence by up to 97%. Additionally, the impact of this ingredient on various technological properties of bread was assessed, revealing that, at the concentrations used, the ingredient did not drastically alter these properties.

Keywords: (lactic acid bacteria, fungi, food waste, biopreservation)

1.3

BREWING AND WINERY BY-PRODUCTS AS SOURCE OF BIOACTIVE COMPOUNDS FROM A CIRCULAR BIOECONOMY PERSPECTIVE

Adriana Dabija[1*], Amelia Buculei[1], Larisa Caisîn[2], Vitalii Agapii[2], Ancuța Chetrariu[1], Ionuț Avrămia[1], Dadiana Dabija[1]

1Ștefan cel Mare University of Suceava, Romania

[2]Technical University of Moldova, Republic of Moldova

*Contact: adriana.dabija@fia.usv.ro

Adriana Dabija *is a professor and doctoral coordinator in the Field of Food Engineering, since 2019. She has an experience of over 39 years in the Field of Food Engineering, 17 years' experience in food production, and 28 years in university education. Areas of expertise: food biotechnology, food microbiology, quality management in food industry, food design.*

Amelia Buculei *is a Lecturer, Ph. D in the Field of Food Engineering with an experience of 24 years in the Field of Food Engineering. Areas of expertise: Technology and quality control of meat and meat products, Technology and quality control in the bakery industry, Packaging and design of new products, Traditional and ecological products, Food control and expertise.*

Abstract

Food waste reduction and recycling, which remain issues in the agro-industrial sector, are the main objectives of the circular bioeconomy. One of the possible tactics to improve the sustainability of food production is waste minimisation. This paper is a review of the specialised literature on the valorisation of by-products from wine and brewing industries within the framework of the circular bioeconomy and the promotion of "green technologies." Regulations in the European Union promote the extraction of important components from food industry secondary products to produce functional foods and feeds. One of the best ways to convert these wastes into products that are both advantageous and less detrimental to the environment is to feed nutrient-dense by-products to animals.

Nowadays, it's common practice to add non-traditional feedstuffs to animal diets as a growth and health enhancer that also helps to boost animal productivity without having any negative side effects. Alternative techniques are needed to repurpose food waste into uses with a higher value in order to lessen the environmental load that is brought on by their production. This will improve the long-term sustainability of our food system and reduce the environmental impact that food waste causes. Finding and developing new ways to use the nutritional and functional potential of brewing and winery by-products is one of the cornerstones of the circular bioeconomy

and one of the biggest challenges in food engineering, with implications for the strategic fields of bioeconomy, health, and environment.

Keywords: circular bioeconomy**,** food waste, functional foods, sustainability, valorisation

ACKNOWLEDGMENTS: This work was supported by a grant of the Ministry of Research, Innovation and Digitization, CNCS-UEFISCDI, project number PN-IV-P8-8.3-ROMD-2023-0121, within PNCDI IV.

1.4

INNOVATIVE ACTIVE SUBSTANCE RELEASE TECHNOLOGIES FOR FUNCTIONAL FOODS DEVELOPMENT

Antonio García González

MARTÍNEZ NIETO, S.A.

Pol. Ind. Los Camachos Sur, Av. del Carbono 44, Parcela 96, 30369 Los Camachos, Cartagena, Spain

*Contact: antoniogarcia@marnys.com

Antonio García Gonzalez *is the Pharmaceutical Technical Director at Martínez Nieto S.A., a company specializing in the manufacture and marketing of dietary supplements, natural cosmetics, sports nutrition, essential oils, and healthy eating under the MARNYS® brand, with a product catalogue of more than 500 products. Antonio García is the director of the network of University Chairs that Marnys maintains with both public and private universities.*

Abstract

Liposomal technology represents an advanced platform for the encapsulation and targeted release of bioactive compounds in nutrition and dietary supplements. Liposomes, vesicular structures composed of phospholipid bilayers, offer significant advantages such as protection against adverse conditions (pH, light, temperature), increased bioavailability, and improved stability of sensitive functional molecules.

This paper presents the fundamentals of liposomal technology, its main advantages when applied to the design of nutritional formulas, and a review of the most relevant preparation methods.

Current applications in the encapsulation of vitamins (C, D, E, K), low-absorption minerals (such as iron and zinc), and other bioactive molecules are also presented. The prospects for innovation in the nutraceutical sector using this technology are also discussed.

Keywords: liposomes, dietary supplements, encapsulation, vitamins, bioavailability, emerging technologies.

1.5
TECHNOLOGIES FOR HEALTHY PLANT-BASED PRODUCTS VALUE PROPOSITIONS

Belén Blanco Espeso

Directora Área de Alimentación, División de Agroalimentación y Procesos, Fundación CARTIF, Parque Tecnológico de Boecillo, Av. Francisco Vallés, 4, 47151 Boecillo, Valladolid

*Contact: belbla@cartif.es

Belen Blanco Espeso *holds a PhD in Food Science and Technology from the University of Burgos, a Master's degree in Total Quality in the Food Industry from the Nevares Institute of Agricultural Entrepreneurs, and University Expert in Sustainable Food Systems. For 25 years, she has worked as Director of the Food Area, Agrifood and Processes Division at the CARTIF Technology Center, innovating in the food sector. She has extensive experience in food technology and its relationship with human nutrition, applying technological processes to improve the nutritional, physical, chemical, functional, and sensory quality of agri-food raw materials and by-products. Specifically, she focuses on the application of extrusion technology for the development of products for human and animal food; evaluating the impact of process variables on food development, the transformation of fiber sources, and protein texturization. She is a researcher in fields related to healthy and sustainable diets through integration into the food system.*

Abstract

Technologies Enabling Value Propositions for Healthy Plant-Based Foods.

The growing demand for plant-based products reflects the needs of increasingly health-conscious consumers, with greater environmental awareness and concern for animal welfare. However, the challenge goes beyond simply replacing animal-derived ingredients; it involves delivering food products that are healthy, sustainable, safe, and appealing from both a sensory and nutritional standpoint.

At CARTIF, as a Technology Centre focused on innovation, we provide tailored solutions to companies for the development of plant-based foods with enhanced added value. To address this, we leverage technologies such as extrusion, texturization, and 3D food printing as tools for the customization of functional food matrices, and explore the use of emerging processes such as ultrasound and cold plasma as innovative strategies to improve the techno-functional properties of plant proteins, enhance food safety, and reduce the use of additives.

In addition, the application of advanced preservation technologies and non-invasive analytical tools such as Near Infrared Spectroscopy (NIRS) enables us to respond to the current challenges of the sector in terms of food safety and quality control.

Furthermore, we emphasize the importance of aligning these developments with the principles of the circular economy, through the valorisation of plant by-products as new sources of proteins and functional compounds. Examples will be presented of how CARTIF acts as a bridge between the laboratory and the market, offering transferable technological solutions tailored to the needs of the food industry.

1.6

FOODTURE OF INGREDIENTS: FOODTECH, INNOVATION, SUSTAINABILITY AND NEW MARKETS

Pedro Prieto Hontoria

*Contact: drprietohontoria@gmail.com

Pedro Prieto Hontoria *holds a PhD in Food, Physiology, and Health from the University of Navarra, and a degree in Food Science and Technology from San Pablo CEU University. He has 20 years of experience in the agri-food and healthcare sectors, has served as R&D director for various national and international food companies, and is a member of food innovation panels in various Latin American and European countries. He has published over 60 articles and presented more than 160 conference papers.*

Abstract

The future of food is being transformed by technological advances, new sustainability models, and a shift toward conscious consumers who demand health and companies with values. In this new horizon, Foodtech stands as a driving force of change, revolutionizing how we produce, process, and consume food. Likewise, digitalization, hyperconnectivity, and artificial intelligence (AI) are revolutionizing the way we produce new foods. In this context, innovation plays a crucial role, introducing solutions such as alternative proteins, ingredients with higher nutritional value, active packaging, functional foods and beverages, and more than ever, it seems that the phrase "let food be thy medicine" is gaining prominence with nutraceutical or adaptogenic ingredients.

But without a doubt, to maintain the nutritional value of food, we need new technologies that preserve bioactive compounds of interest, flavors, and textures, combined with greater production and energy efficiency. Sustainability is not just a trend, but a necessity. To achieve this, we will practically address how clean-label, high-nutritional-value products are being developed through technology and innovation, supporting new regulations on reducing food waste and creating circular food systems.

This scenario invites us to reflect and act to build a more inclusive, sustainable, and technologically advanced food industry. Foodturo is not just a vision; it is the path toward tangible change in the way we feed the world and future generations with purpose.

MARTES 20 DE MAYO

TUESDAY 20th MAY 2025

SEGUNDA SESIÓN / SECOND SESSION

SOSTENIBILIDAD, PROYECTO OASIS
SUSTAINABILITY, OASIS PROJECT

MODERADORES / CHAIRS:
JAVIER CEGARRA, FRANCISCO SERRANO

2.1
INNOVATİVE AND SUSTAİNABLE CLUSTER FOR THE OLİVE VALUE CHAİN, OASIS PROJECT

İbrahim Serdar Koçar
Izmir Ticaret Borsasi, Türkiye.
*Contact: serdarkocar@itb.org.tr

İbrahim Serdar Koçar *is a Project Development Specialist in İzmir Commodity Exchange. He is a graduate of Business Administration. He has experience in EU funded projects in different organizations such as international and local NGOs, universities, technoparks, chamber of commerce and industry under different EU funded programmes since 2016. He currently is working as project team member in the OASIS project funded by EISMEA under SMP AGRICLUSTER call.*

Abstract

Climate change has effects on all parts of our world, agriculture is one of the top effected sectors. Almost all agricultural products have been affected by the changing climate effects, and productivity of the olive cultivation has been shifting in different olive zones of the world.

The Farm to Fork Strategy is at the heart of the European Green Deal aiming to make food systems fair, healthy and environmentally-friendly. With reference to the “Farm to Fork Strategy”, Innovative Sustainable Cluster for Olive Value Chain (OASIS) project has been developed.

OASIS project is funded within the scope of Single Market Programme under Agricluster call. It aims to create and cultivate ‘European Agri-food Sustainability Cluster Partnerships’ aimed at facilitating the adoption of the EU Code of Conduct on Responsible Food Business and Marketing Practices among small and medium-sized enterprises, to decrease the vulnerability of food production systems to external factors, such as adverse weather events linked to climate change, to enhance the adoption of resource-efficient technologies by SMEs by identifying and implementing measures to enhance the efficiency of material utilization in processes, and to develop and implement strategies to improve resource efficiency and reduce food waste, and create a collaboration environment between SMEs in 3 countries.

Acknowledgements: Innovative Sustainable Cluster for Olive Value Chain (OASIS) project (101166124 — OASIS — SMP-COSME-2023-AGRICLUSTER) is funded by European Innovation Council and SME Executive Agency (EISMEA) under Single Market Programme (SMP) between 16 May 2024 – 15 May 2027.

2.2
SUSTAINABLE ALTERNATIVES TO THE TREATMENT OF OLIVE POMACE

Jose Calama

TROIL VEGAS ALTAS, Ctra. Don Benito Guareña, 18, Valdetorres, 06474, Badajoz. Spain.

*Contact: josecalama@troil.es

Jose Calama *is a cyclist but makes his living as an agricultural engineer. He is the manager of TROIL Vegas Altas S. Coop, an olive oil sludge treatment plant, since 2001, so he knows little else. He previously worked in Saudi Arabia as director of the irrigation and composting section of the largest olive farm in Saudi Arabia. He also studied in the US for three years and worked for another two years in irrigation companies.*

Abstract

TROIL is not a typical olive pomace plant. We have focused part of our production on preparing the final products for use as raw materials for feed mills, biotechnology industries, and liquid fertilizers high in organic matter.

TROIL is partly owned by COMPLUS, a composting plant that allows us to recover part of our olive pomace.

We have three cogeneration units whose remuneration scheme ends in 2027, so we will install a biogas plant to cover part of our energy needs.

This biogas plant will make us more versatile, increasing our productivity and that of COMPLUS, as they will receive the digestate from the biogas plant, already partially composted, thus increasing their productivity. With the products from both plants combined, we will be able to replace 75% of our fossil natural gas with biogenic methane.

To supply the remaining thermal energy needed to treat the olive mill sludge, we are planning a biochar plant. Always trying to be as sustainable and circular as possible.

2.3

NOVEL ANTIMICROBIAL COATINGS AND PACKAGING IN THE MEDITERRANEAN. NOVAPACK

Manuela Pintado

Universidade Católica Portuguesa, CBQF – Centro de Biotecnologia e Química Fina – Laboratório Associado, Escola Superior de Biotecnologia, Rua Diogo Botelho 1327, 4169-005 Porto, Portugal.

*Contact: mpintado@ucp.pt

Maria Manuela Estevez Pintado *is currently Full Professor of the Escola Superior de Biotecnologia- Universidade Católica Portuguesa (ESB-UCP), Associate Director of School of Biotechnology (ESB-UCP) and the director of CBQF (Centre of Biotechnology and Fine Chemistry – Associate Laboratory), and President of EBRI - European Biotechnology Research Institute. In the research field, she is the Head of Bioactive and Bioproducts Research group. She has a Ph.D. in Biotechnology and Habilitation in Biotechnology in Food Science and Engineering. Her research focuses on (i) developing and characterizing bioactive ingredients, (ii) valorizing agrifood by-products and novel resources through bioprocesses to obtain high-value bioproducts, and (iii) applying these advancements across various biotechnological fields. Over her scientific career, she has supervised or co-supervised 75 PhD theses and published approximately 770 papers in peer-reviewed international journals, achieving an h-index of 78 with around 25,000 citations. She is the inventor of 30 patent families and has led or co-led more than 120 externally funded national and international projects, with strong collaborations with the agrifood industry. She has been recognized among the World's Top Most Cited Researchers in Agriculture, Fisheries, and Forestry for the past five years (since 2019), according to the World's Top 2% Scientists ranking compiled by Stanford University.*

Abstract

The upcycling of food losses and by-products has become a global concept among consumers, recognized as a key solution for addressing significant environmental and economic challenges. The Mediterranean (MD) region faces escalating environmental degradation, along with water and land scarcity, and relevant variability between regions concerning food systems and technological development. The most important and interconnected triggers for these challenges include: i) the enormous amount of food waste and its deposition in landfills, and ii) the extensive use of plastic for food packaging and its related environmental impact. Therefore, the MD food supply chain should be transformed into an efficient circular system, which collects and regenerates by upcycling the losses and wastes into novel, bioactive ingredients and products. The new value-added ingredients must respond to current consumer demands for ecological and sustainable

products, including the use of biodegradable packaging made from sustainable materials. Additionally, the fruit and vegetables (F&V) co-products must also meet consumer demands for healthier and more natural products.

The NOVel Antimicrobial coatings and PACKaging in the Mediterranean (NOVAPACK) project focuses on the extraction and purification of valuable bioactive compounds from food by-products for the development of active food coatings, films, and functionalized packaging materials. The project identifies bioactive extracts with antimicrobial, antifungal, and antioxidant properties, develops natural colorants with pH-responsive capabilities, and extracts pectin, soluble polysaccharides, and cellulose. These bioactive compounds are incorporated into innovative formulations using renewable biopolymers to create biodegradable films, coatings, and sustainable packaging solutions for food preservation. Additionally, the project explores alternative packaging materials for fresh products, including protective atmosphere packaging, and investigates advanced technologies such as encapsulation to preserve the bioactivity of extracts, thereby maintaining the nutritional and organoleptic properties of food.

Keywords: Food co-products; functional ingredients; zero waste; circular economy; functional coatings; food industry.

Acknowledgements: The authors would like to thank CBQF for its scientific collaboration under the FCT project UIDB/Multi/50016/2020 and the NOVAPACK project (PRIMA/0006/2023).

2.4

BIOCONVERSION STRATEGIES IN AGROINDUSTRY: OG DEMOEXTRACT AND OTHER SUCCESS STORIES

Rebeca Ramos Bueno

Foundation of Auxiliary Industry of Agriculture Tecnova, Almería, Spain.

*Contact: rramos@fundaciontecnova.com

***Rebeca Ramos Bueno**, PhD in Advanced Chemistry, leads the Biotechnology and Bioprocesses Department at TECNOVA Technological Center. With over 8 years of experience, she has managed and collaborated on numerous national and international R&D projects focused on biotechnology developments, sustainable agriculture and circular economy. Her work includes coordinating teams, research and development R&D projects, and participating in international conferences. Her career is distinguished by her contributions to bioactive compounds in fruits and vegetables, plant biotechnology and circular economy topics, collaborating with prestigious companies and research centers.*

Abstract

World population growth and the increase in food demands push the agriculture sector to be a greener and more sustainable system. In this sense, the reduction of agro-industrial residues through technical and economic strategies can represent one of the most efficient and promising solutions due to the large number of residues generated per year and to their valuable composition.

Among different strategies, bioconversion contitutes one of the most promising and marketable processes in the agribusiness sector. Bioconversion is the process of transforming organic waste into valuable products using living organisms. It offers an eco-friendly way not only to manage agricultural residues, but also reducing environmental impact and generating economic value. Thus, these processes allow the promotion of circular economy practices and support sustainable agriculture, being some of the most common applications the production of organic ferlilizers and compost, animal feed, active biomolecules for industrial purposes, etc.

Different types of bioconverison can be developed depending on the living organism used. This presentation is focused on two of them, microbial and edible insect-based conversion. In this context, many projects have been developed focusing on bioconversion strategies to boost the sustainability and the rentability of the agrifood sector. To name but a few:

- DEMOEXTRACT is an EIP-AGRI Operational Group dedicated to the evaluation and demonstration of new agricultural inputs and food ingredients through extractive

technologies and high-efficiency and effectiveness bioconversion processes in the field of valorization of by-products from the citrus, olive, and horticultural industries.

- TOMAGROUP is an EIP-AGRI Operational Group aimed to the development of sustainable agricultural biostimulants through the valorisation of cherry tomato residues generated during its cultivation and commercialization promoting the bioeconomy and circular fertilization around this horticultural crop.
- RUSTICA was an H2020 project based on the assessment of 5 technical solutions (carboxylic acid platform, microbial biomass production, electrodialysis, insect breeding and biochar production) to convert organic residues from the fruit and vegetable sector into novel bio-based fertiliser products.
- AGROENTOOL was an EIP-AGRI Operational Group focused on active biopolymer from insect species to develop new bio-based fertilizer with biostimulant properties.

Bioconversion is a key innovation for the future of agribusiness. It allows us to turn waste into valuable resources, contributing to a more **sustainable, efficient, and circular agricultural system**.

Keywords: Bioconversion, By-product valorisation, Circular Economy, Environmental sustainability.

2.5

HARNESSING MICROWAVE AND RADIOFREQUENCY TECHNOLOGIES FOR EFFICIENT FOOD PROCESSING

Josep Maria Darne

BEMENS, Microwave & Radiofrecuency, Carrer de la Farga 23, 08755 Castellbisbal. Spain.

*Contact : josep.darne@bemens.com

Josep Maria Darné *is a Telecommunications Engineer from the Polytechnic University of Barcelona and the École Nationale Supérieure des Télécommunications de Bretagne, specialising in microwaves and optoelectronics. He is currently CEO of the company "Barcelona Electromagnetic Energy Solutions" (BEMENS). He has 35 years of professional experience in the use of microwaves, both in telecommunications and in so-called industrial applications.*

Abstract

The presentation, aimed at industry leaders in the food sector, focuses on two main topics:

- The advantages of microwave and radio frequency technology with respect to the characteristics of products processed with this technology.
- The energy efficiency derived from the use of this technology.

In the competitive landscape of the food industry, efficiency, safety, and quality are essential. This conference focuses on the strategic implementation of microwave and radio frequency technologies to optimize food processing operations.

Microwave technology offers rapid and uniform heating, making it ideal for applications such as cooking, thawing, pasteurization, sterilization, and dehydration. These capabilities translate into significant reductions in processing times and energy consumption, directly impacting operational efficiency and profitability.

Radio frequency technology complements these advantages by providing uniform drying, rapid thawing, and effective pasteurization and sterilization.

Both technologies guarantee the preservation of the nutritional and sensory qualities of food products, meeting consumer demand for safe, high-quality foods.

By adopting these advanced technologies, the food industry can achieve greater sustainability and competitiveness. This conference will provide detailed information on the mechanisms,

benefits, practical applications of the technology, its use, and safety. Attendees will learn about the latest advances and future trends, providing them with the knowledge to drive innovation and efficiency in their operations.

The presentation will discuss the advantages and disadvantages of the two aforementioned techniques, microwave and radiofrequency, in relation to processes and products, as well as the characteristics of both techniques.

Finally, examples of the technology applied to the food industry will be shown.

Keywords: microwave, radiofrecuency, food technology.

2.6

INDUSTRIAL PROJECTS FOR THE VALORISATION OF ORGANIC WASTE AND BY-PRODUCTS INTO SUSTAINABLE BIOETHANOL, BIOPRODUCTS AND BIOENERGY

Caterina Coll

PERSEO BIOTECHNOLOGY S.L., Carrer Ciudad Dario, 13, 46250 L'Alcúdia, Valencia, Spain

*Contact: caterina@perseobiotech.com

***Caterina Coll Lozano**, CEO of PERSEO Biotechnology S.L., holds a degree in Chemical Engineering from the Higher Technical School of Industrial Engineers of the Polytechnic University of Valencia and more than 20 years of experience in Project Management and Process Engineering. She holds a Master's degree in Environmental Management and an Executive MBA from the Business & Marketing School ESIC. She holds a Project Management Professional (PMP®) certification from the PMI. Over the past few years, she has coordinated and participated in several multidisciplinary projects and teams, both nationally and internationally, and has contributed to various scientific and technical publications for various journals, books, and conference contributions. Passionate about innovation and the development of new technologies, she leads projects that promote the circular economy and renewable energies, transforming industrial processes toward a more efficient and sustainable model. Her approach combines strategic vision, leadership of multidisciplinary teams, and project management to generate a real impact on industry and the environment. Currently, as Manager of Perseo Biotechnology, Caterina leads the company's global strategy, promoting new business models, technological innovation, and seeking funding to consolidate high-impact, sustainable solutions. Her mission is to develop projects that redefine the industry, driving the transition toward a more responsible and efficient future.*

Abstract

The presentation will discuss PERSEO's capabilities to develop technically, environmentally, and economically sustainable projects for the recovery of organic waste and by-products using PERSEO's own technology.

PERSEO Biotechnology S.L. is a company specialized in the development of industrial processes for the recovery of the organic and cellulosic fraction of organic waste and by-products into new, high-value biobased products such as advanced bioethanol, bioproducts, and bioenergy, using proprietary technology and the company's know-how.

At PERSEO, we have the capacity to develop organic waste recovery projects, from the technical-conceptual development phase and techno-economic feasibility study to the development of process engineering and implementation of industrial plants.

MARTES 20 DE MAYO

TUESDAY 20th MAY 2025

TERCERA SESIÓN / THIRD SESSION

TENDENCIAS EN EL SECTOR AGROLIMENTARIO
TRENDS IN THE FOOD SECTOR

MODERADORES / CHAIRS:
EDUARDO COTILLAS, IVÁN PÉREZ

3.1

INTEGRATED SOLUTIONS FOR AUTHENTICITY AND TRACEABILITY TO ENHANCE THE COMPETITIVENESS OF AGRIFOOD SUPPLY CHAINS

Maurizio Notarfonso

Head of the Agri-food Supply Chain Innovation Laboratory, "Sustainable Agrifood Systems" Division, Department for Sustainability. ENEA.

Centro Ricerche Casaccia, Via Anguillarese, 301 - 00123 S.M. di Galeria (RM)

*Contact: maurizio.notarfonso@enea.it

Maurizio Notarfonso *is Head of Laboratory Innovation of Agrifood Supply Chains at ENEA. Political Sciences and Economics background he is working since 2005 within EU project management, technology transfer, environmental and young entrepreneurship dossier at Italian and EU level. He was participating in more than 50 EU project funded projects.*

Abstract

The established interdependence of the World economy and the impact of political decisions at global level are de facto the driving forces of the emerging economic, social and political landscape. Large-scale phenomena like climate change, geo-political distrust and military tensions when not open warfare, uncertainty about growth, prices instability and international trade are all systemic challenges for both businesses and citizens. Food systems are an integral part of these developments. They represent a crucial element in the mechanics of international relations by assuring basic foodstuff independence and security to nations. They also guarantee people's health, safeguard of environmental aims, free trade and commercial exchanges, essential employment levels and increasing investments in technology.

The innovative ecosystem involves mainly large, mid-caps, SMEs, agri-food producers, research institutions, universities, technology companies, other agri-businesses, retailers, policymakers, and consumer groups. Each stakeholder plays a vital role in driving innovation: research institutions and universities focus on developing new knowledge and technologies, farmers and SMEs implement innovations, requiring equitable resource distribution and regulatory support, and suppliers drive commercialization of technologies like digital solutions and NGTs.

Blockchain for better food authenticity and traceability, enhanced supply chain efficiency, reduced food waste, and improved safety and trust in agricultural products constitutes a large and partially unexplored potential for agrifood food supply chain operators and actors which can guarantee and improve their competitiveness within EU market and abroad.

3.2

RESEARCH ON THE DEVELOPMENT OF A CERTIFICATION SCHEME ON THE FOOD CHAIN ACCORDING TO THE ONE HEALTH CONCEPT

Nastasia Belc[1], Florica Constantinescu[1], Florentina Israel Roming[2], Adrian Macri[3], Denisa Udeanu[4], Sorin Pirvu[5] and Denisa Duta[1*]

[1]National Research Development Institute for Food Bioresources, Bucharest.

[2]The University of Agricultural Sciences and Veterinary Medicine of Bucharest, Faculty of Biotechnology.

[3]The University of Agricultural Sciences and Veterinary Medicine of Cluj-Napoca.

[4]Carol Davila University of Medicine and Pharmacy, Bucharest.

[5]The Institute of Hygiene and Veterinary Public Health Bucharest.

*Contact: denisa.duta@bioresurse.ro

Nastasia Belc, *General Director of the National R&D Institute for Food Bioresources, IBA is food senior scientist, PhD, and associate professor to the Faculty of Biotechnology within University of Agronomy and Veterinary Medicine, Bucharest. She is member of Romanian Academy for Agricultural and Forestry Sciences, member of Consultative Council of Ministry of Research, Innovation and Digitalization, Consultative Council of Sustainable Development Department under Romanian Government, Scientific Council of The Sanitary Veterinary Authority and Food Safety and of The Accreditation Council of National Accreditation Body, RENAR. At international level, she is member of SCAR Food System Working Group since 2019 and since 2010 she is nominated by Ministry of Research and Innovation to be member of Governing Board of Food security, Agriculture and Climate Change (FACCE JPI), and of Healthy Diet for a Healthy Life Management Board Joint Programming Initiatives (JPI HDHL). For the last one she is part also of the Steering Committee. Since 2017, she is Romanian Node Representative for the pan-European Research Infrastructure, METROFOOD-RI.*

Abstract

One Health recognizes that the health of humans, domestic and wild animals, plants, and the wider environment (including ecosystems) are closely linked and interdependent.

Given the need to transform the food system into a sustainable, responsible, resilient and, at the same time, competitive one, the purpose of the project „Research on the development of a food chain certification scheme according to the One Health concept (ADER 16.1.2) is to promote the One Health concept at the level of Romanian society through 2 important promotion channels: a certification scheme for food products whose production and processing fall within this concept

and a collaborative information and interaction platform that supports multi- and transdisciplinary and co-creation for building a food system that prioritizes the health of people, animals and ecosystems.

The certification scheme has to levels of implementation: one is at systemic level, by evaluation the entire food ecosystem based on a specific questionnaire and, another one, by identifying several targeted indicators required for the quality of soil, plant and animal origin food raw material/ingredient and final product according to the One Health indicators and criteria which are identified in a series of working groups.

3.3
DIGITALIZATION AND VISION AI: KEYS TO COMPETE

Jorge Conde
UST Evolve, Calle Santa Leonor, 65, Edificio G, 28037 Madrid.
https://www.ust.com
*Contact: jorge.conde@ust.com

Jorge Conde *is Director in Digital Transformation and Strategy, specializing in AI, automation, and operational efficiency for manufacturing and supply chain optimization. He focuses on AI-driven quality control, compliance, and productivity improvements to enhance efficiency in highly regulated environments.*

Abstract

In an increasingly competitive market, the food industry faces growing challenges in quality control, process efficiency, compliance, and operational costs. Digitalization and Vision AI are transforming the sector by providing real-time insights, automation, and predictive analytics to optimize production and supply chain processes.

This presentation will explore how Vision AI enhances quality control, reduces operational risks, and improves productivity in food manufacturing. Through real-world case studies, we will demonstrate how companies can leverage AI-powered solutions to increase efficiency, minimize waste, and ensure regulatory compliance.

Key topics covered:

- How Vision AI improves quality control and food safety through automated defect detection.
- Digitalization strategies to streamline operations and enhance decision-making.
- AI-driven supply chain optimization, reducing costs and increasing traceability.
- Practical use cases from leading companies applying AI in food production.
- By integrating AI and automation, food manufacturers can stay competitive, improve sustainability, and drive long-term growth. This session will provide practical insights on how to successfully implement these technologies and maximize their impact.

3.4
ROUNDTABLE
ARTIFICIAL INTELLIGENCE: OPPORTUNITIES FOR THE FOOD INDUSTRY

MODERATOR
Iván Pérez

PANELISTS

Francisco Javier Gutiérrez Pecharromán *is Research Director at UEMC, with over 24 years of experience in R&D+i, including his work as Coordinator of the Chemical Processes Division at CARTIF and Head of R&D+i at GESTINVER. His extensive experience includes food product development, bioactive compound extraction, and a strong collaborative network with the industrial sector and the national innovation ecosystem.*

Angel Alba *is an artisan consultant specializing in Strategic Innovation with over 20 years of experience. Founder of Innolandia.es, a boutique consulting firm providing strategic innovation and generative AI services, with over 450 clients in 11 countries and 50 teams annually. Recognized as an innovation expert by the European Commission, he has worked for the EIT and the EIC. He is the author of the books "Minimum Viable Innovation Manual" and "Relearning to Innovate," more than 500 articles, two weekly newsletters, and one podcast. He has developed his own models and tools, such as Reverse Design Thinking for technology transfer and the Augmented Innovation Accelerator.*

Emilio Soria Olivas*, graduate in Physics with an extraordinary award, Doctor in Electronic Engineering, currently a University Professor at the University of Valencia (UV). Director of the Masters in Data Science and Artificial Intelligence, both from the UV. Director of the University-Business Chair in Artificial Intelligence and Neuroscience (with the company Balearia). He has written 7 books, published more than 100 articles in high-impact journals, has participated in more than 50 projects with public and private funding, as well as being the director of 12 doctoral theses, all related to the world of artificial intelligence and data.*

POSTERS

INDEX

01. STUDIES ON THE PRODUCTION OF NOVEL FERMENTED DRINKS FROM SWEET WHEY.

02. RESEARCH ON IMPROVING BREAD QUALITY BY ADDING FRUITS FROM THE *PRUNUS* GENUS.

03. POSSIBILITIES OF USING DIFFERENT GERMINATED PSEUDOCEREALS IN BREAD MAKING.

04. TOOLS FOR SUSTAINABILITY AND DIGITAL TRANSFORMATION OF THE AGRO-FOOD SECTOR. DIGISOST.

05. DEVELOPMENT OF BIO-BASED AND BIODEGRADABLE PLASTICS FOR ACTIVE FOOD PACKAGING FROM MIXTURES OF INGREDIENTS AND ACTIVE SUBSTANCES FROM AGRO-INDUSTRIAL WASTE. ET1APLAUS0.

06. RESEARCH ON ENCAPSULATION AND MICROENCAPSULATION OF STRAWBERRY EXTRACTS. ET2FRESACAPS.

07. APPLICATION OF ADVANCED OXIDATION TECHNOLOGIES FOR THE TREATMENT OF SPECIFIC CONTAMINANTS IN FOOD INDUSTRY WATERS. ET3OXICLEAN.

08. OBTAINING FUNGAL CHITOSAN FROM THE VALORISATION OF AGRO-FOOD BY-PRODUCTS GENERATED IN THE REGION OF MURCIA: VALIDATION IN FOOD USE AND SUSTAINABLE MATERIALS. ET4QUITOSAN.

09. ENVIRONMENTAL VALIDATION OF THE SUSTAINABLE MANAGEMENT OF OLIVE EFFLUENTS AS AN HERBICIDAL AGENT. REGIONAL OPERATIONAL GROUP OLIVECIDA

10. RESEARCH IN THE DEVELOPMENT OF TECHNOLOGIES FOR THE REDUCTION OF SUGARS IN JUICES AND REVALUATION OF EXTRACTED SUGARS AS HEALTHY INGREDIENTS. ET2ECOSUGARS.

11. DEVELOPMENT OF ACTIVE FOOD PACKAGING FROM SUSTAINABLE RESOURCES. ET1ALPACA.

12. CHARACTERIZATION AND OPTIMIZATION OF BIOCONSERVATIVE PRODUCTION THROUGH THE USE OF FERMENTERS. ET5BIOPRESERV.

13. NEW THERMAL TREATMENTS FOR STABILIZING HEAT-SENSITIVE FRUIT AND VEGETABLE PRODUCTS.

14. TECHNOLOGICAL, SENSORY AND NUTRITIONAL ASSESSMENT OF FUNCTIONAL INGREDIENTS FOR FOOD APPLICATIONS.
15. DEVELOPMENT OF FUNCTIONAL GLUTEN-FREE BREADS WITH BYPRODUCTS FROM INDUSTRY.
16. DEVELOPMENT OF FUNCTIONAL MEAT PRODUCTS WITH BYPRODUCTS FROM ARTICHOKE INDUSTRY.
17. SUSTAINABILITY PROJECTS CARRIED OUT BY SCIENCE HORIZON KENYA.
18. DEVELOPMENT OF FUNCTIONAL BREADSTICK ENRICHED BY EXTRACTS FROM ARTICHOKE INDUSTRIAL WASTES AS SOURCE OF BIOACTIVE PHENOLIC COMPOUNDS.
19. FINE-TUNING EXTRUSION PROCESSING PARAMETERS TO ENHANCE THE TEXTURAL AND NUTRITIONAL QUALITY OF SOY-BASED MEAT ANALOGS.
20. USE OF LEGUME DERIVED NUTRACEUTICAL COMPOUNDS AS CYTOTOXIC AND RADIOSENSITIZING AGENTS FOR TUMOR CELLS.
21. HOW IMPORTANT IS SAMPLING?
22. CONSUMPTION OF ULTRA-PROCESSED FOODS IN CHILDREN AND YOUNG PEOPLE IN THE REGION OF MURCIA AND ITS IMPACT ON THE RISK AND PROGRESSION OF STEATOTIC LIVER DISEASE ASSOCIATED WITH METABOLIC DYSFUNCTION (MASLD).
23. EVALUATING THE IMPACT OF LEACHING ON THE NUTRITIONAL COMPOSITION AND BIOACTIVE POTENTIAL OF *QUERCUS PYRENAICA* ACORN FLOUR
24. EXPLORING THE POWER OF LEMON CO-PRODUCTS: POTENTIAL APPLICATION IN EDIBLE COATINGS.
25. TAILORING FOOD PRODUCTS TO MEET THE NUTRITIONAL NEEDS OF SENIORS: THE DIET65+ PROJECT.
26. NATURAL-BASED STRATEGIES IN PRE- AND POST-HARVEST HANDLING AND VALUE ADDITION OF SUBTROPICAL CROPS.
27. COMPRESSED INERT GASES FOR INNOVATIVE AND RESIDUE-FREE FOOD PRODUCTS.
28. PLANT-BASED ALTERNATIVES OF FERMENTED FOODS: YOGURTS AND KOMBUCHA, NUTRITIONALLY COMPLETE AND WITH DESIRABLE ORGANOLEPTIC CHARACTERISTICS FOR CONSUMERS, FORMENTERA.

29. SUSTAINABLE SOLUTIONS FOR DIETARY FIBER EXTRACTION FROM BROCCOLI AND OTHER BRASSICAS.
30. NEW FUNCTIONAL SYRUP OBTAINED FROM THE REVALORIZATION WITH SUSTAINABLE TECHNIQUES OF THE MANDARIN PEEL BY-PRODUCT, ECOSYRUP01.
31. BREAKFAST CEREALS: INSIGHTS INTO MARKET DIVERSITY, NUTRITIONAL VALUE, AND POTENTIAL INNOVATION.
32. ONE HEALTH APPROACH AS PROMOTER OF A SUSTAINABLE FOOD SYSTEM.
33. MAGNETIC SOLID-PHASE EXTRACTION FOR THE DETERMINATION OF DYES IN CANDIES USING HIGH PERFORMANCE LIQUID CHROMATOGRAPHY COUPLED TO MASS SPECTROMETRY.
34. SUSTAINABLE PROTEIN RECOVERY FROM SOFT CAPSULE TRIMMINGS USING GREEN EXTRACTION METHODS. GREENCAPSU.
35. DRIED OLIVES: A BYPRODUCT OF OLIVE GROWING WITH THERAPEUTIC POTENTIAL FOR CHRONIC INFLAMMATION.
36. NON-INVASIVE NEAR INFRARED SPECTROSCOPY (NIRS) FOR ON-LINE SODIUM CONTENT PREDICTION IN DRY-CURED HAM SLICES: DEVELOPMENT OF TEMPERATURE-COMPENSATED MODELS.
37. DETECTION AND QUANTIFICATION OF MELAMINE IN MILK POWDER BY NIR SPECTROSCOPY.
38. INTELLIGENT WASTE BINS TO REDUCE FOOD WASTE IN DIFFERDANGE: A DATA-DRIVEN APPROACH TO SUSTAINABLE FOOD MANAGEMENT.
39. EVALUATION OF THE VALUE CHAIN IN THE CULTIVATION OF MEDICINAL PLANTS WITH THE PURPOSE OF OPTIMIZING THEIR RECOVERY IN ORGANIC TEAS.
40. PREDICTIVE ANALYSIS OF ALLERGENS IN NOVEL FOODS BY USING ADVANCED PROTEOMIC AND BIOINFORMATIC TOOLS.
41. A ONE HEALTH APPROACH TO MICROPLASTICS RISK ASSESSMENT IN THE FOOD ECOSYSTEM.
42. AUGMENTED INNOVATION: IMPLEMENTING GENERATIVE AI IN CORPORATE INNOVATION.
43. INNOVATIVE SUSTAINABLE CLUSTER FOR OLIVE VALUE CHAIN PROJECT (OASIS).

44. NEW TOOL FOR THE DIGITALIZATION OF THE PRODUCTION PROCESS OF REFRIGERATED FRUIT JUICES AND OTHER PLANT-BASED BEVERAGES WITH A HIGH DEGREE OF PRECISION.
45. DEVELOPMENT OF A NEW PROTOTYPE TECHNOLOGICAL SOLUTION FOR SUPPLY CHAIN OPTIMIZATION, DEMAND FORECASTING, AND NEW PRODUCT DEVELOPMENT.
46. REVALORIZATION OF PEACH AND APRICOT BY-PRODUCTS THROUGH INNOVATIVE EXTRACTION TECHNOLOGIES: CHARACTERIZATION AND BIOACTIVITY ASSESSMENT.
47. COMPARISON OF NUTRITIONAL AND FUNCTIONAL PROPERTIES OF SINGLE-CELL PROTEIN FROM SACCHAROMYCES CEREVISIAE AND SOY PROTEIN FOR MEAT SUBSTITUTE APPLICATIONS.
48. OPTIMIZATION OF A SOLID-LIQUID EXTRACTION METHOD FOR BLACKBERRY FRUITS BIOACTIVE COMPOUNDS USING A BOX-BEHNKEN DESIGN.
49. POWER PROTEINS: UNLOCKING THE POTENTIAL OF CEREALS & PULSES.
50. ISOLATION AND CHARACTERIZATION OF EPS-PRODUCING LACTIC ACID BACTERIA FROM ARTISANAL SOURDOUGHS.
51. ENVIRONMENTAL BEHAVIORS GUIDELINE AT THE GROCERY SHOP. PRACTICAL TIPS FOR SUSTAINABLE SPENDING IN EVERYDAY GROCERY SHOPPING. MINDTHECAP PROJECT.
52. THE USE OF SUPERABSORBENT HYDROGEL EXTRACTED FROM CITRUS WASTES AS A SOIL AMENDMENT AND NPK FERTILIZER, WHICH REPRESENTS A SUSTAINABLE ALTERNATIVE IN AGRICULTURAL PRODUCTION.
53. USE OF RESULTANT LIGNOCELLULOSIC EXTRACTED FROM CITRUS WASTES AS GREEN FERTILIZER.
54. NOVEL ANTIMICROBIAL COATINGS AND PACKAGING IN THE MEDITERRANEAN. NOVAPACK.
55. BLOOD4GOODS: VALORIZING PORCINE BLOOD AS A SUSTAINABLE HIGH-PROTEIN AND IRON-RICH INGREDIENT.
56. CLIMATE SMART AGRI-TECH: INTEGRATING CONTROLLED ENVIRONMENT AGRICULTURE FOR FOOD SECURITY AND PHARMACEUTICAL PLANT PRODUCTION IN THE ARAB REGION (ARAB AGRI-TECH).

57. NUTRIALITEC. ECOSYSTEM FOR PROMOTING FOOD INNOVATION: SUSTAINABLE EXTRACTIVE AND OMIC TECHNOLOGIES AT THE SERVICE OF FUNCTIONAL NUTRITION.
58. LABELLING AND TRACEABILITY OF POTATOES IN THE CANARY ISLANDS: AN ISOTOPIC APPROACH.
59. ADAPTA INDUSTRIA PROJECT.
60. NEW SUSTAINABLE PROTEINS FOR FOOD, FEED AND NON-FOOD BIO-BASED APPLICATIONS. INNOPROTEIN PROJECT.
61. CHARACTERIZATION OF LOW- CADMIUM ACCUMULATING GENOTYPES IN BREAD WHEAT (TRITICUM AESTIVUM L.).
62. EMPOWERING AGRI-FOOD AND LOGISTICS INNOVATION IN CONTINENTAL EUROPE AND OUTERMOST REGIONS: INSIGHTS FROM THE STARRISE PROJECT.
63. VALORIZATION OF THE *GAZPACHO* BY-PRODUCT AS A FUNCTIONAL INGREDIENT FOR FOOD AND FEED.

01.
STUDIES ON THE PRODUCTION OF NOVEL FERMENTED DRINKS FROM SWEET WHEY

Ramona Huber, Roxana Elena Gheorghiță, Ancuța Chetrariu, Adriana Dabija*
Ștefan cel Mare University of Suceava, Romania
*Contact: adriana.dabija@fia.usv.ro

Abstract

Whey is a significant environmental contaminant since its waste load is estimated to be 100–175 times more than that of an equivalent volume of household wastewater. About half of the whey produced is thought to be consumed for human or animal use, with the remaining half being discharged into the environment as waste water, contributing to pollution. Therefore, its valorisation through the creation of health-promoting products is a significant step for the environment and the food industry in compliance with the standards set forth by the EU Green Deal Program. The specialised literature mentions a variety of whey-based beverages. Whey can be fermented with various yeasts to create wine-like beverages, such as liqueur-style drinks, drinks with an alcohol content of 10–14%, etc. The goal of the study was to produce fermented beverages using deproteinised sweet whey that has been endogenously impregnated with CO_2. Utilising regional components to enhance the nutritional content of the final product—berry syrup—was what made these drinks novel. The production procedure was technologically similar to the process used to make sparkling wines in bottles. Physical-chemical and sensory analyses were performed on the finished product. According to the study, a modern beverage should satisfy the four main needs of consumers: affordability, thirst-quenching qualities, sensory quality, and a good health profile. This research offers a novel way to manage whey waste and supports sustainable food production methods by turning whey into a value-added product.

Keywords: fermented drinks**,** sparkling wines**,** sustainability, valorisation, whey beverages

02.

RESEARCH ON IMPROVING BREAD QUALITY BY ADDING FRUITS FROM THE *PRUNUS* GENUS

Mariana Slavic, Anca Mihaela Gâtlan, Amelia Buculei, Adriana Dabija*

Ștefan cel Mare University of Suceava, Romania

*Contact: adriana.dabija@fia.usv.ro

Abstract

Fruit's enhanced hydration properties, fermentability, phytochemical content, and balanced ratio of soluble and insoluble fibre make it a suitable fibre enrichment ingredient for bakery products. In recent years, fruits from the *Prunus* genus have been described as foods with health-promoting properties. Research on fruits from the Prunus genus' health advantages keeps showing promising results about its memory-boosting, antioxidant, and anti-inflammatory qualities. Studies on fruits from the *Prunus* genus are becoming more popular because to their high phenolic content, especially the anthocyanins, which are known to be natural antioxidants. Since ancient times, people have been aware of and have eaten fruits from the *Prunus* genus. They can be processed to create jams, compotes, jellies, candied fruits, and baked items, or they can be consumed fresh or dried. The literature has extensively discussed the use of fruits from the *Prunus* genus in the food sector, including for making dough for extruded foods, creams, puddings, ice cream, and bakery and pastry products. The importance, production, nutritional profile, availability of bioactive components, and phenolic and flavonoid constituents of fruits from the *Prunus* genus are all discussed in the paper. The benefits of fruits from the *Prunus* genus bioactive compounds for circulatory, pulmonary, and cardiac problems are also covered. The potential use of fruits from the *Prunus* genus in the creation of bakery products is also covered in detail in the paper.

Keywords: bakery products, bioactive components, fruits, health-promoting properties, high phenolic content

03.

POSSIBILITIES OF USING DIFFERENT GERMINATED PSEUDOCEREALS IN BREAD MAKING

Olivia ATUDOREI, Denisa ATUDOREI, Georgiana Gabriela CODINĂ*, Adriana DABIA
Faculty of Food Engineering, University Ştefan cel Mare Suceava, Romania
*Contact: codina@fia.usv.ro

Abstract

Bread is one of the most consumed food products. For this reason, researchers in the field is increasingly looking for ways to improve the original recipe or to modify it, so that it can be consumed by people suffering from celiac disease or to improve the nutritional value of bread. This study aims to analyze the possibilities of using germinated pseudocereals in bread making and the effects of their addition on bread quality, without the contribution of chemical additives to improve its nutritional value.

Pseudocereals are similar to cereals, but compared to corn, wheat and rice, they have higher protein, fat content and lower carbohydrate content. Pseudocereals are also more nutrient-dense than cereals, being richer in bioactive compounds such as unsaturated fatty acids, flavonoids, polyphenols, dietary fiber, minerals and vitamins. This makes them beneficial for heart health, cancer prevention and for the management of diabetes and obesity. Also, pseudocereals can be successfully incorporated into various food products (bread, cakes, biscuits, fruit juices, yogurts, etc.) in order to improve them from a nutritional point of view, but without negatively influencing consumer acceptability.

To enhance the nutritional profile of pseudocereals, researchers have explored various methods to boost the bioavailability of their essential compounds. One such method is germination, which stands out as an environmentally sustainable process since it does not involve any polluting techniques. Germinated pseudocereals, such as chia, quinoa, amaranth, and buckwheat, have been gaining interest as alternative ingredients in bread making. Germination further enhances their nutritional profile and functionality, potentially improving the bread's texture and flavor.

Numerous studies conducted thus far have revealed that the germination process significantly enhances several key nutritional aspects of pseudocereals. Specifically, germination has been shown to increase antioxidant capacity, elevate polyphenol content, and enrich the levels of essential minerals and proteins, all of which contribute to the overall health benefits of these grains. This process not only improves the bioavailability of these nutrients but also leads to an increase in the amount of compounds that may offer additional protective effects against oxidative stress and other health-related conditions.

Keywords: bread, pseudocereals, germination process, physico-chemical changes, health benefits

04.

TOOLS FOR SUSTAINABILITY AND DIGITAL TRANSFORMATION OF THE AGRO-FOOD SECTOR. DIGISOST

Martinez Sanmartin, Angel* and Galvez Caravaca, Francisco Jose

OTRI, National Technological Centre for the Food and Canning Industry CTNC, Murcia, Spain

*Contact: angel@ctnc.es

Abstract

Objectives: Support for the agri-food sector in the Region of Murcia to act about the challenge that lies ahead in the transition towards a digital economy, applying it to all phases of the company to create a more efficient industrial fabric without ever forgetting its sustainability. Duration: 2023 and 2024

Activities:

- Technological monitoring in digitalization of the agro-food sector for the Region of Murcia.
- Knowledge acquisition and transfer.
- Report on food legislation.

Within the frame of this project CTNC has participated in the 22nd World Congress of Food Science and Technology in September 2024 in Rimini (Italy), visited ENEA Italy and other organisms. The innovations identified have high potential for application in the industries with which the CTNC collaborates. Many training actions and digital transformation sessions have been carried out in the sector, on artificial vision in food processing. 10 regional proposals were submitted to Innovation Vouchers of the Regional Development Agency INFO and many European proposals under Horizon Europe, PRIMA, NEXT MED, etc.

Acknowledgements

Region of Murcia Development Agency (INFO), Modality 2 ref 2023.08.CT02.000003

05.

DEVELOPMENT OF BIO-BASED AND BIODEGRADABLE PLASTICS FOR ACTIVE FOOD PACKAGING FROM MIXTURES OF INGREDIENTS AND ACTIVE SUBSTANCES FROM AGRO-INDUSTRIAL WASTE. ET1APLAUS0

Garcia, P.*, Quintín, D., Lorca, F., Balbastre, S., Fernandez, J.,

National Technological Centre for the Food and Canning Industry CTNC, Murcia, Spain.

*Contact: sese@ctnc.es

Abstract

In Europe, the transformation processes of the agro-food industry generate large quantities of wastes, affecting the competitiveness of the sector and posing significant environmental problems. Various investigations have shown that these agro-industrial by-products represent an excellent source of bioactive substances, such as antimicrobials and antioxidants, which can replace synthetic additives in foods, cosmetics and active plastic packaging. This poster describes the results of the ET1APLAUSO project, which aims to develop bio-based , biodegradable and recyclable plastics with properties suitable for flexible packaging, incorporating extracts of agro-industrial by-products.

Valorisation of agro-industrial waste represents an opportunity to improve sustainability of the food sector and address environmental challenges. In collaboration with the Technological Centre for Footwear and Plastics of the Region of Murcia (CETEC), ET1APLAUSO project seeks to implement innovative solutions by incorporating bioactive compounds into biodegradable plastics.

Acknowledgements

Region of Murcia Development Agency (INFO), Modality 1 ref 2023.08.CT01.000014

06.

RESEARCH ON ENCAPSULATION AND MICROENCAPSULATION OF STRAWBERRY EXTRACTS. ET2FRESACAPS

Garcia Gomez, Presentacion*, Quintin Martinez, David, Lorca Salcedo, Francisco

National Technological Centre for the Food and Canning Industry CTNC, Murcia, Spain.

*Contact: sese@ctnc.es

Abstract

Strawberries are functional foods, which include dietary fiber, vitamins, minerals and polyphenols, and are characterized by being a source of antioxidants. Most strawberry production is sold as fresh fruit, but there is an alternative for those fruits that cannot be sold in the fresh market, so 21% of strawberry crops are used for industrial processing of derived products, generating streams of by-products rich in bioactive strawberry compounds and which are treated as organic waste. ET2FRESACAPS project has extracted, preserved and stabilized by-product encapsulation of bioactive compounds from strawberry by-products using different sustainable and economically viable technologies, giving added value to by-products from the strawberry sector for their application in different food and cosmetic sectors, as dehydrated natural ingredients.

Acknowledgements

Region of Murcia Development Agency (INFO), Modality 1 ref 2023.08.CT01.000012

07.

APPLICATION OF ADVANCED OXIDATION TECHNOLOGIES FOR THE TREATMENT OF SPECIFIC CONTAMINANTS IN FOOD INDUSTRY WATERS. ET3OXICLEAN

Martínez López, Sofía*; Bello Moya, Elena Minerva; Ayuso García, Luis Miguel

National Technological Centre for the Food and Canning Industry CTNC. Environmental Area, Murcia, Spain.

*Contact: sofiamartinez@ctnc.es

Abstract

Region of Murcia suffers a severe water shortage with an important agricultural production, a high food industry activity and a high demand for water.

Reusing water for agricultural irrigation, or recirculating water in the food processing and packaging industry, can reduce water stress and improve water efficiency.

However, wastewater generated by food packaging or processing industries can be considered point sources of contamination by post-harvest phytosanitary compounds, and the water used in recirculation processes can be loaded with these same compounds, potentially compromising the quality of the final product.

Treatment of these waters using advanced oxidation technologies (photocatalysis and electro-oxidation) ensures microbiological quality and the elimination of chemical contaminants (phytosanitary) in the waters (compliance with REGULATION (EU) 2020/741) from the food industry production processes that can compromise the final quality of the commercial product.

Acknowledgements

Region of Murcia Development Agency (INFO), Modality 1 ref 2023.08.CT01.000006

08.

OBTAINING FUNGAL CHITOSAN FROM THE VALORISATION OF AGRO-FOOD BY-PRODUCTS GENERATED IN THE REGION OF MURCIA: VALIDATION IN FOOD USE AND SUSTAINABLE MATERIALS. ET4QUITOSAN

Elena Minerva Bello Moya, Sofia Martinez Lopez and Luis Miguel Ayuso Garcia*

National Technological Centre for the Food and Canning Industry CTNC, Murcia, Spain.

*Contact: ayuso@ctnc.es

Abstract

The general objective of the QUITOSAN project is the complete valorisation of plant wastes from the food sector in the Region of Murcia, by processing it into substrates for the fungal production of chitosan and obtaining extracts rich in dietary fibre, with the aim of developing new food formulations and sustainable materials for the furniture sector.

Food formulations have been developed including:

- Recovered fiber obtained from the solid phase of processing by-products to obtain substrates suitable for the fermentation of microorganisms.
- Fungal chitosan obtained from producing microorganisms.

These products have been evaluated at nutritional and organoleptic levels to determine consumer acceptance, and their sanitary quality has been verified. In addition, the shelf life of the products has been studied to verify the antioxidant and antimicrobial properties attributed to chitosan.

Acknowledgements

Region of Murcia Development Agency (INFO), Modality 1 ref 2023.08.CT01.000019

09.

ENVIRONMENTAL VALIDATION OF THE SUSTAINABLE MANAGEMENT OF OLIVE EFFLUENTS AS AN HERBICIDAL AGENT. REGIONAL OPERATIONAL GROUP OLIVECIDA

Carrillo, M. [1]*, Moreno, L. [1], Romero-Gámez, M[2], Rodríguez, L.[2] Prieto, JL. [3], Corbacho, A. [3], Peral, N[4].

[1]Centro Tecnológico Nacional Agroalimentario, CTAEX, Badajoz, Spain. [2]360 Soluciones Cambio Climático, Badajoz, Spain. [3]Extremadura Verde, Cáceres, Spain. [4]Grupo IAN, Cáceres, Spain.

*Contact: mcarrillo@ctaex.com

Abstract

Table olive processing industries generate large volumes of wastewater with a high pollution load due to their content of organic matter, suspended solids, fats, acidic and basic pH, phenolic compounds and high conductivity associated with excess salt. There are procedures for the purification of these waters, but at present they are not economically profitable, and the solution is storage in ponds, which have limitations.

On the other hand, the use of herbicides, particularly glyphosate, entails environmental and human health risks due to their persistence, bioaccumulation and possible contamination of water and soil. Its indiscriminate application affects organisms essential to ecosystems, such as pollinators and aquatic species, generating a large-scale environmental problem. Both sectors require more sustainable treatment and management strategies to mitigate their impacts.

From an environmental point of view, the Life Cycle Assessment revealed that the production of Olivecida has significant impacts, especially in the transport and materials stage. In addition, filtration generates a water cost that is not sustainable. In terms of soil application, although ecotoxicity and toxicity impacts were lower than with glyphosate, eutrophication remains a problem. Further studies are recommended to assess its long-term impact and to optimize its application. The economic study indicates that industrial-scale production of the herbicide "Olivecida" could generate a net benefit from being a by-product.

Project co-financed 85% by the European Agricultural Fund for Rural Development (EAFRD) within the Rural Development Programme (RDP) of Extremadura 2014-2022, 11.28% by the Regional Government of Extremadura and 3.72% by the State, Ministry of Agriculture, Fisheries and Food (MAPA).

10.

RESEARCH IN THE DEVELOPMENT OF TECHNOLOGIES FOR THE REDUCTION OF SUGARS IN JUICES AND REVALUATION OF EXTRACTED SUGARS AS HEALTHY INGREDIENTS. ET2ECOSUGARS

[1*]Presentación García-Gómez, [1]Francisco Lorca-Salcedo and [1]David Quintín-Martínez, [2]Ana Belen Morales Moreno.

[1]National Technological Centre for the Food and Canning Industry – CTNC, Murcia, Spain.

[2]Agrifood Cluster Foundation of the Region of Murcia -AGROFOOD, Murcia, Spain.

*Contact: sese@ctnc.es

Abstract

The ET2ECOSUGARS project focuses on developing innovative and scalable technologies to reduce sugar content in fruit juices while maintaining their sensory and nutritional quality. High sugar consumption is linked to health risks such as obesity and diabetes, and although fruit juices are considered natural and healthy, their sugar content can be excessive. To address this challenge, the project applies advanced filtration and enzymatic treatments for selective sugar removal, membrane separation technologies to preserve key nutrients, and bioconversion methods to transform extracted sugars into functional food ingredients. Sensory, nutritional, and physicochemical evaluations were conducted to ensure consumer acceptability, while industrial-scale trials assessed the feasibility and economic viability of the proposed solutions. The results demonstrate a significant reduction in sugar levels without compromising juice quality, the preservation of essential bioactive compounds such as vitamins and polyphenols, and the successful conversion of extracted sugars into functional ingredients for new food applications. This project presents a sustainable and innovative approach to sugar reduction in fruit juices, aligning with global consumer demand for healthier products while promoting resource efficiency and circular economy principles in food production.

Keywords: Sugar reduction, Fruit juices, Filtration, Enzymatic treatment, Functional ingredients, Circular economy, Sustainable food production.

Acknowledgements

Region of Murcia Development Agency (INFO)

Unión Europea

Región de Murcia

"Una manera de hacer Europa"
Fondo Europeo de Desarrollo Regional

Región de Murcia

11.

DEVELOPMENT OF ACTIVE FOOD PACKAGING FROM SUSTAINABLE RESOURCES. ET1ALPACA

[*1]David Quintín-Martínez, [1]Francisco Lorca-Salcedo, [1]Presentación García-Gómez, [2]Ana Belen Morales Moreno

[1]National Technological Centre for the Food and Canning Industry – CTNC, Murcia, Spain.

[2]Agrifood Cluster Foundation of the Region of Murcia -AGROFOOD, Murcia, Spain.

*Contact: dquintin@ctnc.es

Abstract

Growing environmental concerns over plastic waste have intensified the demand for sustainable food packaging solutions. The ET1ALPACA project addresses this issue by developing biodegradable active packaging through eco-friendly extraction technologies that recover bioactive compounds from agro-industrial by-products, such as algae, fruit, and vegetable. These bioactive compounds exhibit antimicrobial, antioxidant, gas barrier, and light-blocking properties, enhancing food safety and extending shelf life.

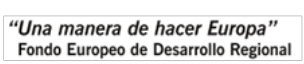
This study applies advanced techniques, including supercritical fluid extraction (SFE), ultrasound-assisted extraction (UAE), and enzymatic hydrolysis, to optimize bioactive molecule recovery while preserving their functional integrity. Incorporating these compounds into biopolymer-based films and trays enhances their mechanical, barrier, and bioactive properties, providing a sustainable alternative to petroleum-based plastics.

These findings highlight the potential of bio-based active packaging as a viable and eco-friendly solution for the food industry, aligning with circular economy principles and reducing reliance on fossil-based materials.

Keywords: Green Extraction Technologies, Food Packaging, Agro-Industrial Waste, Circular Economy, Active Compounds, Barrier Properties, By-Product Valorization.

Acknowledgements

Region of Murcia Development Agency (INFO).



12.

CHARACTERIZATION AND OPTIMIZATION OF BIOCONSERVATIVE PRODUCTION THROUGH THE USE OF FERMENTERS. ET5BIOPRESERV

Francisco Jose Cervantes, Silvia Balbastre, Patricia Sánchez, Ana Martinez-Abarca, Isabel Manzano, Rebeca Vidal, Jose Fernandez*

National Technology Centre for the Food and Canning Industry CTNC, Molina de Segura, Murcia, Spain.

*Contact: jfernandez@ctnc.es

Abstract

BIOPRESERV project was conceived in response to a sectoral problem posed by the use of artificial preservatives for the production of processed foods with a shelf-life expectancy that is sufficiently high to enable them to reach foreign markets with sufficient guarantees of quality and food safety.

The main aim of this project is to find biopreservatives capable of providing food safety to foods, in order to help the functional food sector by providing solutions to its conservation problems.

Another objective of the project is to search for bacteriocins for their application in the food industry.

Different activities have been carried out: Bibliographic search for bioactive compounds with antimicrobial capacity from natural sources, Use of meat, dairy and vegetable matrices for the isolation of LAB, Measurement of antimicrobial capacity, Stability studies of antimicrobial activity against temperature and pH factors, Optimization of bacteriocin production by microbial growth in a fermenter, Isolation and purification of bioactive compounds using different techniques, etc.

Acknowledgements

Region of Murcia Development Agency (INFO), Modality 1 ref 2023.08.CT01.000002

13.

NEW THERMAL TREATMENTS FOR STABILIZING HEAT-SENSITIVE FRUIT AND VEGETABLE PRODUCTS

Sancho Bañón[1]*, Cristina Cedeño[1], Marta García-Alarcón[1], Israel Muñoz[2], María Dolors Guàrdia[2], Nisrine Tahori[2], Berta Torrens[2], Neus Sanjuan[3], Gabriela Clemente[3], and Javier Rival[3]

[1] Department of Nutrition, Food Science and Technology, Veterinary Faculty, Regional Campus of International Excellence "Campus Mare Nostrum", UM-University of Murcia, 30100 Murcia, Spain.

[2] Institut de Recerca i Tecnologia Agroalimentàries IRTA-Food Quality and Technology Program, Finca Camps i Armet, Monells, 17121 Girona, Spain.

[3] Department of Food Technology (ASPA Group), UPV-Universitat Politècnica de València, 46022 Valencia, Spain.

*Contact: sanchoba@um.es

Our interdisciplinary group includes experts in emerging technologies (IRTA), products design and assessment (UM) and sustainability assessment (UPV). Prof. Sancho Bañón (sanchoba@um.es) and P. Dr. Cristina Cedeño (cristinacarmen.cedenop@um.es) are Food Technology Researchers at the University of Murcia.

Abstract

Current advances in preservation technologies aim to overcome the limitations of conventional thermal treatments used for heat-sensitive fruit and vegetable products, such as smoothies, purees, salmorejo and dehydrated powders, among others. Through several R+D projects funded by the Spanish government, we have developed different processes based on high pressurizing, radiofrequency heating, and pulsed spray drying. Our findings confirm that these technologies provide heat-treated fruit and vegetable products of excellent quality and stability. A key aspect is to achieve a good balance among the preservation level (inhibition of pathogenic and spoilage microorganisms), thermal damage (retention of sensory properties and nutrients, avoidance of undesirable physicochemical changes, reducing residual enzymatic activity, etc.) and environmental implications (decreasing energy and water consumption, and reducing product environmental footprint). The treatments to be applied will depend on the product characteristics (composition, thermal properties, viscosity, etc.) and heating conditions (liquids flowing through heat exchangers or packed products advancing in tunnels). High pressure processing is excellent to pasteurize without altering sensory quality, although complementary heating is required to inactivate enzymes; radiofrequency

heating is very effective in solid and packed products, saving time and energy; while pulse spry drying provides stable powders under favourable energy conditions. Companies that implement these technological innovations may enhance their market position by improving their elaboration processes and products.

Keywords: Fruit, vegetables, preservation, pressurizing, dielectric heating, pulse spry drying.

14.

TECHNOLOGICAL, SENSORY AND NUTRITIONAL ASSESSMENT OF FUNCTIONAL INGREDIENTS FOR FOOD APPLICATIONS

Sancho Bañón[1]*, Cristina Cedeño[1], Marta García-Alarcón[1], Magdalena Martínez-Tomé[1], Antonia María Jiménez-Monreal, Israel Muñoz[2], Maria Dolors Guàrdia[2], Nisrine Tahori[2], Berta Torrens[2], and María José Jordan[3]

[1] Department of Nutrition, Food Science and Technology, Veterinary Faculty, Regional Campus of International Excellence "Campus Mare Nostrum", UM-University of Murcia, 30100 Murcia, Spain.

[2] Institut de Recerca i Tecnologia Agroalimentàries IRTA-Food Quality and Technology Program, Finca Camps i Armet, Monells, 17121 Girona, Spain.

[3] Research Group on Rainfed Crops for the Rural Development, IMIDA- Instituto Murciano de Investigación y Desarrollo Agroalimentarios, La Alberca, 30150 Murcia, Spain

*Contact: sanchoba@um.es

Our interdisciplinary group includes experts in food development and quality (UM), emerging technologies (IRTA), and aromatic plant extracts (IMIDA). Prof. Sancho Bañón (sanchoba@um.es) Prof. Magdalena Martínez-Tomé (mmtome@um.es), Prof. Antonia M. Jiménez Monreal (antoniamjimenez@um.es) and P. Dr. Cristina Cedeño (cristinacarmen.cedenop@um.es) are Food Technology and Science Researchers at the University of Murcia.

Abstract

There is a growing demand for functional food products, especially those made with natural ingredients. Among them, antioxidants and prebiotic dietary fibers stand out due to their potential applications in food. Prebiotic fibers can also serve as bulk agents to reduce the caloric value in sugary foods, such as candies. Most natural ingredients are obtained through separation methods (extraction, centrifugation, etc.) and are not pure compounds. In fact, their active compounds often represent only a small fraction of the total weight, meaning that other components can influence the quality of the fortified food products. Therefore, the effects of these ingredients must be carefully assessed from technological, sensory, and nutritional perspectives. Through several R&D projects and contracts, we have developed and/or used various functional ingredients (e.g., polyphenol extracts from tea, grape, rosemary, sage or thyme, chicory inulin, etc.) in different food products (candies, fruit and vegetable smoothies, yogurt, fish and meat products, etc.). Our research experience includes: (i) optimization of technological processes (heating, drying, agglomeration, packing, etc.); (ii) sensory evaluation of ingredients; (iii) degradation and/or retention of

active compounds with functional potential; (iv) microbiological, oxidation and physical quality indexes; (v) nutritional composition; and (vi) *in vitro* bioavailability of active compounds and their properties (antioxidant capacity, etc.).

Keywords: Functional food, natural, antioxidants, dietary fibre, polyphenols, prebiotics.

15.

DEVELOPMENT OF FUNCTIONAL GLUTEN-FREE BREADS WITH BYPRODUCTS FROM INDUSTRY

Quizhpe Romero, Jhazmín; Ayuso Nicolás, Pablo; Rosell Pérez, María de los Ángeles; García-Pérez Pascual; Peñalver Miras Rocío; Ros Gaspar; Nieto, Gema*

University de Murcia, Food Science and Human Nutrition Department. Veterinary Faculty.

*Contact: gnieto@um.es

Abstract

Aim: The aim of this study was to formulate gluten-free sourdough breads improving the nutritional value of gluten free breads on the market, using broccoli extracts obtained from food industry by-products and enriching them with fibre.

Method: Two gluten-free sourdough breads were made with two different broccoli extracts: one with and one without enzyme treatment, both enriched with dietary fibre using flax seeds and flour from quinoa, chickpea and buckwheat. A commercially available gluten-free bread was used as a control. Nutritional composition, dietary fibre, antioxidant capacity (FRAP, DPPH and ABTS) and total phenolic compounds (Folin), colour, pH and sensory analysis were studied to evaluate the organoleptic quality of the different samples compared to the commercial bread.

Results: The results showed that the incorporation of flax, broccoli extract and quinoa, chickpea, and buckwheat flours increased the percentage of total dietary fibre. In addition, the two reformulated breads also showed significantly improved antioxidant properties compared to commercial bread. On the other hand, the enzyme-treated bread showed the best results in total dietary fibre (13.65%), total phenolic compounds (461.36 mg gallic/g) and antioxidant capacity tests. In addition, in the sensory analysis, the bread with enzyme-treated extract was rated higher than the bread without enzyme treatment.

Conclusion: In conclusion, taking into account the nutritional, physicochemical and organoleptic characteristics, broccoli extract with enzymatic treatment is the ideal compound for the production of fortified sourdough breads for people with coeliac disease.

16.

DEVELOPMENT OF FUNCTIONAL MEAT PRODUCTS WITH BYPRODUCTS FROM ARTICHOKE INDUSTRY

Ayuso Nicolás, Pablo; Quizhpe Romero, Jhazmín; Rosell Pérez, María de los Ángeles; García-Pérez Pascual; Peñalver Miras Rocío; Ros Gaspar; Nieto, Gema*

University de Murcia, Food Science and Human Nutrition Department. Veterinary Faculty.

*Contact: gnieto@um.es

Abstract

Aim: The main objective of this study was to evaluate the antioxidant effects of artichoke and olive byproducts in meat products through its incorporation in fat-replaced beef burgers.

Method: Beef burgers were elaborated following 4 different formulations, a control burger; a burger with 50% of the fat replaced by an emulsion using AOVE (extra virgin olive oil) and Prosella; a fat-replaced burger with 2.5% artichoke by-product extract; and a fat-replaced burger with 2.5% enzymatically treated artichoke extract. In order to evaluate the benefits of the reformulations, the nutritional composition, color, pH, antioxidant capacity (FRAP, ABTS and DPPH), total phenolic compounds, lipid oxidation (TBARS) and sensory attributes of the burgers were evaluated.

Results: The results showed that the reformulations did not negatively affect nutritional parameters and sensory attributes. On the other hand, both the replacement with AOVE and the addition of artichoke significantly increased the antioxidant capacity values in the three techniques evaluated (FRAP, ABTS and DPPH). The burgers with enzymatically treated artichoke extract also presented the highest values of total phenolic compounds (445.42 mg GAE/100g). This increase in antioxidant activity resulted in a reduction of oxidation after refrigerated storage, measured through color changes and lipid oxidation (TBARS).

Conclusion: As a conclusion, both the replacement of animal fat with AOVE and the incorporation of artichoke by-product proved to be a natural alternative to reduce oxidation of beef burgers. Potentially promoting positive effects for the consumer and not negatively affecting sensory qualities of the final product.

17.
SUSTAINABILITY PROJECTS CARRIED OUT BY SCIENCE HORIZON KENYA

Ibrahim Naibei*

Science Horizon Kenya, Egerton University, Kenya.

*Contact: sciencehorizonkenya@gmail.com

Abstract

Science Horizon Kenya is a non-profit organization committed to empowering youth and marginalized communities through innovation, entrepreneurship, and sustainable development. Our work focuses on addressing societal challenges by implementing projects in ICT, climate-smart agriculture, and green energy solutions. Through these initiatives, we aim to drive economic growth, enhance digital inclusion, and promote environmentally sustainable practices. Our experienced team specializes in training, research, and capacity building, providing valuable insights across multiple sectors. By fostering innovation and collaboration, we strive to create long-term impact and contribute to a more resilient and inclusive future. Two of our projects are:

Green Roofs and Urban Gardens

As Science Horizon, we launched the Green Roofs and Urban Gardens project in January 2024 and successfully completed it in September 2024. In partnership with the Rainforest Alliance and Kenya Resources Institute, this initiative promoted the use of green roofs and urban gardens in cities. The project aimed to combat urban heat, improve air quality, and provide fresh food for local communities, contributing to environmental sustainability and healthier urban living.

Waste-to-Energy Solutions

Waste-to-Energy Solutions is an ongoing project by Science Horizon, launched in June 2024 in partnership with SO Energies and Kenya Zero Waste. This initiative converts organic waste, such as agricultural residue and food waste, into biogas or bioenergy through anaerobic digestion or gasification. The methane-rich biogas produced is used for cooking, electricity generation, and heating, promoting clean, renewable energy for local communities.

18.

DEVELOPMENT OF FUNCTIONAL BREADSTICK ENRICHED BY EXTRACTS FROM ARTICHOKE INDUSTRIAL WASTES AS SOURCE OF BIOACTIVE PHENOLIC COMPOUNDS

Giovanna Dellapina, Giovanna Poli*, Andrea Brutti

Trasversal and Multidisciplinary Services Area - Consumer Science and Technology Divisions - Experimental Station for the Food Preserving Industry – Research Foundation, Parma, Italy.

*Contact: giovanna.poli@ssica.it

Abstract

The aim of the work was to develop a functional food aimed at meeting the latest consumer demands for well-being and environmental sustainability by recovering the bioactive molecules in artichokes industrial processing waste and incorporating them into a new functionally enriched product following a micro-encapsulation process.

The valorisation of vegetable processing waste represents an opportunity for companies in the sector to develop new products and to contribute to increasing both economic and environmental sustainability. By transferring the know-how acquired within the Medismart and Agro2Circular projects, financed by the European Union (PRIMA and Horizon 2020) we could produce polyphenol-rich extracts from the industrial processing wastes, through processing/extraction techniques that do not involve the use of organic solvents.

The extraction process, developed by SSICA, made it possible to obtain functional extracts through the use of low-energy processes to optimise a snack with improved healthy, nutritional and sensory characteristics.

Innovation was achieved through different steps: 1) green extraction techniques for the recovery of functional substances from industrial waste of vegetable species to be used in enriched food products, 2) market surveys conducted to explore consumer needs, and 3) development of products enriched with micro-encapsulated molecules.

Keywords: Artichoke industrial wastes, Flavonoids, Microencapsulation

19.

FINE-TUNING EXTRUSION PROCESSING PARAMETERS TO ENHANCE THE TEXTURAL AND NUTRITIONAL QUALITY OF SOY-BASED MEAT ANALOGS

Gabriela Ribeiro[1,2*], Florencia Parle[2], Belén Blanco[1], and Laura Román[2]

[1]CARTIF Technology Centre, Parque Tecnológico de Boecillo, parcela 205, 47151 Boecillo (Valladolid), Spain

[2]Food Technology Area, Department of Agricultural and Forestry Engineering, University of Valladolid, Av. Madrid, 50, 34004 Palencia, Spain

*Contact: gabrib@cartif.es

Abstract

High-moisture extrusion is a key processing technology for structuring plant-based proteins into fibrous texturized materials that resemble animal meat. Among plant-protein sources, soy protein ingredients are still standing out as one of the main protein-rich materials for production of plant-based meat analogs due to its high fiber-forming potential. This study evaluates the impact of screw speed (300, 350, 400 rpm) and extrusion temperature (120 °C and 140°C maximum temperature) on the structural and nutritional properties of extrudates obtained from a blend of soy protein isolate (SPI) and soy protein concentrate (SPC) (1:9 ratio, 70% protein). Unextruded protein powders were characterized for their proximate composition and physicochemical properties to assess their structuring behavior during high-moisture extrusion. The resulting extrudates were analyzed for textural attributes, fibrous structure, color, protein secondary structure (FTIR), and trypsin inhibitor activity. Higher extrusion temperatures led to softer, darker extrudates with enhanced visual anisotropy, whereas increased screw speeds resulted in lighter, softer textures but had a minimal effect on fiber formation. FTIR analysis denoted a reduction in β-sheet structures and an increase in aggregated protein structures upon extrusion, particularly at higher temperature (140°C). Furthermore, trypsin inhibitors were reduced by over 90% under all extrusion conditions, improving the nutritional quality of the protein. These findings highlight the importance of selecting the appropriate extrusion parameters to optimize both the textural and nutritional properties of plant-based meat analogs.

20.

USE OF LEGUME DERIVED NUTRACEUTICAL COMPOUNDS AS CYTOTOXIC AND RADIOSENSITIZING AGENTS FOR TUMOR CELLS

Julia Escudero-Feliu[1,2], María I. Nuñez[2,3,4], Josefa Leon[2,5*], Jose C. Jimenez-Lopez[1,6*]

[1]Department of Stress, Development and Signaling in Plants. Estación Experimental del Zaidín (EEZ). Spanish National Research Council (CSIC). Granada, Spain.

[2]Biosanitary Research Institute of Granada (ibs.GRANADA). Granada, Spain.

[3]Department of Radiology and Physical Medicine. Faculty of Medicine. University of Granada. Granada, Spain

[4]Biopathology and Regenerative Medicine Institute (IBIMER). Center for Biomedical Research (CIBM). University of Granada. Granada, Spain

[5]Clinical Management Unit of Digestive Disease and UNAI. San Cecilio University Hospital. Granada, Spain

[6]The UWA Institute of Agriculture. The University of Western Australia. Perth, WA Australia

*Contacts: josecarlos.jimenez@eez.csic.es; pepileon@ugr.es

Abstract

Breast cancer (BC) is the most widespread tumor in women and the second type of most common cancer worldwide. BC treatments, such as surgery, hormonal therapy, chemotherapy, radiotherapy (RT) and immunotherapy, have limitations in effectiveness and side effects, especially in the more aggressive molecular subtypes of the disease, which makes treating BC particularly challenging.

Interestingly, natural plant derived nutraceutical compounds from legume seeds have become new potential therapeutic alternative to regulate and decrease cancer stem cells (CSCs) subpopulation and their self-renewal capacity. This treatment as also shown a potential prevention of the CSCs phenotype acquisition, at the origin of tumor regrowth, metastasis and relapse.

The present invention aims at the combined use of nutraceutical agents derived from legume crops (acting as selective cytotoxic agents for BC) and radiotherapy (RT) to increase the sensitivity of tumor cells to ionizing radiation (IR)[1].

This could allow the implementation of a selective, effective and alternative therapy for various types of cancer, including breast cancer. This proposal is an unique and novel strategy for cancer management and treatment[2], since these compounds i) have dual cytotoxic and radiosensitizing effects for cancer cells treatment; ii) allow to deliver IR in much lower doses, having fewer side

effects for the patients treated with IR; iii) are a selective therapy causing reduction of tumor resistance, prevention of more aggressive phenotypes and decreased risk of metastasis; and iv) are nutraceutical compounds environmentally sustainable.

References

1.- Escudero-Feliu J, et al. (2023). Narrow leafed lupin (*Lupinus angustifolius* L.) β-conglutin seed proteins as new natural cytotoxic agents against breast cancer cells. *NUTRIENTS* 15:523. https://doi.org/10.3390/nu15030523

2.- Patents ref.: P202330927 and ref.: PCT/ES2024/070701

Acknowledge & Funding

JCJ-L thanks 1) Europena Research programa MARIE CURIE (FP7-PEOPLE-2011-IOF), grant ref.: PIOF-GA-2011-301550; 2) Spanish Ministry of Economy and Competitiveness (Ramón y Cajal research program), grant ref.: RYC-2014-16536; 3) Intramural CSIC program, grant ref.: 202240I002; 4) Spanish Ministry of Science and innovativeness, grant ref.: CPP2021-008989; 5) Spanish Ministry of Science, Innovativeness and Universities, grant ref.: EQC2024-008162-P.

JL thanks to Instituto de Salud Carlos III-FEDER (PI18/01947) and Nicolás Monardes Program from the Andalusian Health Service (C-0033-2015).

21.
HOW IMPORTANT IS SAMPLING?

KEOFITT A/S, Francesc Terradellas and Borja García

(IBERFLUID Instruments, SA)

*Contacts: Francesc.terradellas@iberfluid.com ; Borja.garcia@iberfluid.com

Abstract

Sample concept: A small part or quantity intended to show what the whole is like. If the sample is not representative, the sampling process is a waste of time, with confusing results and uncertainties.

The importance of cleaning methods: alcohol, steam, CIP/SIP.

What is the best technique for our process?

The right equipment guarantees a good sample, but costs can change the approach. How can you be sure to choose the right solution?

We should seek advice from experts and test certificates issued by independent laboratories that demonstrate the effectiveness of such methods and devices.

When it comes to Microbiology, we must demand certain requirements from sampling devices and valves, such as minimum dead volume, absence of welds in the body, internal roughness better than 0.5µm, and coaxial design for absolute cleanability and sterilisability. With this and good training we can ensure maximum reliability and absence of false positives.

However, we must also pay attention to the methods and equipment for collecting and transporting samples, ensuring aseptic conditions.

22.

CONSUMPTION OF ULTRA-PROCESSED FOODS IN CHILDREN AND YOUNG PEOPLE IN THE REGION OF MURCIA AND ITS IMPACT ON THE RISK AND PROGRESSION OF STEATOTIC LIVER DISEASE ASSOCIATED WITH METABOLIC DYSFUNCTION (MASLD)

Natalia Lates Profir[1]*, Rafael Ríos De Moya Angeler[2], David Planes Muñoz[1], Enrique Casado Galindo[2], María Eugenia Gutiérrez Peralta[2], Martín López Marín[2], Juana Valero Morenilla[2], Carmen Frontela Saseta[1], Rubén López Nicolás[1]

[1] University of Murcia, 30100, Spain (Region of Murcia)

[2] Centro de Salud San Diego, 30800, Spain (Region of Murcia)

*Contact: natalia.ichim@um.es

Abstract

The consumption of ultra-processed foods has increased significantly among children and adolescents, in the last decades. Excessive intake of these products is associated with various metabolic diseases, including metabolic dysfunction-associated steatotic liver disease (MASLD). Globally, MASLD is highly prevalent and its incidence is projected to increase in the young population. Improving dietary habits through a Mediterranean style of eating and physical activity could reduce the progression of this pathology.

Objective: To evaluate the effect of the consumption of ultra-processed foods in the infant and adolescent population of Area III de Salud of Murcia on the incidence and evolution of MASLD.

Materials and methods: An analytical prospective longitudinal study was carried out in children and adolescents in Area III of Murcia. A total of 132 volunteers with MASLD or at risk of developing it received a nutritional intervention based on a Mediterranean diet with a reduction of ultra-processed foods for 12 months.

Results: Until now, in the 23 volunteers who completed the study, we found an improvement in serum glucose and GOT-AST levels in all participants, as well as in albumin, total cholesterol and GAMMA-GT in the steatosis group, although without significant differences. Consumption of ultra-processed foods rich in sugars, and rich in saturated fatty acids (SFA) was higher in the MASLD group compared to the non-MASLD group. In addition, body weight and body fat percentage values increased, while muscle mass percentage decreased significantly (p-values <0.0239; <0.0034 and <0.01 respectively).

Conclusion: It is crucial to promote nutrition education on the adolescents and school-aged populations in order to increase awareness of the risks of overconsumption of ultra-processed foods. Furthermore, it is essential to promote healthy eating habits and physical activity to curb the worrying increase in MASLD in young people.

Acknowledgements

This work is the result of a pre-doctoral research staff training contract funded by the Consejería de Empleo, Universidades, Empresa y Medio Ambiente de la CARM, through the Fundación Séneca-Agencia de Ciencia y Tecnología de la Región de Murcia. The research related to this summary was funded by the Cátedra Fundación ASISA-Universidad Europea de Madrid and the Fundación Robles Chillida-Universidad de Murcia.

23.

EVALUATING THE IMPACT OF LEACHING ON THE NUTRITIONAL COMPOSITION AND BIOACTIVE POTENTIAL OF *QUERCUS PYRENAICA* ACORN FLOUR

Maria Luz Maia[1]*, Cristina V. Rodrigues[1], Pedro Babo[2], Manuela Pintado[1]

[1] Universidade Católica Portuguesa, CBQF - Centro de Biotecnologia e Química Fina – Laboratório Associado, Escola Superior de Biotecnologia, R. de Diogo Botelho 1327, 4169-005 Porto, Portugal

[2]LandraTech, Largo do Esteiro 6, 2050-261 Azambuja, Portugal

*Contact: mlmaia@ucp.pt

Abstract

Acorns, the fruit of oak trees, are highly abundant in Portugal's territory. However, they remain largely unexploited, with only 1% being integrated into human diets. *Quercus* trees, which cover about 34% of Portugal's forested area, produce around 300 thousand tons of acorns every year. Rich in fatty acids, phenolic compounds, tocopherols, and minerals, acorns are promising to enhance traditional foods with functional and health-boosting properties[1,2,3]. Given that Portugal is a net food importer, it is strategic to value this nutrient-dense resource, especially considering its established nutritional benefits[1,2]. Moreover, acorn by-products offer considerable potential for added-value bioactive compounds, contributing to reduce industrial waste, encourage upcycling, and foster sovereignty over sustainable non-edible agrifood products for technical applications. This study aimed to evaluate the nutritional composition and bioactive potential of *Quercus pyrenaica* flour (QP), provided by Landratech, before and after leaching (QPL).

Regarding the nutritional composition, the moisture content of QP was 10.34 ± 0.00% (w/w), and 5.84 ± 0.00% (w/w) for QPL. The leaching process significantly impacted the ash content of the acorn flour, with 2.82 ± 0.01% DW and 0.35 ± 0.00% DW for QP and QPL, respectively. Also, protein, total lipid, and carbohydrate content were significantly altered, 8.60 ± 0.07% DW, 7.19 ± 0.79% DW, and 71.11 ± 1.02% DW for QP and 7.12 ± 0.43% DW, 5.28 ± 0.13% DW and 81.41 ± 0.42% DW for QPL, respectively. The energy value was similar between samples, with 395.15 ± 2.66 Kcal/100 g DW for QP and 398.58 ± 0.09 Kcal/100 g DW for QPL. The total phenolic compounds (TPC) and total tannins (TT) in the aqueous extracts were assessed using the Folin-Ciocalteu method, revealing a decrease in these compounds after leaching. QP presented values of 46.01 ± 2.79 mg gallic acid equivalents (GAE)/g DW for TPC and 41.27 ± 2.93 mg GAE/g DW for TT, while QPL showed 1.86 ± 0.27 mg GAE/g DW and 1.33 ± 0.13 mg GAE/g DW for TPC and TT, respectively. In addition, the QP extracts demonstrated promising antioxidant activity by ABTS (296.40 ± 12.97 µmol trolox equivalents (TE)/g DW), DPPH (225.85 ± 5.02 µmol TE/g

DW), and ORAC (208.43 ± 4.74 µmol TE/g DW) assays. Nonetheless, the extract's antioxidant activity decreased after the leaching process (QPL samples), for all assays (ABTS: 20.31 ± 2.52 µmol TE/g DW; DPPH: 18.05 ± 1.46 µmol TE/g DW and ORAC: 16.20 ± 3.32 µmol TE/g DW).

Overall, exploring alternative debittering techniques and their impact on the functional characteristics of acorn flour could enhance its integration into the food market. This study highlights the potential of acorns, particularly *Q. pyrenaica*, as a sustainable and promising versatile resource, rich in valuable nutritional compounds and bioactive properties.

Acknowledgments

The authors acknowledge the OAKFOOD Project (Projeto de investigação, desenvolvimento e inovação, PRR-C05-i03-I000200). Furthermore, the authors acknowledge FCT—Fundação para a Ciência e Tecnologia for the financial assistance provided. In addition, the authors extend their appreciation for the scientific collaboration with CBQF within the framework of the UIDB/50016/2020 project. This work was financially supported by Programa de Recuperação e Resiliência (PRR), founded by European Union NextGenerationEU - Investimento RE-C05-i03 – Agenda de investigação e inovação para a sustentabilidade da agricultura, alimentação e agroindústria, Aviso n.º 15/C05-i03/2021 Projetos I&D+I – Promoção dos Produtos Agroalimentares Portugueses.

References

1. Castro, *et al*., Journal of Food Composition and Analysis (2022).

2. Zhou, *et al*., Sci Technol Adv Mater (2020).

3. Szabłowska, *et al.,* Applied Sciences (2024).

24.
EXPLORING THE POWER OF LEMON CO-PRODUCTS: POTENTIAL APPLICATION IN EDIBLE COATINGS

Daniela Magalhães[1]*, Paula Teixeira[1], Manuela Pintado[1]

Universidade Católica Portuguesa, CBQF – Centro de Biotecnologia e Química Fina – Laboratório Associado, Escola Superior de Biotecnologia, Rua Diogo Botelho 1327, 4169-005 Porto, Portugal

*Contact: dmagalhaes@ucp.pt

Abstract

Citrus is one of the most widely cultivated fruit crops and one of the main consumed products in the Mediterranean area. The annual production of different citrus fruits was approximately 143 thousand tonnes, whereas lemons and limes represented around 20 thousand tonnes in 2019 [1]. Industrial processes exploit only 45% of the total fruit weight, which generates a significant amount of waste, including peel (flavedo: 27%), pulp (albedo and endocarp: 26%), and seeds (2%). Lemon by-products are composed of significant amounts of bioactive compounds, which give them bioactivities related to food preservation, such as antimicrobial and antioxidant [2]. Furthermore, lemon by-products, which are usually discarded as waste in the environment, can generate new ingredients, such as essential oil (LEO), lemon phenolic compounds-rich extract (LPC) and pectin (Lp), being an opportunity for the food industry to promote the zero-waste concept. To understand the preservative potential of these ingredients in formulating edible coatings that extend the shelf-life of fruits, the antioxidant activity (measured by ABTS, DPPH, and ORAC assay) and antibacterial capacity (minimal inhibitory concentration, MIC) were assessed. Among all ingredients, the LPC showed a higher antioxidant capacity (3.77 mmoL TE/mL for ABTS, 9.03 mmoL TE/mL and 56.10 mmoL TE/mL for ORAC). On the other hand, LEO is recognised for their inhibition potential against bacteria, with MIC of 31.25 mL/mL for *E. coli* and *S. aureus* and 62.5 mL/mL for *B. cereus* and *P. aeruginosa*. The Lp exhibited structural properties that can be utilised not only for their preservative qualities but especially as a polymer to replace common commercial chitosan or alginate in edible coatings. Based on these results, it can be concluded that lemon co-products contain interesting bioactive compounds and serve as a suitable matrix for extracting functional ingredients. This significantly supports their valorisation in edible coating applications for extending the shelf-life of fruits and presents an innovative idea for a changing world.

Keywords: lemon co-products; functional ingredients; zero waste; edible coatings; food industry.

Acknowledgements

The authors would like to thank the scientific collaboration of CBQF under the FCT project UIDB/Multi/50016/2020 and the NOVAPACK project (PRIMA/0006/2023). In addition, the author, Daniela Magalhães, would like to acknowledge FCT for the individual PhD grant (2022.12417.BD).

References

1. FAO Citrus Fruit Statistical Compendium 2020. **2021.**

2. Magalhães, D.; Vilas-Boas, A.A.; Teixeira, P.; Pintado, M. Functional Ingredients and Additives from Lemon By-Products and Their Applications in Food Preservation: A Review. *Foods 2023, Vol. 12, Page 1095* **2023**, *12*, 1095, doi:10.3390/FOODS12051095.

25.

TAILORING FOOD PRODUCTS TO MEET THE NUTRITIONAL NEEDS OF SENIORS: THE DIET65+ PROJECT

Ana Sofia Salsinha[a*], Marta Correia[a], Isabel Oliveira[b], Miguel Azevedo[b], Manuela Pintado[a*]

a. Universidade Católica Portuguesa, CBQF - Centro de Biotecnologia e Química Fina –Laboratório Associado, Escola Superior de Biotecnologia, Rua de Diogo Botelho, 1327, 4169-005 Porto, Portugal

b. Decorgel Produtos Alimentares S.A, Rua do Progresso, 363 – Lantemil | 4785-647 Trofa, Portugal

*Contact: asalsinha@ucp.pt and mpintado@ucp.pt

Abstract

The number of people aged 65+ worldwide is projected to more than double by 2050 (1), which requires societal and governmental responses to adequately answer the challenges that are inherently associated with aging. In the elderly, sensory modalities including taste and smell, undergo significant changes (2). In addition, this can compromise some metabolic processes, and salivary, gastric, and pancreatic secretions are induced by this initial sensory system. Changes in gastrointestinal function are also characteristic in the elderly as well as changes in gut microbiota (3).

The Diet65+ - High nutritional and functional value food products integrated with tradition and sustainability adapted to elderly +65 consumer- is a project that intends to develop food products tailored and fully adapted to preserved food's taste, color, and flavor, enhancing the palate, and enabling more adaptability, towards a nutritional pattern fulfilling 65 years plus (65+) individual specific nutritional requirements. In the first screening, around 30 commercially available ingredients were nutritionally characterized in terms of protein, carbohydrates and fat composition, and their total dietary fiber content, as well as fatty acids and amino acids profile were obtained. In all the ingredients, the major fatty acids detected were stearic, palmitic and oleic acid. Aspartic and glutamic acid, alanine, arginine, leucine and lysine were the most prevalent amino acids in all the analyzed ingredients. After the ingredient's selection, a range of different food formulations rich in fiber (≥6,1 g/ 100 g of edible fraction) and protein (≥6,8 g/ 100 g edible fraction) were developed, including three different versions of an instant soup/purée, offering diverse meal options for daily consumption. With this first screening the products were fully adapted for this population and the improved formulations were subjected to a sensorial analysis study to assess their acceptability among this target population.

Acknowledgments

This work was part of Agenda VIIAFOOD – Plataforma de Valorização, Industrialização e Inovação Comercial para o AgroAlimentar (nºC644929456-00000040), which was a project supported by Plano de Recuperação e Resiliência (PRR, www.recuperarportugal.gov.pt).

References:

1. Instituto Nacional de Estatística. Projeções de População Residente. 2017.
2. Correia C, Lopez KJ, Wroblewski KE, Huisingh-Scheetz M, Kern DW, Chen RC, et al. Global Sensory Impairment in Older Adults in the United States. J Am Geriatr Soc. 2016 Feb;64(2):306–13.
3. Cristina NM, Lucia d'Alba. Nutrition and Healthy Aging: Prevention and Treatment of Gastrointestinal Diseases. Nutrients. 2021 Nov;13(12).

26.

NATURAL-BASED STRATEGIES IN PRE- AND POST-HARVEST HANDLING AND VALUE ADDITION OF SUBTROPICAL CROPS

González-Fernández, M.J.[a*], Ramos-Bueno, R.[a], Hidalgo-Santiago, L.[a]

Foundation of Auxiliary Industry of Agriculture Tecnova, Spain [a]

*Contact: mjgonzalez@fundaciontecnova.com

Abstract

Subtropical fruits, such as mango and avocado fruits, contain nutrients that provide healthy biological properties and a high antioxidant capacity, but their limited life after harvesting make these fruits targets of research lines to look for effective post-harvest handling. On the other hand, the high production rates of the agri-food sector and the demands of the market require the development of new strategies aimed at improving and maintaining the quality of fruit and ensuring the sustainability and low environmental impact. In response to this challenge, EcoSkin project has been created among 4 entities including a primary producer, fertilizer company, research center and foundation, with the common objective of developing sustainable and effective strategies that will allow farmers to produce a high-quality subtropical fruit and ensure its safety and a long shelf-life. In addition, in line with current circular economy policies, the project aims to give a second life to the by-products generated during cultivation and to develop extracts with agronomic potential.

Methodology

Two activities were carried out to complete this project. In the first activity, a complete study was carried out of the main by-products generated during the cultivation of mangos and avocados (pruning residues and fruit wastes) by means of a complete physicochemical characterization (organic matter, pH, phenolic content and antioxidant activity, etc.). These wastes were then subjected to two extraction protocols: I) aqueous extraction and II) ethanolic extraction, after which a phytochemical screening was carried out to determine the presence of compounds of agronomic interest (alkaloids, phenols, tannins, etc.). The development and formulation of new products with agronomic application are currently in progress. Conversely, the second task involved the study of preservation protocols and the extension of the shelf-life of subtropical fruits through the application of coatings based on natural extracts. These coatings were applied to the fruit by immersion at the established dose (3 cc/l) and stored under refrigeration for 21 days. Finally, several parameters were monitored to determine the suitability of the formulations (firmness, color, acidity, visual appearance, ºBrix, etc.).

Results and discussion

Among all the characterized waste materials (leaves, skins and stones of avocado crops and peels of mango fruits), higher phenolic content of the mango peel (5.1 mg a.g/g) compared to the rest of the avocado by-products (~1.5 mg a.g/g) was highlighted as a potential biostimulant ingredient. On the other hand, considering the high biocidal potential of alkaloids and tannins, aqueous extracts of avocado leaf and mango skin and ethanolic extracts of avocado skin and stone were selected to formulate new prototypes with biocidal capacity (currently in progress). Additionally, regarding the post-harvest applications, several prototypes of coatings based on natural compounds were developed and assessed to determine their feasibility of an extension of shelf-life period in subtropical fruits. In these trials, physicochemical and deterioration changes during storage were less pronounced in fruit treated with some of the prototypes to be tested, showing an improvement in post-harvest quality parameters (such as weight loss, firmness, respiration rate, or dry matter) compared to the control (untreated fruit). Based on these results, new prototypes will be formulated and/or reformulated for further post-harvest trials (currently in progress).

Conclusion

As a starting point, it can be concluded that the use of different subtropical wastes seems to be valuable ingredients to be included in agronomic formulations with interesting biocidal properties. On the other hand, although no final conclusions can be drawn due to the lack of conclusive data, it is expected that natural coating prototypes designed for post-harvest applications can be effective to reduce weight loss during the shelf-life and to improve the texture of the targeted subtropical fruits, and hence, extend their useful life.

Acknowledgements

ECOSKIN project is funded by the European Agricultural Fund for Rural Development (FEADER) and co-financed by the Ministry of Agriculture, Fisheries, Water and Rural Development of the Government of Andalusia.

27.

COMPRESSED INERT GASES FOR INNOVATIVE AND RESIDUE-FREE FOOD PRODUCTS

Prof. Dr.-Ing. Arne Pietsch

Technical University Luebeck,23562 Luebeck, Germany

*Contact: arne.pietsch@th-luebeck.de

Abstract

Intensifying regulations and growing consumer expectations limit todays processing toolbox in the food processing industry; e.g. residue tolerance is decreasing. Consequently todays technologies focus on biotechnology, variation of heat treatments, various mechanical treatments, mainly water as a solvent and a very thorough raw material procurement. But there is another permissible option in the food sector: besides others the University of applied sciences Luebeck works on various processes using inert gases.

Supercritical fluid extraction – or high-pressure extraction - especially with carbon dioxide CO_2 is very well established in industrial scale in the food sector. The advantages are: selective extraction with a harmless and tunable fluid, **residue-free extracts** (e.g. aromas) and **residue-free cleaned materials** (e.g. rice, cork, polymer and sealings). Besides, there are many other possibilities with compressed inert gases, like **structural changes** (e.g. controlling insect risks, volume increase, powder color); **viscosity reduction** (e.g. gas-assisted pressing of vegetable oils, spray-processes); **reducing microbial load**, **coloring and impregnation**; special effects (e.g. **foaming creamers**, **popping candies**). The poster provides an overview and offer for a detailed discussion.

28.

PLANT-BASED ALTERNATIVES OF FERMENTED FOODS: YOGURTS AND KOMBUCHA, NUTRITIONALLY COMPLETE AND WITH DESIRABLE ORGANOLEPTIC CHARACTERISTICS FOR CONSUMERS, FORMENTERA

[1]Francisco Lorca- Salcedo, [1]David Quintín- Martínez, [2] Rafael Bermejo Fernández, [2]Sergio Ariel Streitenberger Jacobi, [1]Presentación García- Gómez*.

[1]National Technological Centre for the Food and Canning Industry – CTNC, Murcia, Spain.

[2]AMC IDEAS, Murcia, Spain.

*Contact: sese@ctnc.es

Abstract

The need to feed a global population that currently stands at over 7.8 billion people, the increase in demand for health-beneficial foods, as well as the high environmental and economic costs of animal-derived products, are some of the main reasons for the growing interest in alternatives in the food sector such as plant-based products. On the other hand, the constant increase in demand and popularity of fermented foods is due to their unique flavor, health benefits, and their ability to improve digestion, nutrient absorption, or strengthen the immune system.

In this scenario, the FORMENTERA project is proposed in collaboration between different actors in the food sector, focused on the search for new fermented plant-based products (yogurts and kombucha) with improved organoleptic and nutritional characteristics, also incorporating by-products of the food industry as raw materials through green conversion processes, as well as the validation of the products in human intervention studies.

Key trials within the project have demonstrated the efficacy of enzymatic hydrolysis extraction techniques in isolating and enhancing plant-derived protein concentrates. Optimized processing conditions have resulted in improved protein solubility, emulsification capacity, and gelling properties, making these fractions highly suitable for application in fermented matrices such as plant-based yogurts and kombucha.

These findings support the potential of sustainable food system innovations that mitigate food waste while responding to the growing consumer demand for high-value plant-based alternatives with optimized nutritional and functional properties.

Keywords: Plant-Based Products, Sustainable Nutrition, Functional Foods, Dairy Alternatives, Nutritional Enhancement, Food Industry By-Products, Green Conversion Processes, Environmental Impact of Food Production, Food Innovation and Sustainability, Circular Economy in Food.

Funding program

Public-Private Collaboration 2022 of the Ministry of Science and Innovation. The publication is part of project CPP2022-009547, funded by MCIN/AEI/10.13039/501100011033 and by the European Union “NextGenerationEU”/PRTR.

29.

SUSTAINABLE SOLUTIONS FOR DIETARY FIBER EXTRACTION FROM BROCCOLI AND OTHER BRASSICAS

[1]Francisco Lorca Salcedo, [1]David Quintín Martínez. [1]Presentación García Gómez*, [2]Sonia Mercader

[1]National Technological Centre for the Food and Canning Industry CTNC. Molina de Segura, Murcia, Spain.

[2]Agrícola Santa Eulalia. Lébor Alto, Murcia, Spain

*Contact: sese@ctnc.es

Abstract

The increasing demand for sustainable food production has driven the exploration of alternative sources of dietary fiber from agricultural by-products. This study focuses on the extraction and purification of fiber from broccoli, cauliflower, kohlrabi, and pointed cabbage remains using environmentally friendly processes. By eliminating traditional chemical reagents, such as acids and organic solvents, a novel enzymatic extraction protocol has been optimized to enhance both efficiency and sustainability. The results confirm the viability of these by-products as functional food ingredients, contributing to waste reduction and circular economy strategies in the food industry. The findings present a significant advancement in sustainable food technology, providing an eco-friendly alternative for fiber production while ensuring compliance with food safety standards.

Keywords: Sustainable food processing, dietary fiber extraction, broccoli by-products, enzymatic extraction, circular economy, agricultural waste utilization.

Funding

The FIBROCOLIS project has been financed within the framework of the Agri-Food PERTE with funds from the Recovery, Transformation and Resilience Plan, financed by the European Union – NextGenerationEU. File number PAG-020100-2023-251.

30.

NEW FUNCTIONAL SYRUP OBTAINED FROM THE REVALORIZATION WITH SUSTAINABLE TECHNIQUES OF THE MANDARIN PEEL BY-PRODUCT, ECOSYRUP01

[1]Presentación García Gómez*, [1]Francisco Lorca Salcedo, [1]David Quintín Martínez, [2]Vanesa Aparici.

[1]National Technological Centre for the Food and Canning Industry CTNC. Molina de Segura, Murcia, Spain.

[2]Industrias Videca, S.A. Ctra. La Pobla Larga, s/n. Villanueva de Castellón, Valencia, Spain.

* Contact: sese@ctnc.es

Abstract

Mandarin peel, a significant by-product of the citrus industry, is rich in bioactive compounds, including flavonoids, phenolic compounds, and organic acids. This study aimed to develop a process for revalorizing mandarin peel and discarded segments into functional syrups with high antioxidant potential while optimizing sugar content and avoiding bitterness. Two syrup formulations were obtained: one from mandarin peel and another from segment by-products, both exhibiting functional properties. Antioxidant capacity, hesperidin, limonin, and sugar composition were analysed, demonstrating the potential of these syrups as sustainable food ingredients. The results confirmed that the sugar concentration was adequate for use as a syrup canned fruit, while organic acids in the segment syrup enhanced its functional properties. The antioxidant activity was validated using an electric impedance technique, showing significant protection against oxidative stress. These findings support the utilization of citrus by-products in the food industry, promoting sustainability and value addition.

Keywords: Mandarin peel, mandarin segments, functional syrup, antioxidants, hesperidin, organic acids, limonin, citrus by-products, sustainability, food industry

Acknowledgments

This project has been financed within the framework of the Agri-Food PERTE with funds from the Recovery, Transformation and Resilience Plan, financed by the European Union – NextGenerationEU. File number PAG-020200-2023-134.

31.

BREAKFAST CEREALS: INSIGHTS INTO MARKET DIVERSITY, NUTRITIONAL VALUE, AND POTENTIAL INNOVATION

Castro, L.M.G.[1], Silva, S.[1], Ema, D.[2], Pintado, M.[1*]

[1] **Universidade Católica Portuguesa, CBQF - Centro de Biotecnologia e Química Fina – Laboratório Associado, Escola Superior de Biotecnologia, Rua Diogo Botelho 1327, 4169-005 Porto, Portugal**

[2] **Germen - Moagem de Cereais, S.A., Rua Joaquim Pinto 91, 4461-901 Sra. da Hora, Portugal**

*Contact: mpintado@ucp.com

Abstract

More than half of the Portuguese population consumes breakfast cereals (BC), which have high sugar, saturated fatty acids, and salt contents while being low in fiber. To better understand these shortcomings, the nutritional composition of 178 BC commercially available in Portugal was analyzed, alongside a literature revision. Only 26% of BC were classified as having good nutritional quality (Nutri-Scores A or B), with the remaining 74% having medium-to-low quality (Nutri-Scores C, D, or E). Unflavored expanded BC had the highest percentage of Nutri-Scores A or B (90%), while all flavored and co-extruded BC had the lowest (up to 9%). All BC elaborated using single-pseudocereals, and combinations of cereals and legumes had good nutritional quality, followed by those elaborated from cereals and pseudocereals, single-cereals, and multi-cereals. Nutritional claims on macronutrients and salt were mainly found on the unflavored cornflakes, unflavored expanded, and flavored extruded BC, while fiber and micronutrient claims were found on flavored extruded, and petals BC. The former claims were prevalent in single cereal BC, while the latter ones were on multi-cereals. The literature suggests that sprouted wheat whole meal, red and black rice, purple corn, biofortified maize, quinoa, millet, legumes, fruit by-products, inulin, algae, silkworm pupae powder, and butterfly pea flower can enhance fiber and protein contents, improve the physicochemical and sensorial properties and increase antioxidant activity and phytochemical contents. Technologies like physical blowing agent-assisted extrusion can further improve the quality of vegetable-based BC. These strategies highlight the need for nutritional improvement in BC to meet consumer health trends.

Keywords: Breakfast cereals, Nutri-Scores, claims, nutritional quality, improvement.

Acknowledgments

Acknowledgments are given to Universidade Católica Portuguesa by providing financial support to CBQF Associate Laboratory under the UID/Multi/50016/2021 FCT project and to Agenda VIIAFOOD - Plataforma de Valorização, Industrialização e Inovação comercial para o AgroAlimentar (n. º C644929456-00000040).

32.

ONE HEALTH APPROACH AS PROMOTER OF A SUSTAINABLE FOOD SYSTEM

Nastasia Belc[1,2]*, Ion Sirbu[2], Manuela Sirbu[2], Florica Constantinescu[1,2], Denisa Duta[1,2].

[1] National R&D Institute for Food Bioresources, IBA Bucharest

[2] One Health Nicolae Manolescu Strunga Association

*Contact: nastasia.belc@bioresurse.ro

Abstract

Since the first One Health World Conference in New York, in 2004, integrative and systemic approaches have been included in the global debates, agendas and policies. This movement was related to the global grand challenges such as climate change, increasing number of Earth population and limited resources as land, water, and energy, available for producing food. Additionally, the higher interconnectedness of human, animal, and environmental health could come with potential sanitary crises. The One Health approach is an integrative effort that aims to balance and optimize the health of people, animals, plants, and their shared environments, promoting interdisciplinary collaboration to address health challenges holistically. When applied to sustainability, this approach offers a comprehensive framework for addressing environmental and health issues in a manner that supports long-term ecological balance and resilience. Food System as a system with high complexity needs multidisciplinary and transdisciplinary approaches and integration of all perspectives covered by different food system stakeholders for participatory processes, thus contributing to systemic addressing the societal challenges. In another way, the systemic approaches such as One Health and Sustainability give the opportunity to increase cooperation and collaboration within food ecosystem as well as in defining its users' engagement and co-creation strategies.

33.

MAGNETIC SOLID-PHASE EXTRACTION FOR THE DETERMINATION OF DYES IN CANDIES USING HIGH PERFORMANCE LIQUID CHROMATOGRAPHY COUPLED TO MASS SPECTROMETRY

Marina Miras[a]*, Natalia Campillo[b], Pilar Viñas[b], Fuensanta Melendreras[a]

[a] National Technological Centre for the Food and Canning Industry, CNTC, C/ Concordia s/n, Molina de Segura, Murcia, Spain.

[b] Department of Analytical Chemistry, University of Murcia, Faculty of Chemistry, Regional Campus of International Excellence "Campus Mare-Nostrum", University of Murcia, E-30100 Murcia, Spain.

*Contact: marina.mirasl@um.es

Abstract

Colour is an important characteristic directly associated with food choice by consumers. The appearance, taste and safety of any food product are directly associated with its colour. Different types of natural and synthetic dyes are available in the food industry, where the latter have gained popularity because they are very stable and cheap [1]. The control of the addition of dyes in candies is a topic of great interest nowadays, especially due to their consumption by children.

The aim of this study was to develop an analytical method for the identification and quantification of fourteen dyes, including 13 synthetic dyes (amaranth, quinoline yellow, azorubine, brilliant blue, patent blue, erythrosine, indigotine, acid red 2G, allura red, ponceau red, sunset yellow, tartrazine and acid green) and one of natural origin (curcumin) in candies. The proposed method was based on liquid chromatography with tandem mass spectrometry (LC-MS/MS) using a triple quadrupole (QQQ) analyzer. The use of nano-adsorbents dispersed in the sample matrix for dye extraction has proven to be an effective method in different matrices [2]. In this case, the miniaturized sample preparation known as magnetic solid-phase extraction (MSPE) was applied for the isolation of analytes. A solid-liquid extraction in water was applied, before MSPE adsorption step, for what magnetized polyethyleneimine (PEI) modified nanoparticles with polydopamine (PDA) (PEI@PDA@ Fe_3O_4) were used. Desorption of the dyes was carried out using a 70:30 acetonitrile:ammonia mixture and the extract was evaporated and reconstitued with 250 µL of water before being injected into the LC-MS/MS system.

The method was validated and limits of quantification in the 0.11 µg/kg to 0.92 mg/kg range were obtained, which allowed to verify that the samples comply with the maximum levels legislated for

the dyes studied. Thirteen candy samples of different matrices were analyzed and concentrations between 0.01 and 5 mg/kg were obtained in several of them for azorubine, brilliant blue, patent blue, curcumin, allura red and tartrazine.

In conclusion, the method developed has proved to be suitable and effective for the quantification of dyes in candies, providing a useful analytical tool for the control of these additives in sweet products.

References

[1] A. Renita, T.K. Tejal, K. Gajaria et al. Foods 12 (2023) 1521.

[2] W.A. Khan, P. Varanusupakul, H.U. Haq et al. Microchem. J. 208 (2025) 112419.

Acknowledgements

Financial support of National Technological Centre for the Food and Canning Industry (CNTC) and Comunidad Autónoma de la Región de Murcia (CARM, Fundación Séneca, Región de Murcia (Spain)) for fellowship 21496/CTC/21 to M. Miras López. The authors thank the Spanish MCIN project PID2021-123201NB-I00 financed by MCIN/AEI/10.13039/501100011033/ FEDER, EU.

34.

SUSTAINABLE PROTEIN RECOVERY FROM SOFT CAPSULE TRIMMINGS USING GREEN EXTRACTION METHODS. GREENCAPSU

[1]Francisco Lorca Salcedo, [1]David Quintín Martínez, [2]Antonio García, [1]Presentación García Gómez*.

[1]National Technological Centre for the Food and Canning Industry CTNC. Molina de Segura, Murcia, Spain.

[2]Martínez Nieto S.A. Los Camachos, Murcia, Spain.

*Contact: sese@ctnc.es

Abstract

The encapsulation process of food supplements in soft capsules generates a significant amount of industrial waste, primarily composed of gelatin-based trimmings. This project aims to revalorize these by-products by developing green extraction methods that eliminate the use of organic solvents. Through innovative solvent-free techniques, such as enzymatic hydrolysis, supercritical fluid extraction and membrane, the project successfully recover high-quality protein suitable for food applications. The extracted protein was characterized demonstrating its potential as a sustainable food ingredient. The results highlight the feasibility of circular economy approaches in the food supplement industry, contributing to waste reduction, resource efficiency, and environmental sustainability. This research supports the development of novel protein-enriched food formulations, reinforcing the role of green technologies in the advancement of sustainable food systems.

Keywords: industrial waste valorization, green extraction, soft capsule trimmings, protein recovery, sustainable food ingredients, solvent-free technology, circular economy, enzymatic hydrolysis, supercritical fluid extraction, functional proteins.

Acknowledgments

This project has been financed within the framework of the Agri-Food PERTE with funds from the Recovery, Transformation and Resilience Plan, financed by the European Union – NextGenerationEU. File number PAG-020100-2023-248.

35.

DRIED OLIVES: A BYPRODUCT OF OLIVE GROWING WITH THERAPEUTIC POTENTIAL FOR CHRONIC INFLAMMATION

Juan de Dios Alché[1,2,*], Antonio Jesús Castro[1], Elena Lima[1]

[1] Plant Reproductive Biology and Advanced Microscopy Laboratory (PReBAIL). Department of Stress, Development and Signaling in Plants. Estación Experimental del Zaidín (EEZ), CSIC, Granada.

[2] University Institute of Research on Olive and Olive Oils (INUO), Jaén.

* Contact: juandedios.alche@eez.csic.es

Abstract

Dried olives, both at their green and ripe stages, represent an underutilized byproduct of olive cultivation, which could have valuable applications due to their high concentration of bioactive compounds. These olives contain polyphenols with antioxidant and anti-inflammatory properties, as well as protective effects against various metabolic and cardiovascular diseases. The objective of this study was to evaluate the antioxidant activity of dried olives at both ripening stages and to explore the ability of polyphenols extracted from dried olives to reduce inflammation in a cellular model of human pancreatic cells.

Antioxidant activities such as catalase, superoxide dismutase (SOD), total glutathione (GSH), and total antioxidant capacity were measured in dried olives at the green and ripe stages. Polyphenols were extracted, and their antioxidant capacity was evaluated through specific assays. To assess cell viability after exposure to polyphenol extracts, the MTT assay was employed in cell cultures. Additionally, the anti-inflammatory effect of the extracts was investigated in a cellular model of human pancreatic PANC-1 cells induced with various agents to simulate an inflammatory response. The inducers used were PMA, PHA and LPS, which generated a strong inflammatory response. The production of pro-inflammatory cytokines (TNF-α, IL-1β, IL-2) was quantified using ELISA, and the expression of the iNOS enzyme was analyzed by Western blot.

High antioxidant activity was observed in dried olives at both ripening stages, with greater antioxidant capacity noted in the green stage. The polyphenol extracts showed no toxicity at the concentrations used in the MTT assay, maintaining cell viability around 100%. In PANC-1 cells induced with PMA, PHA + IO, and LPS, the polyphenol extracts significantly reduced the production of TNF-α, IL-1β, and IL-2, in addition to decreasing iNOS expression compared to controls. These results suggest that the polyphenols in dried olives may have a protective effect against chronic inflammation, offering new therapeutic alternatives and opening opportunities

for the valorization of agricultural alternatives, contributing to both human well-being and environmental sustainability.

This work was supported by research projects: PYC20 RE 009 CSIC. EEZ and P18-RT-1577 (Junta de Andalucía), RTC-2016-4824-2, TED2021-130015B-C22 (MCINN), and REGAGE23e00065226662 (MAPA)

36.

NON-INVASIVE NEAR INFRARED SPECTROSCOPY (NIRS) FOR ON-LINE SODIUM CONTENT PREDICTION IN DRY-CURED HAM SLICES: DEVELOPMENT OF TEMPERATURE-COMPENSATED MODELS

M. Isabel Campos[1,2,*], Gregorio Antolín[1†] Luis Debán[2], Rafael Pardo[2]

[1] CARTIF Technology Center, Agrifood and Processes Division, Parque Tecnológico de Boecillo, 205. 47151 Valladolid, Spain

[2] Analytical Chemistry Department, Faculty of Sciences, University of Valladolid, Pº de Belén, 7. 47011 Valladolid, Spain

*Contact: marcam@cartif.es

Abstract

Sodium plays a crucial role in cured meats by ensuring microbial stability, texture, and flavor, but excessive intake poses health risks, requiring precise control. Near-infrared spectroscopy (NIRS) provides a fast, non-invasive alternative for real-time monitoring. This study evaluates the potential of NIRS as an on-line analytical technique for predicting sodium content in dry-cured ham slices. The proposed methodology also investigates the influence of temperature on model development, as fluctuations can significantly impact spectral measurements. Spectra were collected directly from the surface of dry-cured ham slices using a remote fibre-optic probe at temperatures ranging from -12 ºC to 20 ºC. Sodium content was determined via Inductively Coupled Plasma Atomic Emission Spectrophotometry (ICP-AES) after chemical digestion. To enhance model robustness, both local and global temperature compensation strategies were implemented, with Partial Least Squares regression (PLSR) used for calibration. Both temperature-compensated NIRS models achieved prediction errors of 0.13-0.15% Na, comparable to the reference method (0.11% Na). The results indicate that while local models are sensitive to temperature deviations beyond the range in which they were developed, the global model demonstrates superior performance, achieving a 90% adjustment with more accurate results, making it a more versatile option for packaging lines. This work confirms the feasibility of integrating NIRS technology for real-time sodium monitoring, improving quality control and providing consumers with reliable nutritional information.

37.

DETECTION AND QUANTIFICATION OF MELAMINE IN MILK POWDER BY NIR SPECTROSCOPY

M. Isabel Campos[1,2,*], Raquel Sánchez[2], Luis Debán[2]

[1] CARTIF Technology Center, Agrifood and Processes Division, Parque Tecnológico de Boecillo, 205. 47151 Valladolid, Spain

[2] Analytical Chemistry Department, Faculty of Sciences, University of Valladolid, Pº de Belén, 7. 47011 Valladolid, Spain

*Contact: marcam@cartif.es

Abstract

Melamine is a nitrogenous compound that has been fraudulently used to increase the apparent protein content in dairy products, leading to severe health consequences due to its toxicity. In this work, near infrared spectroscopy (NIRS), combined with chemometric methods, has been used to detect and quantify melamine in milk powder samples. A total of 130 solid samples with different melamine concentrations were prepared from commercial milk powders. They were analysed using a NIR fibre optic probe for the acquisition of the corresponding spectra. The quantification of melamine in the contaminated samples was performed using a reference method, based on the pretreatment of the samples and their quantification by HPLC with UV-Visible detection. Spectral data were analysed by principal component analysis (PCA) and cross-validated calibration equations were constructed using partial least squares regression (PLSR). PCA enabled the classification of samples according to their melamine concentration, detecting the degree of contamination solely by spectral information. Prediction models were developed in different melamine concentration ranges between 0-10%, obtaining cross-validation correlation coefficients (R^2CV) higher than 98%. The predictive capacity in the external validation reached values of 7.66 and 3.05, with standard errors of prediction of 0.42% and 0.09% for the models developed in the 0-10% and 0-1% concentration ranges, respectively. These results confirm that NIRS is a viable alternative for the detection and quantification of melamine in milk powder samples.

38.

INTELLIGENT WASTE BINS TO REDUCE FOOD WASTE IN DIFFERDANGE: A DATA-DRIVEN APPROACH TO SUSTAINABLE FOOD MANAGEMENT

Fernández-Casal, Laura[1]*, Pinedo-Gil, Julia[1]; Fallah, Diego[2]; Reuter, Philippe[2]; Heidari-Velisi, Stella[2]

[1] **Fundación CARTIF, Parque Tecnológico de Boecillo, parcela 205. 47151, Boecillo, Valladolid, Spain**

[2] **City of Differdange 40, avenue Charlotte L-4530 - Differdange, Luxembourg**

*Contact: laufer@cartif.es

Abstract

According to the 2024 Food Waste Index Report (UNE), Luxembourg ranks 4th among EU-27 countries in food waste generation per capita, following Portugal, Malta, and Greece[1]. On average, 120 kg of food is wasted per resident per year across restaurants, shops, canteens, and households. In response, the city of Differdange (Luxembourg) launched a pilot project utilizing AI-powered intelligent waste bins to monitor and reduce food waste in a public kitchen. This initiative, developed in collaboration with the Differdange Food Council, the EU-funded FUSILLI Project, and NetZeroCities, aims to enhance food waste management and support the city's goal of achieving climate neutrality by 2030.

Methods

Two Orbisk smart bins were installed in a Servior/private-managed kitchen within a residential home for the elderly, tracking kitchen and plate waste over 19 weeks (October 2024 – March 2025). The AI-driven system analyzed waste composition, frequency, and weight, collecting data on total waste volume, financial costs, and CO_2 emissions to provide actionable insights for operational improvements.

Results

During the monitoring period, total food waste was 9,044 kg, marking an 11% reduction from baseline. Weekly food waste decreased by 37.82%, resulting in a 38% cost reduction and a 36.78% drop in CO_2 emissions. Mondays showed the highest waste levels, with soups, sauces, and bread being the most discarded categories. Over five months, the project saved 1,143 kg of food, equivalent to 2,539 meals, translating into estimated savings of €9,508 and 4,608 kg of CO_2 emissions.

1 United Nations Environment Programme (2024). Food Waste Index Report 2024. Nairobi.

Conclusions

The use of AI-powered waste bins has proven effective in reducing food waste, financial losses, and environmental impact. This project highlights the scalability and replicability of smart waste management solutions, offering a data-driven approach to sustainable food systems and supporting Differdange's climate action strategy.

Keywords: Food waste, innovative solutions, smart bins, sustainability, NetZeroCities, FUSILLI project.

39.

EVALUATION OF THE VALUE CHAIN IN THE CULTIVATION OF MEDICINAL PLANTS WITH THE PURPOSE OF OPTIMIZING THEIR RECOVERY IN ORGANIC TEAS

Gabriela Vlăsceanu[1*], Florentina Lupoae[2], Florentina Vasile[3]

[1] Bioterra University, str. Gârlei 81, district 1, Bucharest, Romania

[2] Ionna Plant SRL, Costi -Vânători, Galați, Romania

[3] Vegetable Research and Development Station, Buzău, Romania

*Contact: ga.vlasceanu@yahoo.com

Abstract

The assessment of the value chain in the cultivation of medicinal plants represents an integrated approach, which combines sustainable practices, ensuring superior product quality and satisfying consumer demands. In this context, the company ***Ionna Plant SRL*** (Galați area, Romania) has reconfigured its entire technological chain to adapt it to the production process of organic teas. Through rigorous scientific methods, medicinal plant seedlings were obtained and selected at the ***Buzău Vegetable Research and Development Station*** (Romania) with the aim of establishing crops that were subsequently certified, thus ensuring an organic quality of the products offered. After harvesting, medicinal plants are rigorously analyzed, both qualitatively and quantitatively, to evaluate the content of *essential oils* (with calming properties, supporting the digestive process, etc.) and other active principles beneficial to health (*flavonoids* - known for their antioxidant effects and antimicrobial properties, *alkaloids* - which can improve mood and energy status, *saponins* - with adaptogenic properties and supporting the immune system, *glucosinolates* - which contribute to detoxifying the body, *tannins* - with anti-inflammatory and astringent properties, *phenolic acids* - powerful antioxidants with role in regulating blood sugar levels, etc.). In a landscape characterized by contemporary challenges such as climate change, the stressful rhythm of daily life, and increased pollution, ***Ionna Plant*** natural teas constitute an effective solution for combating asthenia, maintaining optimal energy levels and improving mood. This study presents the innovative processes and strategies adopted by ***Ionna Plant SRL*** to maximize the valorization of medicinal plants in the form of organic teas, with a positive impact on consumer health and with growth potential in the organic products market. The evaluation of the applied methods highlights the importance of integrating sustainability into the value chain of medicinal plant products.

Keywords: medicinal plants, culture, valorization, organic teas

40.

PREDICTIVE ANALYSIS OF ALLERGENS IN NOVEL FOODS BY USING ADVANCED PROTEOMIC AND BIOINFORMATIC TOOLS

Juan de Dios Alché[1,2], María López-Pedrouso[3], José M. Lorenzo[4], Ramón Moreira[5] and Daniel Franco[5,*]

[1] Plant Reproductive Biology and Advanced Microscopy Laboratory (PReBAIL). Department of Stress, Development and Signaling in Plants. Estación Experimental del Zaidín (EEZ), CSIC, Granada. Spain

[2] University Institute of Research on Olive and Olive Oils (INUO), Jaén. Spain

[3]Department of Zoology, Genetics and Physical Anthropology, Universidade de Santiago de Compostela, Santiago de Compostela, 15872 A Coruña, Spain

[4]Centro Tecnolóxico da Carne de Galicia, Rúa Galicia Nº 4, Parque Tecnológico de Galicia, San Cibrao das Viñas, 32900 Ourense, Spain.

[5]Department of Chemical Engineering, Universidade de Santiago de Compostela, 15782 Santiago de Compostela, Spain.

*Contact: daniel.franco.ruiz@usc.es

Abstract

In recent years, novel foods have emerged as an increasingly popular trend in developed countries. Research is being conducted on food proteins from plants (pulses, legumes, cereals), fungi, bacteria, and insects to incorporate them into meat alternatives, beverages, baked goods, and more. One of the most significant challenges in bringing novel foods to market is ensuring food safety.

New food scenarios drive the need to detect novel allergens that must be identified and quantified for proper labeling. Allergenic reactions are primarily caused by proteins that are abundant in foods, typically of low molecular mass, glycosylated, water-soluble, and highly stable to proteolysis.

The most relevant plant and animal food allergens, such as lipid transfer proteins, profilins, seed storage proteins, lactoglobulins, caseins, tropomyosins, and parvalbumins from fruits, vegetables, nuts, milk, eggs, shellfish, and fish, have been studied. New methods for large-scale screening to identify potential allergens need to be developed, particularly regarding protein databases and other online tools.

Additionally, various bioinformatics tools based on sequence alignment, motif identification, or 3-D structure predictions should also be implemented.

Finally, targeted proteomics will become a powerful technology for quantifying these hazardous proteins. The ultimate goal is to establish an effective and resilient surveillance network using this cutting-edge technology [1].

[1] López-Pedrouso, M., Lorenzo, J. M., Alché, J. d. D., Moreira, R., & Franco, D. (2023). *Advanced Proteomic and Bioinformatic Tools for Predictive Analysis of Allergens in Novel Foods. Biology, 12(5), 714. https://doi.org/10.3390/biology12050714*

41.

A ONE HEALTH APPROACH TO MICROPLASTICS RISK ASSESSMENT IN THE FOOD ECOSYSTEM

Gabriel Mustăţea[1,*] and Elena L. Ungureanu [1]

[1] National Research and Development Institute for Food Bioresources - IBA Bucharest, 5 Ancuta Baneasa Street, 020323, Bucharest, Romania

*Contact: gabi.mustatea@bioresurse.ro

Abstract

Microplastics are a growing concern due to their widespread presence in the environment and potential effects on food safety, human health, and ecosystem stability. Their persistence and bioaccumulative nature pose risks to crops, wildlife, and humans, while also contributing to climate change-related challenges. These include threats to food security, the emergence and spread of new pathogens, and disruptions to essential ecosystem services, such as increased risks of flooding. Given the lack of effective removal methods, their accumulation in natural systems remains a critical issue. Addressing these challenges requires high-quality research under environmentally relevant conditions, considering various microplastic characteristics (e.g., polymer types, weathering, and shapes), diverse organisms, and co-occurring contaminants. A One Health multidisciplinary approach is essential to integrate insights from multiple fields, deepen our understanding of their broader environmental impacts, and develop effective mitigation strategies.

Keywords: One Health, microplastics, food packaging, risk assessment

42.

AUGMENTED INNOVATION: IMPLEMENTING GENERATIVE AI IN CORPORATE INNOVATION

Ángel Alba* and Ángela Medina**

Innolandia.es.

*Contact: *angel@innolandia.es; ** angela@innolandia.es

Abstract

Generative Artificial Intelligence (Gen-AI) is transforming corporate innovation, redefining how new solutions are created, processes are optimized, and value is generated. However, its adoption still faces significant challenges, from technological integration to change management, while recognizing that implementing Gen-AI is an innovation process by itself.

To address these challenges and enhance its impact, we have developed a series *of tools under the concept of Augmented Innovation.* The principal idea is that this technology does not replace us as innovators, but rather enhances our capabilities.

This poster presents an updated overview of the state of the art in Gen-AI applications for innovation, exploring where and to what extent it´s being used, as well as the most common tools.

Within the framework of Augmented Innovation, we have designed a methodology to facilitate the integration of Gen-AI into corporate innovation processes called: the Accelerator. This methodology prioritizes agile experimentation and scalability, enabling organizations to incorporate this technology efficiently and sustainably by researching how these tools fit into innovation processes.

The poster provides an updated view of Gen-AI applications in innovation, exploring here and how it is used, along with the most widely adopted tools. Additionally, we present the results of applying Augmented Innovation with our clients, revealing a gap between the initial learning phase and organizational scaling. Finally, we highlight critical success factors and best practices for companies looking to harness the full potential of Gen-AI in their innovation processes.

43.

INNOVATİVE SUSTAİNABLE CLUSTER FOR OLİVE VALUE CHAİN PROJECT (OASIS)

İbrahim Serdar Koçar*[1], Pınar Erdil[1], Dr. Erçin Güdücü[2], Nuray Başer[3], Luigi Triggiani[4], Francesca Dadomo[5], Angel Martinez[6] , Presentación García [6] , David Quintin [6]

[1] Izmir Ticaret Borsasi, Türkiye.

[2] Izmir Agricultural Technology Center, Türkiye.

[3] International Centre for Advanced Mediterranean Agronomic Studies CIHEAM Bari, Italy.

[4] Unioncamere Puglia, Italy.

[5] Italian Chamber of Commerce and Industry for Spain CCIS, Spain.

[6] National Technological Centre for the Food and Canning Industry CTNC, Spain.

*Contact: serdarkocar@itb.org.tr

Abstract

Climate change has effects on all parts of our world, agriculture is one of the top effected sectors. Almost all agricultural products have been effected by the changing climate effects, and productivity of the olive cultivation has been shifting in different olive zones of the world. The Farm to Fork Strategy is at the heart of the European Green Deal aiming to make food systems fair, healthy and environmentally-friendly. With reference to the "Farm to Fork Strategy", Innovative Sustainable Cluster for Olive Value Chain (OASIS) project has been developed.

OASIS project is funded within the scope of Single Market Programme under Agricluster call. It aims to create and cultivate 'European Agri-food Sustainability Cluster Partnerships' aimed at facilitating the adoption of the EU Code of Conduct on Responsible Food Business and Marketing Practices among small and medium-sized enterprises, to decrease the vulnerability of food production systems to external factors, such as adverse weather events linked to climate change, to enhance the adoption of resource-efficient technologies by SMEs by identifying and implementing measures to enhance the efficiency of material utilization in processes, and to develop and implement strategies to improve resource efficiency and reduce food waste, and create a collaboration environment between SMEs in 3 countries.

Keywords: Agrifood, cluster, green transition, resource efficiency, food waste.

Organizations

Izmir Commodity Exchange (TUR), Unioncamere Puglia (ITA), Italian Chamber of Commerce and Industry in Spain (SPA), CIHEAM Bari (ITA), National Technological Center for the Food and Canning Industry CTNC (SPA), Izmir Agricultural Technology Center (TUR).

Acknowledgements:

Innovative Sustainable Cluster for Olive Value Chain (OASIS) project (101166124 — OASIS — SMP-COSME-2023-AGRICLUSTER) is funded by European Innovation Council and SME Executive Agency (EISMEA) under Single Market Programme (SMP) between 16 May 2024 – 15 May 2027.

44.

NEW TOOL FOR THE DIGITALIZATION OF THE PRODUCTION PROCESS OF REFRIGERATED FRUIT JUICES AND OTHER PLANT-BASED BEVERAGES WITH A HIGH DEGREE OF PRECISION

Salvador García Ortuño*

Digital & Cyber Tech Business Solutions director. AMC ND and FTN.

*Contact: sgortuno@amcglobalco.com

Abstract

Presentation of the DIGITWIN Project

The DIGITWIN project, developed by AMC Natural Drinks S.L. and Fruit Tech Natural S.A., is part of the PERTE Agro initiative and aims to digitalize and virtualize the production process of refrigerated fruit juices and plant-based beverages through the implementation of a Digital Twin.

This innovative tool will enable real-time monitoring of plant operations with unprecedented precision, improving traceability, efficiency, and sustainability in production. To achieve this, the project will leverage advanced sensor technology, massive data collection, and Machine Learning, facilitating strategic and operational decision-making.

The Digital Twin will allow for scenario simulation, optimizing production while reducing costs. Additionally, it will ensure greater control over product quality and food safety, integrating all management systems into a single digital platform.

With this development, AMC and FTN seek to strengthen their competitiveness in the agri-food sector, enhance product traceability, and move toward a more efficient, sustainable, and innovative industry.

Acknowledgements:

"The project has received a grant under the call for aid to actions for industrial strengthening of the agri-food sector within the Agri-Food Sector, within the framework of the Recovery, Transformation and Resilience Plan, financed by the Ministry of Industry, Trade and Tourism and the European Union - Next Generation EU".

45.

DEVELOPMENT OF A NEW PROTOTYPE TECHNOLOGICAL SOLUTION FOR SUPPLY CHAIN OPTIMIZATION, DEMAND FORECASTING, AND NEW PRODUCT DEVELOPMENT

Salvador García Ortuño*

Digital & Cyber Tech Business Solutions director. AMC ND and FTN.

*Contact: sgortuno@amcglobalco.com

Abstract

Presentation of the SUPCHAINML Project

The SUPCHAINML project, developed by AMC Natural Drinks S.L. and Fruit Tech Natural S.A., is part of the PERTE Agro initiative and aims to create an innovative technological solution for supply chain optimization, demand forecasting, and new product development in the agri-food sector.

Using Big Data and Machine Learning, a prototype system will be developed to analyze massive data, predict consumption trends, and improve stock and logistics management. This will not only increase the efficiency and profitability of the companies involved but also contribute to the sustainability of the sector by reducing waste and optimizing resources.

The project focuses on the digitalization of key processes, including demand forecasting, production management, and transportation optimization. With this development, AMC and FTN seek to strengthen their competitive position, enhance product traceability, and foster a more efficient and sustainable industry.

Acknowledgements:

"The project has received a grant under the call for aid to actions for industrial strengthening of the agri-food sector within the Agri-Food Sector, within the framework of the Recovery, Transformation and Resilience Plan, financed by the Ministry of Industry, Trade and Tourism and the European Union - Next Generation EU".

46.

REVALORIZATION OF PEACH AND APRICOT BY-PRODUCTS THROUGH INNOVATIVE EXTRACTION TECHNOLOGIES: CHARACTERIZATION AND BIOACTIVITY ASSESSMENT

[1]David Quintín Martínez, [1]Francisco Lorca Salcedo, [1]Angel Martínez Sanmartín, [1*]Presentación García Gómez, [2]Ana Belen Morales Moreno, [3]Gerard García-Villaraco Isern, [3]Lidia Gil Martínez, [4]González-Fernández, M.J., [4]Ramos-Bueno, R.

[1] National Technological Centre for the Food and Canning Industry – CTNC, Murcia, Spain.

[2] Agrifood Cluster Foundation of the Region of Murcia -AGROFOOD, Murcia, Spain.

[3] Department of Chemistry and Natural Products -DOMCA S.A.U., Alhendín, Spain.

[4] Foundation of Auxiliary Industry of Agriculture Tecnova, Almería, Spain.

*Contact: sese@ctnc.es

Abstract

In the framework of the DEMOEXTRACT Project, this study presents a novel process for the revalorization of peach and, apricot by-products, focusing on the development of sustainable extraction and bioconversion methodologies. The research aims to obtain high-value bioactive extracts with potential applications in food and agronomic industries while aligning with circular economy principles.

A combination of green extraction technologies was employed to enhance the recovery of polyphenols, flavonoids, and other bioactive compounds from fruit by-products. The obtained extracts were extensively characterized in terms of their chemical composition, total phenolic content (TPC), flavonoid concentration and antioxidant activity using spectrophotometric and chromatographic techniques. Their antimicrobial activity of the extracts was also evaluated against foodborne pathogens such as E. coli, Salmonella spp. And Listeria monocytogenes.

Additionally, for agronomic purposes, two concentrated sugar extracts from peach and apricot by-products were used in an insect-based bioconversion process as supplementary ingredients in experimental trials. Three diets using different percentages of replacement control-based ingredients were designed and used in a 3-consecutive laboratory trials before its scaling up. The feed consumption and the growth state were monitored by measuring three main parameters: relative growth rate (RGR), feed conversion ratio (FCR) and efficiency of conversion of ingested feed (ECI).

Promising results were obtained replacing 20 and 30% of peach concentrate in the diet providing a higher value of RGR (0.082 day^{-1}) compared to control diet (0.063 day^{-1}), as well as better results in both conversion indicators. On the contrary, apricot concentrate showed comparable results to the control one. Finally, bioconverter insects and their by-products (frass) were characterised to evaluate their potential as an economic and valuable bio-based fertilizers.

This research supports the DEMOEXTRACT Project's objectives of fostering environmentally friendly valorization strategies, promoting circular bioeconomy models, and enhancing the utilization of fruit-processing by-products. Both extracts demonstrated antioxidant and antimicrobial activity, leading to significant reductions in cell viability with decreases of 2 to 3 logarithmic units after 48h of exposure compared to the control. Future studies will explore the scalability of these extraction techniques and their application in food and feed formulations.

Keywords: Bioingredients, Extraction technologies, Bioconversion, By-product valorization, Circular Economy, Antimicrobial, Antioxidant, Functional ingredients, Environmental sustainability.

47.

COMPARISON OF NUTRITIONAL AND FUNCTIONAL PROPERTIES OF SINGLE-CELL PROTEIN FROM SACCHAROMYCES CEREVISIAE AND SOY PROTEIN FOR MEAT SUBSTITUTE APPLICATIONS

[1]Antonio Jesús Ureba-Aragón, [1]Nuria Mut-Salud, [1]José Manuel García-Madero, [1,2*]Lidia Gil-Martínez

[1] Department of Quality and Food Technology, DOMCA S.A.U.-Alhendín, Spain

[2] Department of Chemistry and Natural Products, DOMCA S.A.U.- Alhendín, Spain.

*Contact: lidiagm@domca.com

Abstract

As part of the LOOKING4PRO Project, this study aims to assess the nutritional and functional properties of Single-Cell Protein (SCP) derived from the controlled fermentation of *Saccharomyces cerevisiae* under optimized conditions. The physicochemical and technological characteristics of this protein were compared with those of soy protein, which is widely utilized in the food industry for the formulation of plant-based meat analogues. The nutritional composition, including amino acid profile, was determined using high-performance liquid chromatography coupled with mass spectrometry (HPLC-MS). Furthermore, key functional and technological parameters were evaluated, including solubility, water-holding capacity, oil-holding capacity, foaming capacity, emulsifying activity, and gelation properties, as these factors are critical for the application of proteins in food systems.

This research contributes to the objectives of the LOOKING4PRO Project by exploring alternative protein sources to replace conventional ones, which are often associated with significant environmental sustainability challenges. The results demonstrate that Single-Cell Protein constitutes a nutritionally valuable alternative, offering a high biological value protein alongside functional and technological properties that make it suitable for the development of meat substitutes. These findings underscore the potential of SCP as a sustainable ingredient for the food industry.

Keywords: Yeast protein, meat substitution, sustainable protein sources, alternative proteins, plant-based nutrition

Looking4pro es un proyecto financiado por la Junta de Andalucía a través del Fondo Europeo Agrícola de Desarrollo Rural

48.

OPTIMIZATION OF A SOLID-LIQUID EXTRACTION METHOD FOR BLACKBERRY FRUITS BIOACTIVE COMPOUNDS USING A BOX-BEHNKEN DESIGN

[1*]Lidia Gil Martínez, [1]José Antonio Ruiz García, [2,3]Vito Verardo, [3,4]Ana María Gómez Caravaca

[1] Department of Chemistry and Natural Products, DOMCA S.A.U.- Alhendín, Spain;

[2] Department of Nutrition and Food Science, University of Granada, Campus of Cartuja, 18071 Granada.

[3] Institute of Nutrition and Food Technology 'José Mataix', Biomedical Research Centre, University of Granada, Avd. Conocimiento s/n, 18100 Granada, Spain

[4] Department of Analytical Chemistry, University of Granada, Avda Fuentenueva, 18071 Granada, Spain

*Contact: lidiagm@domca.com

Abstract

Blackberries (Rubus sp.) are widely recognized for their high content of bioactive compounds, particularly phenolic compounds such as anthocyanins, flavonoids, and ellagitannins, which are associated with antioxidant, anti-inflammatory, and antimicrobial activities. In this study, the extraction of antioxidant compounds from blackberry fruits was optimized using a traditional solid-liquid extraction method with Generally Recognized As Safe (GRAS) solvents, aiming to develop an efficient and environmentally friendly process. A Box-Behnken design (BBD) was employed to evaluate the influence of ethanol concentration (10–90%, v/v), extraction time (1–24 h), and temperature (25–60 °C) on total phenolic content (TPC), determined by the Folin-Ciocalteu method. Response surface methodology (RSM) was used to model and optimize the process, with TPC as the response variable. The model showed high predictive accuracy (R^2 = 0.9981) and no significant lack of fit ($p > 0.05$). Optimal extraction conditions were established at 50% ethanol, 14.5 h, and 50 °C, yielding 31.1 ± 4.9 mg gallic acid equivalents (GAE)/g dry weight. These findings support the valorization of blackberries as a natural source of functional compounds and suggest potential applications in nutraceutical and food industries.

Keywords: Bioingredients; Natural extracts; Functional ingredients; Antioxidants; Statistical modelling

49.

POWER PROTEINS: UNLOCKING THE POTENTIAL OF CEREALS & PULSES

Denisa Eglantina Duta*[1], Gabriela Daniela Criveanu-Stamatie[1], Sabina Bobea[1], Cristian Florea[1], Nastasia Belc[1]

[1] National R&D Institute for Food Bioresources, IBA Bucharest, Romania.

*Contact: denisa.duta@bioresurse.ro

Abstract

Cereals and pulses are staple food sources worldwide, offering a rich and complementary profile of essential amino acids and making them valuable for addressing global nutritional challenges. This study explored the potential of these plant-based proteins to enhance food security, promote sustainability, and improve human health. Cereals, such as quinoa, amaranth, and teff, along with pulses, such as lentils, chickpeas, and beans, provide a diverse array of protein options that can meet the nutritional needs of various dietary preferences. Moreover, the cultivation of cereals and pulses requires fewer resources and has a lower environmental impact compared to animal agriculture, aligning with global efforts toward sustainable food production. We examined the composition of different varieties of chickpeas and cereals, highlighting the recent advancements in processing techniques that enhance their functional properties. Chickpeas are a rich source of proteins, carbohydrates, lipids, fibers, and minerals, with protein content ranging from 19.79% to 27.4% across different varieties. Various modification methods, including physical, biological, chemical, and combinations thereof, can be used to enhance the functional properties of chickpea proteins. These techniques aim to improve the solubility, water-holding capacity, and emulsifying and gelling properties, which are crucial for expanding chickpea protein applications in food products. Additionally, pretreatment methods, such as soaking and germination, have been found to be effective in reducing antinutritional factors and improving protein solubility, emulsifying capacity, and foaming properties. Additionally, we analyzed the role of cereal-pulse combinations in plant-based diets and their potential applications in alternative protein industries. By leveraging their nutritional and environmental benefits, cereals and pulses can play a crucial role in shaping the future of sustainable protein sources.

Keywords: cereals, pulses, chickpeas, proteins, plant-based diet

50.

ISOLATION AND CHARACTERIZATION OF EPS-PRODUCING LACTIC ACID BACTERIA FROM ARTISANAL SOURDOUGHS

Imanol Pinedo*, Monserrat Alvarado Jasso, Iñaki Diez-Ozaeta, Olaia Estrada

GOe Tech Center, Technology Center in Gastronomy, Basque Culinary Center, Donostia-San Sebastián, Spain

*Contact: ipinedo@bculinary.com

Abstract

Exopolysaccharides (EPS) are extracellular polymers produced by lactic acid bacteria (LAB). Previous studies have demonstrated that these compounds improve the technological and functional properties of fermented foods. Consisting mainly of monosaccharides, these compounds contribute to texture, viscosity, stability, and water retention in foods. Beyond their functional properties, EPS have also been demonstrated to provide health benefits such as prebiotic activity, antioxidant, and gastrointestinal mucosal protection.

The present study aims to assess the production of EPS by LAB strains isolated from traditional sourdoughs, with a view to investigate their potential functional and technological applications in food systems. The isolates were cultured on MRS agar plates enriched with 2% sucrose. Colonies that formed a viscous layer after six days of incubation were identified as EPS producers. To further assess EPS production, the selected bacterial strains were evaluated using a modified liquid MRS medium supplemented with 2% sucrose as the sole carbon source. Following a 48-hour incubation at 30 ºC the EPS were collected via centrifugation, precipitated with absolute ethanol, and stored at low temperatures. The recovered EPS were then freeze-dried and quantified by dry weight, thereby providing information on the strains capacity to produce these compounds.

Six EPS-producing wild strains were successfully isolated, phenotypically and genetically characterized, and their EPS production capacity was evaluated. The results indicated that the strain BLT_1 was identified as the strain that produced the highest biomass, thus highlighting its potential for applications in the production of EPS in fermented food systems.

The identified strains offer significant potential for applications in the development of fermented products, thereby driving innovation in the food industry and promoting sustainable and differentiated solutions that respond to current consumer demands.

51.

ENVIRONMENTAL BEHAVIORS GUIDELINE AT THE GROCERY SHOP. PRACTICAL TIPS FOR SUSTAINABLE SPENDING IN EVERYDAY GROCERY SHOPPING. MINDTHECAP PROJECT

Dr. Eng. Daniel AMARIEI*, Dr. Krisztina TOTH, Mihai SITARIU,
PAMEA EXPERTS, Austria.
*Contact: pamea.experts@gmail.com

Abstract

MindtheCAP is an Erasmus+ initiative addressing the Climate Change and Sustainable Development through education and civic engagement, developing a comprehensive approach involving formal and non-formal learning methods, which integrates education, awareness, and civic engagement to empower Youngsters as leaders and advocates for environmental sustainability, leveraging their ability to drive significant change within their communities and beyond.

The MindtheCAP consortium formed by 5 partners (EUROBOX - Italy, AVEC - Tunisia, SYL - Jordan, PAMEA - Austria and EFE - Latvia) is centred on the establishment of several Living Labs across EU and MENA countries serving as education hubs for CC&SD, MindtheCAP is bringing together local communities, NGOs, and other stakeholders in a collaborative environment, LLs which foster the development of innovative solutions and practical actions that address the most pressing environmental challenges, serving as practical application through pilot educational interventions and generating behavioural changes.

A cornerstone of the MindtheCAP project is the development is the creation of a multidisciplinary competence framework, aligned with the European Green Deal and GreenComp, which focuses on essential skills for sustainable development, combining innovative educational approaches to equip youngsters with the necessary knowledge, skills, and attitudes.

The Environmental behaviours guideline at the grocery shop, through a combination of educational insights, practical tips, and interactive tools, empower consumers to make informed, sustainable choices for grocery shopping, seeking to inspire a sustainability mindset in consumers, empowering them as pivotal actors in the transition to a climate-friendly world.

More info: www.mindthecap.eu

Co-funded by
the European Union

52.

THE USE OF SUPERABSORBENT HYDROGEL EXTRACTED FROM CITRUS WASTES AS A SOIL AMENDMENT AND NPK FERTILIZER, WHICH REPRESENTS A SUSTAINABLE ALTERNATIVE IN AGRICULTURAL PRODUCTION

El Sayed El Habbasha*[1], Sebastiano Porretta[2], Ahmed M. Youssef[3], Yildiray Istanbullu[4], Ángel Martínez Sanmartín[5], Manuela Pintado[6] and Faten M. Ibrahim[7]

[1]Field crops Research Department., National Research Centre, Dokki, Giza, P.O. 12622, Egypt

[2]Experimental Station for the Food Preserving Industry, Department of Consumer Science, Viale Tanara 31/a,I-43121 Parma, Italy

[3]Packaging Materials Department, National Research Centre, 33 El Bohouth St. (former El Tahrir St.), Dokki, Giza, P.O. 12622, Egypt

[4]Central Research Institute of Food and Feed Control, Adalet M, 1. Hürriyet Cd. No:128,16160 Osmangazi, Bursa, Turkey

[5]National Technological Centre for the Food and Canning Industry (CTNC), C. Concordia, s/n, 30500 Molina de Segura, Murcia, Spain

[6]Universidade Católica Portuguesa, CBQF—Centro de Biotecnologia e Química Fina—Laboratório Associado, Escola Superior de Biotecnologia, Rua Arquiteto Lobão Vital 172, 4200-374 Porto, Portugal

[7]Medicinal and Aromatic Plants Research Department, Pharmaceutical and Drug Industries Research Institute, National Research Centre, Cairo P.O. Box 12622, Egypt

*Contact: elsayedelhabasha@yahoo.com

Abstract

In the frame work of the MEDISMART project (PRIMA-S2-2019), there are many applications were developed from citrus wastes, one of these applications was extracts carboxymethyl cellulose (CMC) based SH hydrogels produced via graft polymerization with acrylic acid (AA) monomers have found extensiveapplication. Where, the hydrogel-encapsulated soluble NPK fertilizer would be the perfect slow- release SH formulation.

Drought is a condition characterized by a low rate of water precipitation, which has a strong impact on the productivity of crops and poses a threat to global food production. In this particular context, the utilization of soil amendments, such as superabsorbent hydrogels extracted from orange waste, presents a potential technological solution for enhancing water use efficiency and increasing crop yields as well as hydrogels derived from orange waste possess favorable attributes for utilization as soil enhancers or bio-fertilizers. They exhibit a high capacity for water absorption,resistance to intense osmotic pressure solutions, and excellent urea absorption capabilities. This study focused

on the synthesis of cellulose-based hydrogels, the characterization of their physical and functional properties, the evaluation of their environmental impact, and their potential as soil amendments. The hydrogel exhibited a pH range of 7.0 to 7.5 and a conductivitybelow 12.0 μS cm^{-1}. Fourier-transform infrared spectroscopy (FTIR) revealed a low-intensity peakin the crystallinity region. The hydrogel demonstrated a swelling capacity of over 200 g of water,along with good resistance to osmotic pressure and high thermos ability, making it suitable for application in hot and arid regions. Furthermore, no potentially hazardous compounds were detected, and there were no adverse effects on soil microorganisms. Thishydrogel have demonstrated the ability to absorb multiple times their weight in urea solution, highlighting their potential as superabsorbent additives. Furthermore, the environmentally friendly method employed in the production process, which eliminates acrylates and acrylamide from the formula, positions our hydrogels as a compelling and more sustainable choice for agricultural purposes. The hydrogel was also found to be safe for use during seed sowing and for promoting seedling development. In a greenhouse pot experiment, the hydrogels significantly increased the biomass of maize shoots and roots, indicating their ability to enhance the overall water-holding capacity of the soil and improve nutrient availability for more efficient plant growth. It is important to emphasize that our hydrogels were primarily crafted from bio-based materials, devoid of epichlorohydrin in the leaching liquid, and had no adverse effects on soil bacteria, indicating the environmental friendliness of our products.In terms of cost-effectiveness, it is likely a more economically viable option as it is composed of carboxymethyl cellulose and cellulose sourced from orange waste. In conclusion, the superabsorbent hydrogel displayed promising characteristics as a soil amendment, with potential for scalability, and represents a sustainable alternative for agricultural applications.

Keywords: superabsorbent hydrogel, citrus wastes, soil amendment, NPK fertilizer, sustainability**.**

53.

USE OF RESULTANT LIGNOCELLULOSIC EXTRACTED FROM CITRUS WASTES AS GREEN FERTILIZER

El Sayed El Habbasha[1*], Ángel Martínez Sanmartín[2], Farid M. Rohim[3], Manuela Pintado[4] Sebastiano Porretta[5], Yildiray Istanbullu[6] and Faten M. Ibrahim[7]

[1]Field crops Research Department., National Research Centre, Dokki, Giza, P.O. 12622, Egypt

[2]National Technological Centre for the Food and Canning Industry (CTNC), C. Concordia, s/n, 30500 Molina de Segura, Murcia, Spain

[3]Horticulture Crops Technology, National Research Centre, Dokki, Giza, P.O. 12622, Egypt

[4]Universidade Católica Portuguesa, CBQF—Centro de Biotecnologia e Química Fina—Laboratório Associado, Escola Superior de Biotecnologia, Rua Arquiteto Lobão Vital 172, 4200-374 Porto, Portugal

[5]Experimental Station for the Food Preserving Industry, Department of Consumer Science, Viale Tanara 31/a,I-43121 Parma, Italy

[6]Central Research Institute of Food and Feed Control, Adalet M, 1. Hürriyet Cd. No:128,16160 Osmangazi, Bursa, Turkey

[7]Medicinal and Aromatic Plants Research Department, Pharmaceutical and Drug Industries Research Institute, National Research Centre, Cairo P.O. Box 12622, Egypt

*Contact: elsayedelhabasha@yahoo.com

Abstract

The use of manure in agriculture is considered an optimal method for valorizing this waste in the framework of the MEDISMART project (PRIMA-S2-2019), because the nutrients in this waste are recycled and reused in a beneficial way for degraded soils. Composting is an effective method for recycling citrus plant leaves, citrus juice industries wastes, farm waste. Various factors influence the composting process, which can be enhanced by adjusting certain parameters. The conversion of biodegradable organic waste into ecofriendly organic manure, however, this organic manure not only enriches the soil's fertility but also enhances soil aeration, while simultaneously reducing environmental pollution. The improvement of the physical, chemical, and biological properties of the soil due to the use of manure as a fertilizer is widely known. Similarly, this organic waste increases crop productivity due to the high content of organic matter and nutrients necessary for plant growth and development. It is now widely acknowledged worldwide that the utilization of chemical fertilizers and other substances is detrimental to soil productivity and contributes to

water and air pollution. The structure and composition of manure improve the properties of the soil, such as: aeration, density, porosity, pH, electrical conductivity, water retention capacity, etc. Additionally, the nutrient content of compost can ensure the growth and development of plants by providing a slow-release source of nutrients that can be taken up by plants as they need them. Producing organic fertilizer through the decomposition of organic waste with the help of microbial inoculums, however, by incorporating different inoculums, the composting duration can be reduced while enhancing the quality of the final product. The content of nutrients in the compost ensures the growth and development of plants over long periods of time, without the need to apply another type of fertilizer for a period of 2–3 years, thus reducing the number of chemical fertilizers. Additionally, by creating a healthy, balanced soil ecosystem, compost can reduce the need for chemical pesticides and herbicides to ensure the maturity and stability of the compost, a range of biological and chemical tests can be conducted. The resulting mature compost is beneficial for plant growth, serving as a safe and effective soil conditioner. This study confirms that composting is an optimal way to improve soil structure and provide essential nutrients for plants.

Keywords: Citrus waste- recycling- composting process- soil's fertility

54.

NOVEL ANTIMICROBIAL COATINGS AND PACKAGING IN THE MEDITERRANEAN. NOVAPACK

Francisco Lorca Salcedo[1], David Quintín Martínez[1], Presentación García Gómez[1], Daniela Magalhães[2], Ana A. Vilas Boas[2,3], Débora Campos[2,3], Adma Melo[2], Lazhar Zourgui[4], Faten M. Ibrahim[5], EL Sayed El Habbasha[6], Manuela Pintado*[2], Nuria López Aznar[7], Agnieszka Kobus[7], Oscar Ballesta Caravaca[8], Amel Chelbi[9].

[1]National Technological Centre for the Food and Canning Industry – CTNC, Murcia, Spain.

[2]Universidade Católica Portuguesa, CBQF – Centro de Biotecnologia e Química Fina – Laboratório Associado, Escola Superior de Biotecnologia, Rua Diogo Botelho 1327, 4169-005 Porto, Portugal.

[3]AgroGrIN Tech® – Rua Alfredo Allen 455, 4200-135, Porto, Portugal.

[4] Gabes University, Higher Institute of Applied Biology Medenine, Research Lab. BMA, Route eljorf Km 22.5, P.Box 5224119 Medenine, Tunisia.

[5] Medicinal and Aromatic Plants Research Department, Pharmaceutical and Drug Industries Research Institute, National Research Centre, Cairo P.O. Box 12622, Egypt.

[6] Field Crops Research Department, National Research Centre, Cairo P.O. Box 12622, Egypt.

[7]AIMPLAS – Asociación de Investigación de Materiales Plásticos y Conexas, Carrer de Gustave Eiffel, 4, 46980, Paterna, Valencia, Spain.

[8] EVERSIA, s/n, Polig. Ind. El Tapiado, 30500 Molina de Segura, Murcia, Spain.

[9]ZINA FRESH. Km 20, road to El Hamma Chenchou Gabes 6095, Tunisia.

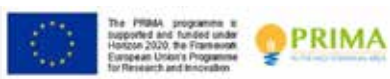
*Contact: mpintado@ucp.pt

Abstract

The NOVel Antimicrobial coatings and PACKaging in the Mediterranean (NOVAPACK) project aims to develop innovative, cost-effective antimicrobial coatings, films, and bio-based packaging that enhance the shelf life and safety of minimally processed food products while reducing food waste and plastic use. The food industry generates considerable by-products, such as non-conforming fruit, peels, pomaces, and seeds. These by-products are considered economical and renewable resources for obtaining diverse valuable compounds. They are rich sources of essential vitamins, minerals, fibres and bioactive compounds, such as phenolic compounds. This research and innovation action focuses on creating novel biodegradable food packaging materials, bio-based films, and coatings tailored for Mediterranean Foods Categories, utilizing waste, losses, and by-products. It explicitly targets fruits and vegetables produced in high

amounts within the region, such as citrus, pomegranates, tomatoes, grapes, and olives, and will provide integrative solutions to be implemented across the food supply chain, reducing environmental impact and improving efficiency. This research seeks to identify, extract, and characterize pectin and other soluble polysaccharides from natural sources to formulate cutting-edge coating materials. A systematic integrative approach was employed, beginning with raw material selection and optimising extraction techniques to maximize the yield and functionality of bioactive compounds. The extracted polysaccharides were analysed for their physicochemical and antimicrobial properties to assess their suitability for new packaging solutions. Furthermore, this research will apply characterization techniques, including spectroscopy, rheology, and microbiological assessments, to evaluate the developed materials' effectiveness.

Keywords: Antimicrobial coatings, bio-based packaging, pectin extraction, polysaccharides, food preservation, sustainability, food waste reduction, circular economy, minimally processed food, novel packaging solutions.



55.

BLOOD4GOODS: VALORIZING PORCINE BLOOD AS A SUSTAINABLE HIGH-PROTEIN AND IRON-RICH INGREDIENT

Llavata, B.*[1]; Valverde, M.[1]; Vega, S.[2]; Florido, J.L.[3]

[1]AINIA - Food Industries. Parque Tecnológico de Valencia, Av. Benjamín Franklin 5-11, 46980 Paterna (Valencia, Spain)

[2]Prolongo-FACCSA. Mataderos industriales Soler, S.A.;Frigoríficos andaluces de conserva de carne, S.A., Plaza Prolongo 1 y 2. 29580 Estación de Cártama (Málaga, Spain)

[3]Keratin. C/ Verdejo 72, 41807 Espartinas (Sevilla, Spain)

*Contact: bllavata@ainia.es

Abstract

Porcine blood is one of the main by-products generated in slaughterhouses, and its high production poses both economic and environmental challenges. However, rather than being a waste product, it is a valuable resource due to its high content of proteins and bioactive compounds. Additionally, it is rich in minerals such as iron, making it a highly interesting ingredient for the food industry.

In this context, the BLOOD4GOODS project aims to transform porcine blood into a functional ingredient with a high protein and iron content that can be incorporated into the formulation of new food products. To achieve this, a patented process developed by Keratin has been applied, utilizing hydrolysis to obtain a final product that is odorless and tasteless, with a protein concentration above 95% and over 2000 mg/100 g of iron.

Thanks to these characteristics, the resulting ingredient can be integrated into various food products without altering their sensory profile while enhancing their nutritional value. The results obtained so far demonstrate the great potential of porcine blood valorization, turning it into a functional and sustainable resource for the food industry.

Acknowledgments:

G.O. BLOOD4GOODS_Valorización del residuo generado por la sangre de vacuno y porcino para aumentar la circularidad de los mataderos.

Este Grupo Operativo como organismo responsable del contenido ha sido beneficiario de una ayuda para la preparación y ejecución de proyectos de innovación de interés general por grupos operativos supraautonómicos de la Asociación Europea para la Innovación en materia de

productividad y sostenibilidad agrícolas (AEI-Agri), en el marco del Plan Estratégico de la PAC de España (PEPAC); cofinanciadas al 80% por el Fondo Europeo Agrícola de Desarrollo Rural FEADER y al 20% por el Ministerio de Agricultura Pesca y Alimentación.

El montante total de la ayuda asciende a 599.959,81€ y el presupuesto del proyecto a 599.959,81€.

Keywords: BLOOD4GOODS; porcine blood; protein; iron; functional foods

56.

CLIMATE SMART AGRI-TECH: INTEGRATING CONTROLLED ENVIRONMENT AGRICULTURE FOR FOOD SECURITY AND PHARMACEUTICAL PLANT PRODUCTION IN THE ARAB REGION (ARAB AGRI-TECH)

Mustapha Gorai[1,*], Mohammed El-Mahrouk[2], Mohammed Al-issawi[3], Sobhia Saifan[4], Almoayied Assayed[5], Abdullah Alrajhi[6], Mays Khazem[7] & Hail Rihan[8]

[1] Laboratory of Biodiversity, Molecules & Applications, Higher Institute of Applied Biology of Medenine, University of Gabes, Tunisia

[2] Department of Horticulture, Faculty of Agriculture, Kafrelsheikh University, Egypt

[3] Department of Field Crops, College of Agriculture, University of Anbar, Iraq

[4] Faculty of Agricultural Technology, Al Ahliyya Amman University, Amman, Jordan

[5] Water, Environment & Climate Change Centre, The Royal Scientific Society, Amman, Jordan

[6] Technology National Center for Sustainable Agriculture Research and Development, Riyadh, Saudi Arabia

[7] Department of Pharmacognosy, Faculty of Pharmacy, Damascus University, Syria

[8] School of Biological and Marine Sciences, Faculty of Science and Engineering, University of Plymouth, UK

* Contact: mustapha.gorai@univgb.tn

Abstract

Climate change, and global warming in particular, is dramatically impacting the Arab region and we urgently need to introduce modern, smart and innovative agricultural technologies that work to develop advanced agricultural production systems and achieve food security. The climate smart Agri-Tech: integrating controlled environment agriculture for food security and pharmaceutical plant production in the Arab region (Arab Agri-Tech) project aims to integrate controlled environment agriculture (CEA) for relevant crop and medicinal plant production in the Arab region, with an arid desert climate. This research uses CEA to address the different environmental impacts on plant production and highlight the trade-off between the different elements of the Water-Energy-Food-Environment (WEFE) nexus.

The consortium gathers a diversified group of leaders from six (06) Arab countries (Egypt, Iraq, Jordan, Syria, Saudi Arabia, and Tunisia) that ensures the know-how, engages with key innovative companies (private actors) and promotes its participatory action and fully addresses the involvement of science and industry (R&I). The challenge of Arab Agri-Tech consists in solving the

problems of arid climate to mitigate water scarcity and a worrying socio-economic context as well as pooling resources. Furthermore, extensive use of ecosystem services, economic incentives, market innovations, and stakeholder synergies should be integrated into food security and plant pharmaceutical resilience. This research seeks to introduce the advanced CEA technology to the Arab world to produce strategic crops for food security and important pharmaceutical plant species by generating a better income for the farming community. The proposed system can be easily adapted for the growth of specific individual crops, to facilitate the development of a major new horticulture supply model in the market.

Keywords: Climate Change, Controlled Environment Agriculture (CEA), Food security; Nutritional value; Wild medicinal plant production chain; Smart agriculture, Sustainable production

Acknowledgments:

This work was funded by the Arab Research & Innovation Co-Funded Alliances (ARICA) of the Federation of Arab Scientific Research Councils (FASRC) related to the League of Arab States; Project code: ARICA23-906. The authors thank the staff members of FASRC for supporting the completion of this work.

57.

NUTRIALITEC. ECOSYSTEM FOR PROMOTING FOOD INNOVATION: SUSTAINABLE EXTRACTIVE AND OMIC TECHNOLOGIES AT THE SERVICE OF FUNCTIONAL NUTRITION

[*1]Pablo Flores, [2]M. Pilar García, [3]Javier Campión, [4]Luis Tejada, [5]Lorenzo Torreni, [6]Fernando Boned.

[1]National Technological Centre for the Food and Canning Industry – CTNC, Murcia, Spain.

[2]CTAEX Agricultural and Food Technological Centre – CTAEX, Badajoz, Spain.

[3]GOe Tech Center, Technology Center in Gastronomy, Basque Culinary Center, Donostia-San Sebastián, Spain.

[4]UCAM Catholic University of Murcia, Murcia, Spain.

[5]oloBion SL, Barcelona, Spain

[6]Artica Ingenieria E Innovacion SL.

*Contact: pabloflores@ctnc.es

Abstract

The challenge is to valorize and give a second life to the vast amount of byproducts currently generated during agro-industrial activities, with the aim of obtaining novel and healthy ingredients within the framework of a sustainable food model. All of this is encompassed in a shift toward a dietary pattern that includes more plant-based foods, which would provide environmental benefits, nutrient adequacy, and better health.

The entities that make up the innovative ecosystem management group have a portfolio of specialized services: R&D services, consulting, analytics, training, environmental impact studies, among others, which will be enhanced through effective collaboration to respond to the sector.

The NUTRIALITEC group has designed actions aimed at companies, knowledge-generating entities, and administrations involved in the bioingredient value chain. The implementation of these activities will lead to significant developments in the functional bioingredient value chain, including extraction protocols, chemical and functional characterization using omics techniques, delivery of bioingredients in food matrices and nutritional supplements, optimization of their release, toxicity control, and analysis of their efficacy in nutritional, medical, and therapeutic fields.

NUTRIALITEC is open to companies and business associations in the agri-food sector, companies in the pharmaceutical, medical, nutrition, and cosmetics sectors interested in the use

of bioingredients, as well as research centers, technology centers, and universities developing technology in these areas.

NUTRIALITEC Innovation Ecosystem (ECO-20241004), funded by the CDTI and supported by the Ministry of Science, Innovation and Universities of the Government of Spain

Keywords: Bioingredients, healthy ingredients, healthy food, nutrition, lifestyle, diet, health benefits, omics technologies, cosmetic, new food products, prebiotics, functional.

58.

LABELLING AND TRACEABILITY OF POTATOES IN THE CANARY ISLANDS: AN ISOTOPIC APPROACH

Raúl S. Suárez-Torres[1*], Samara M. Dionis[1], Ricardo Díaz-Díaz[1]

[1]Department of Environmental Analysis, Technological Institute of the Canary Islands, C/Los Cactus, 68 35118, Polígono Industrial de Arinaga, Agüimes, Las Palmas, Canary Islands, Spain

*Contact: rsuarez@itccanarias.org

Abstract

The Potato (*Solanum tuberosum L.*) is a staple food in the diet of the Canary Islanders. In this outermost region of the European Union, potato cultivation has an important cultural and economic value. Currently, local production cannot meet the high demand for potatoes, leading to imports from the others countries, with the United Kingdom (UK) being the main supplier. This dependence on international markets is necessary to satisfy local demand. However, competition with local production is intensified by inadequate labelling practices in local markets, which can contribute to food fraud and mislabelling issues. In this work, carbon isotope ratios were studied by Elemental Analysis Isotope Ratio Mass Spectrometry (EA-IRMS) to determine their usefulness to verify the authenticity and geographical origin of these crops. A total of 168 potato samples identified as locally grown (Canarias, N = 123) and imported (UK, N = 22; Cyprus, N = 9; Egypt, N = 9; Israel, N = 5) were collected from marketplaces in Canary Islands between 2021 and 2023. The samples were processed and freeze-dried and milled for isotopic analysis. The carbon ($\delta^{13}C$) isotope ratios were determined using the standard delta notation formula (Coplen, 2011), where values are expressed to a reference standard in part per thousand (‰). Statistical analysis was performed to the samples using open-source software. First, the $\delta^{13}C$ values were grouped according to the origin of the samples, showing statistically significant differences between imported and local potatoes. Cypriot, Egyptian and Israeli samples showed very different values, while UK samples were closer to the Canarian samples. Secondly, the samples were analysed according to the place where they were purchased (supermarkets, public market and the countryside). Outliers were detected in samples purchased in public market, which could be due to mislabelling. In supermarkets, traceability showed better data consistency, with a lower data dispersion than in other data sets, but inconsistencies were still found. One-way analysis of variance (ANOVA) confirmed statistically significant differences according to geographical origin, showing that samples from the Canary Islands showed significantly different $\delta^{13}C$ values. However, food fraud and the geographical origin of potatoes marketed in the Canary Islands cannot be rigorously identified by this parameter alone. Additional analytical parameters must be added to develop a robust mathematical classification model. Finally, collaboration with local farmers and authorities is needed to increase the database and improve marketing control.

59.
ADAPTA INDUSTRIA PROJECT

César Nicolás Martínez, Antonia María Ruiz Gandía y José Ramón Miralles Silvestre*
Agrupación de Industrias Alimentarias de Murcia, Alicante y Albacete – Agrupal, Murcia, Spain
*Contact: agrupal@agrupal.com

Abstract

Objectives: Development of a self-diagnosis manual for risks and the integration of climate change adaptation in the food industry, through the selection of methodologies and successful experiences discussed in technical seminars, their implementation through pilot projects in companies in eastern Spain, and the development of training, experience-sharing, and awareness-raising activities.

Duration: 2023, 2024 and 2025

Activities:

1. Outreach and Communication
2. Development of an initial knowledge base
3. Development of four technical seminars
4. Drafting of a methodological manual for climate risk self-assessment
5. Implementation of two specific training courses for company technicians
6. Implementation of self-assessments through pilot projects
7. Creation of a space for disseminating information sources, success stories, and case studies. “Campus Adapta Industria” (Industry Adaptation Campus)
8. Conducting two awareness-raising sessions for project writers and company CEOs
9. Estimation of the adaptations and changes that will be generated in the sector thanks to the commitments achieved in the project and the diagnosis generated.

Through the development of this project, the various risks facing the food industry in the future due to the impact of climate change on its production activities have been identified, and various adaptation measures have been established that companies in the sector can implement in the future. Various training activities and four outreach sessions have been conducted, and more than 25 companies in the sector have participated in the project, developing pilot projects for adapting to climate change.

Acknowledgements:

Fundación Biodiversidad.

60.

NEW SUSTAINABLE PROTEINS FOR FOOD, FEED AND NON-FOOD BIO-BASED APPLICATIONS. INNOPROTEIN PROJECT

Irene Ríos Grau*

AIMPLAS, Valencia Technology Park, C. Gustave Eiffel 4, 46980 Paterna, Valencia, SPAIN

*Contact: irios@aimplas.es

Abstract

The INNOPROTEIN project addresses one of the critical global challenges: how to sustainably produce enough high-quality proteins for a projected population of 10 billion by 2050, while minimizing environmental and resource impact. The European Union, heavily reliant on protein imports—especially soy—faces a significant "protein gap." INNOPROTEIN seeks to close this gap by developing new, sustainable protein sources for use in food, animal feed, and other bio-based applications. These sources include single-cell proteins from microalgae, bacteria, and fungi, as well as insect-derived proteins.

Aligned with the European Green Deal and the Farm to Fork Strategy, the project emphasizes circular economy principles and zero-waste approaches. It aims to build robust, sustainable protein value chains that meet consumer and industrial needs. With a strong consortium of 15 partners from 9 countries—including research institutions, SMEs, and NGOs—INNOPROTEIN spans multiple disciplines and sectors. Over 48 months, the project will demonstrate technological innovations and raise awareness among consumers and industry, ultimately enhancing Europe's self-sufficiency in protein production.

61.

CHARACTERIZATION OF LOW- CADMIUM ACCUMULATING GENOTYPES IN BREAD WHEAT (TRITICUM AESTIVUM L.).

Haitham Mokhles Saad Khatlan, Mohammed Hamdan Edan Al-Issawi*

Department of Field Crops – College of Agriculture– University of Anbar- Iraq

*Contact: ag.mohammed.hamdan@uoanbar.edu.iq

Abstract

Wheat is the widely consumed cereal for human nutrition, particularly in the Middle East. However, when grown in areas contaminated with heavy metals, it can become a source of cadmium (Cd) entering the food chain and, eventually, the human body. The use of low-accumulated cadmium genotypes would be the most effective and eco-friendly method for excluding Cd from the food chain. In this context, the study investigated the effect of Cd on many genotypes of wheat to characterise the low Cd-accumulating genotypes suitable for human and animal nutrition, besides characterising those that accumulate a higher amount of Cd, which could be used as phytoremediation. Heavy metal toxicity is a real threat to the environment, crop productivity, and the health of humans and animals, especially when the toxicity enters the food chain. This study investigates the effect of cadmium on the physiological and molecular levels of ten introduced wheat genotypes. Genotypes were stressed by cadmium (75 mg L^{-1}) in comparison with the unstressed treatment to highlight their response to the cadmium. The experiment was laid out as a factorial arrangement in RCBD, with three replicates. The genotypes included in this study varied in their response to cadmium stress during the laboratory tests. Notably, genotype G-41 was superior to the rest of the genotypes in terms of seed vigour (18.58), chlorophyll content (8.72 mg g^{-1}), and carotenoid content (4.87 mg g^{-1}). In contrast, genotype IRAQ had wider epidermis in the root (2.28 µm) and ordinary epidermis cells (3.10 µm). Cadmium boosted some physiological and anatomical traits, including REC, Chlorophyll, carotenoids, length and width of root epidermis cells. However, cadmium concentration caused a deterioration in some anatomical characteristics, including cortex thickness and the length of the ordinary epidermis cells. Some wheat genotypes showed more resistance to cadmium stress than others, and G-3 was notably affected by cadmium treatment. It can be concluded that cadmium reduced the physiological performances except for some genotypes that showed more tolerance. The results showed that all genotypes grown in cadmium-contaminated soil had high cadmium content in their roots. Only genotype G-39 had a low cadmium content in its stems and leaves, within the permissible limits. Meanwhile, genotypes G-28 and G-29, as well as the cultivar Diyar, showed low cadmium content in grains, within the allowable limits. In addition, genotypes G-4 and G-24, as well as the cultivar Iraq, also showed low cadmium content, but slightly exceeding the permissible limits.

Those genotypes could therefore be investigated further to assess the accumulation of cadmium in their grains.

Keywords: Wheat Genotypes, Pollution, Wheat grains, Cadmium, Anatomy.

Acknowledgements:

This work is part of the master's degree studies of the first author (Haitham Mokhles Saad Khatlan).

62.

EMPOWERING AGRI-FOOD AND LOGISTICS INNOVATION IN CONTINENTAL EUROPE AND OUTERMOST REGIONS: INSIGHTS FROM THE STARRISE PROJECT

Lucía Dobarro Delgado, Teresa Rodríguez González and Jose Benito Brito Guedes

Instituto Tecnológico de Canarias S.A.

*Contact: starrise@itccanarias.org

Abstract

The STARRISE Project, funded by the European Union, aims to foster innovation and collaboration within the agri-food and logistics sectors, particularly in less developed and Outermost Regions of the EU. Through a comprehensive journey encompassing capacity-building activities, mentorship, and networking opportunities, STARRISE supports SMEs and stakeholders in developing sustainable and impactful innovation projects and interconnected regional ecosystems. Key components include ecosystem building workshops, hybrid hackathons, masterclasses on innovation management, tailored training programs, matchmaking activities and personalised support with experts. By leveraging interregional collaboration and promoting resilience, the project enhances knowledge transfer, strengthens regional innovation ecosystems, and facilitates integration into EU value chains. This poster highlights the methodologies, outcomes, and future directions of the STARRISE journey, showcasing its pivotal role in driving technological advancements and sustainable practices in the agri-food and logistics sectors.

Partners.

Latvian Technology Center. IMP³ROVE - European Innovation Management Academy. Institute of Entrepreneurship Development (iED). Instituto Tecnológico de Canarias (ITC). INOVA+. Agenţia de Dezvoltare Regională - ADR Nord-Vest. Chambre de Commerce et d'Industrie de la Martinique (CCIM).

Web: https://starriseproject.eu/

63.

VALORIZATION OF THE *GAZPACHO* BY-PRODUCT AS A FUNCTIONAL INGREDIENT FOR FOOD AND FEED.

Inmaculada Moscoso-Ruiz[1]*, Raquel del Pino-García[1], Álvaro Rodríguez-Pascual[1], David Manteca-Bautista[1], Inés Cea-Pavez[1], Armando Lara-Cambil[1], Vito Verardo[1,2,3]

[1]Centro de Investigación y Desarrollo del Alimento Funcional (CIDAF), Avda. Del Conocimiento, 37, 18016 Granada, Spain.

[2]Institute of Nutrition and Food Technology 'José Mataix', Biomedical Research Centre, University of Granada, Avda. Conocimiento s/n, 18100, Granada, Spain.

[3]Department of Nutrition and Food Science, University of Granada, Campus of Cartuja, 1811, Granada, Spain.

*Contact: imoscoso@ugr.es

Abstract

The tomato processing industry generates large volumes of byproducts rich in bioactive compounds, offering both environmental challenges and opportunities for revalorization since, from a circular bioeconomy perspective, they can be used to develop functional ingredients. In this context, the byproduct generated during *gazpacho* production, primarily composed of tomato skins and seeds, stands out as a rich source of carotenoids and phenolic compounds with potent antioxidant properties. These bioactive compounds are crucial not only for their role in mitigating oxidative stress-related diseases but also for their potential application in enhancing the stability and shelf life of food products.

Objective: This study aims to characterize the content of bioactive compounds in *gazpacho* byproduct, as well as in the innovative functional ingredients, foods, and feeds developed within the CHERRY4FOOD project to valorize this byproduct.

Methodology: The *gazpacho* byproduct (GB) was dried in an infrared oven at 80 °C until its moisture content was reduced below 10%, then ground and sieved to a particle size of 2 mm. This *gazpacho* functional ingredient (GFI) was used in the formulation of a ruminant concentrate feed in which it was incorporated at 15% (GFe), allowing to reduce the soybean content of the base feed (BFe) by 25%, while also replacing, reducing or increasing other ingredients. As an innovative food prototype, Mediterranean-flavored meal replacement bars incorporating the GFI at 2% were developed at both pilot scale (GPB) and industrial scale (GIB). In all these products, total carotenoids and total phenolic compounds were evaluated by spectrophotometry,

while lycopene and β-carotene contents were quantified by HPLC-DAD. In addition, the oxidative stability of GFI was evaluated over 3 months, determining the content of total carotenoids and phenols and total antioxidant capacity (ABTS and DPPH).

Results/Discussion: GFI retain a significant amount of the bioactive compounds present in GB, with lycopene being the most susceptible to processing, whereas phenolic compounds are more concentrated in GFI. GFe, GPB and GIB also retain most of the phenolic compounds present in GFI, whereas their carotenoid content was significantly lower. It was also observed that GFI suffered around 22% decrease in its content of total carotenoids during the first month of storage, remaining more stable over the next 2 months, whereas its total phenolic content and total antioxidant capacity was not affected by storage.

Conclusion: The byproduct generated during *gazpacho* production can be valued as a functional ingredient rich in carotenoids and phenolic compounds for the production of food and feed, preserving the majority of said bioactive compounds and their antioxidant activity during storage, although the carotenoid content may be affected by processing.

NOTAS / NOTES

NOTAS / NOTES

NOTAS / NOTES

Centro Tecnológico Nacional de la Conserva y Alimentación

MURCIA Food 25

XII INTERNATIONAL SYMPOSIUM FOOD TECHNOLOGY

SYMPOSIUM AND FOOD BROKERAGE EVENT

Comité técnico · Technical Committee

Comité organizador · Oganizing Committee

Proyecto INFO RENOVA, Modalidad 2 Exp. nº 2024.08.CT02.000001

Colaboradores · Collaborators