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Transcolab Summit
Trend in grain-based foods
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Title

Trends in grain-based foods

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1° Trends in grain-based foods

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Trends in grain-based foods

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About

TRANSCOLAB is a European project that brings together universities, research centres, foundations, and companies from Castilla y León and Northern Portugal. This project intends to strengthen the connection between research institutions and companies, identifying the challenges and needs of the cereal industry and the existing scientific-technological capacities of the participating entities. It also aims to generate novel products, promote knowledge and innovation transfer, and develop a series of actions to promote innovative products and processes in the cereal sector, particularly in bakery and pastry.

Therefore, and because the project is coming to an end, the TRANSCOLAB partners organised an international congress, bringing together researchers and professionals to share innovative ideas in this field. The congress is divided into four different topics:

1. Past as key to the future (ancient grains, wholemeal products, and sourdoughs)
2. New Ingredients in grain-based products (Pseudocereals, pulses, and new flour sources)
3. Novel technologies, processes, and products
4. Sustainability and Circular economy.

The TRANSCOLAB SUMMIT team would like to thank you for your application to the congress, contributing to its success, with more than 170 registrations. The submitted works were received, processed, divided into two main categories (Oral Communications and Posters), and later distributed according to the aforementioned topics. In total, 34 Oral and 42 Panel Communications will be presented, joined by three Technical Communications and six plenary lectures. Moreover, the TRANSCOLAB SUMMIT will start with a Traditional and Innovative Bakery workshop, with 45 participants. On the SUMMIT's last day, we will have a discussion panel regarding "Myths and truths regarding cereal consumption". Once again, we would like to thank you all for attending our congress, and we hope to see you again at future research events.

The TRANSCOLAB SUMMIT team.

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Keynote Information

Trends in grain-based foods

SUSTAINABLE INGREDIENTS, PROCESSES AND PRODUCTS

Past as key to the future

(ancient grains, wholemeal products, and sourdoughs)

Alessandra Marti, Ph.D

Associate Professor at the Department of Food, Environmental and Nutritional Sciences at the Università degli Studi di Milano, Italy.
Her main research activity focuses on understanding the effects of processing on the interactions among starch, protein, fibre and water - the main components in grains and related products – as well as their role on the quality of final products with particular attention to bread and pasta. Furthermore, she's involved in the development of fibre-enriched products, gluten-free products and in the exploitation optimization of legumes, minor cereals, pseudocereals, and perennial crops

Carlo Giuseppe Rizzello, Ph.D

Full Professor in Food Microbiology at La Sapienza University of Rome, (Department of Environmental Biology), Italy.
His area of expertise includes proteomics and enzymology of lactic acid bacteria; bioactive compounds; nutritional and functional aspects of fermented foods; fermented food biotechnologies; biotechnological protocols for the food wastes valorisation
He is member of the editorial boards of International Journal of Food Microbiology and Foods, and guest associate Editor for Frontiers in Nutrition, Frontiers in Microbiology and Fermentation. Moreover, he was scientific responsible for technology transfer projects (ca. 60) with many industries af the agri-food sector.

Trends in grain-based foods

SUSTAINABLE INGREDIENTS, PROCESSES AND PRODUCTS

New Ingredients in grain-based products
(Pseudocereals, pulses, and new flour sources)

Claudia Monika Haros, Ph.D

Graduated in Chemist, MSc in Bromatology and Food Technology and Biology Analysis and Ph.D in Chemistry. She's permanent staff of CSIC and continues her investigation in the Cereal Group, Department of Food Science of IATA.
The major theme in Dr. Haros's research is the utilization of different strategies to improve nutritional and/or functional value of cereal by-products or cereal ingredients. These strategies include use different physical, biochemical, or biological treatments during milling cereal process; development new cereal by-products by including novel ingredients. In recent years her research focused on: Nutritional studies of vegetable raw materials and/or their by-products on their biological activity for their subsequent integration into new food matrices.

Laura Román, PhD

She's a Novo Nordisk postdoctoral scientist working at the Department of Food Science at Aarhus University. Her current research efforts center on the understanding of the molecular details of structure formation in plant-based food systems. Her work lies at the interface between molecular structures and physical chemistry of biomaterials.
Her current project focuses on physicochemical studies of protein-starch interactions in complex biopolymer matrices, with a multidisciplinary approach. The overall goal is to understand the conformational and supramolecular mechanisms that lead to the interactions between plant-based proteins and starch during processing, critical to develop more sustainable and nutritious functional plant-based foods.

Trends in grain-based foods

SUSTAINABLE INGREDIENTS, PROCESSES AND PRODUCTS

Novel technologies, processes, and products

Mario Martínez, Ph.D

He's adjunct Assistant Professor at the Whistler Center for Carbohydrate Research (Purdue University, IN, USA) and at the Department of Physics of the University of Guelph (ON, Canada). Developed a research portfolio on food carbohydrates and associated metabolites that can be encompassed by three distinct competence areas (glycomics, structuring and health-promoting compounds).
Since 2017, Mario works on the fundamentals aspects related to the molecular and supramolecular architecture of glycans, structuring technologies of plant-based foods, health-promoting compounds, and glycan-based packaging solutions. All in all, Mario ´s team relies on coherent and focused food system approaches to find common ground for health and environmental sustainability.

Sustainability and Circular economy

Maria Manuela Estevez Pintado, ph.D

She's currently Associate Professor of the College of Biotechnology of the Portuguese Catholic University (ESB-UCP), Associate Director of School of Biotechnology from Universidade Católica Portuguesa (ESB-UCP, Porto, Portugal) and the director of CBQF (Chemistry and Biotechnology Center – State Associate Laboratory). In research field she is Leader of Biobased and Biomedical Group and Head of Bioactive and Bioproducts Research Laboratory.
The research can be summarized into: (i) development, compositional characterization and validation of bioactivity of functional and bioactive ingredients (ii) by-product and new resources valorization through bioprocesses (iii) application of the above research developments to other Biotechnological fields

Schedule

Trends in grain-based foods

SUSTAINABLE INGREDIENTS, PROCESSES AND PRODUCTS

MARCH 24TH, MORNING

9:00-9:30 OPENING SESSION
LILLIAN BARROS - SUMMIT CHAIR
NUNO RIBEIRO - DIRECTOR OF ESTIG
LUÍS PAIS - VICE-PRESIDENT OF IPB
ISABEL FERREIRA - STATE SECRETARY OF INLAND IMPROVEMENT

9:30-13:00 SECTION 1: PAST AS KEY TO THE FUTURE
CHAIRS: SANDRINA HELENO AND MÁRCIO CAROCHO

09:30-10:00 PLENARY SESSION 1: ALESSANDRA MARTÍ

10:00-11:00 ORAL SESSION 1

10:00-10:10 RITA BELTRÃO MARTINS
"ACORN FLOUR: AN INGREDIENT FROM THE PAST READY FOR THE FUTURE"

10:10-10:20 KATERINA ATHINAIOU
"TECHNOLOGICAL AND NUTRITIONAL CHARACTERIZATION OF WHEAT FROM ANCIENT CROPS"

10:20-10:30 VANÉZIA ROCHA
"BROADENING FOOD SECURITY THROUGH GRAIN-BASED SOLUTIONS: AFRICAN MILLETS AND THEIR CABO VERDE AN WILD RELATIVE"

10:30-10:40 CARLA BRITES
"RICE AUTHENTICITY & TRACEABILITY, ELEMENTS OF SUSTAINABILITY AND QUALITY DIFFERENTITION"

10:40-10:50 MANUEL AYUSO
"COMPARATIVE ANALYSIS OF THE CHEMICAL COMPOSITION OF DIFFERENT PORTUGUESE BREAD"

10:50-11:00 MARIA OTILIA CARVALHO
"THE IMPACT OF TRIBOLIUM CASTANEUM INFESTATIONS ON QUALITY OF WHEAT FLOUR FOR BREAD-MAKING"

11:00-11:30 COFFEE BREAK AND POSTER SESSION

11:30-12:30 ORAL SESSION 2
CHAIRS: ELIANA PEREIRA AND ANGELA FERNANDES

11:30-11:40 ANA CATARINA RIBEIRO
"YEAST PROTEIN EXTRACT AS AN ALTERNATIVE PROTEIN IN THE FORMULATION OF MAYONNAISE"

11:40-12:00 STEFAN LUNDGREN (PERKINELMER)
"MEASURING INGREDIENT PERFORMANCE, CHARACTERIZING PROCESSING EFFECTS, AND DODGING BULLETS IN THE PLANT PROTEIN WILD WEST"

12:00-12:15 ISABEL REINAS
"INNOVATION IN BAKERY AND PÂTISSERIE INDUSTRY - THE CASE OF TECPAN"

12:15-12:30 JUAN CARBAJO AGUIRRE
"COLLABORATE TO MOVE FORWARD"

12:30-13:00 PLENARY SESSION 2: CARLO GIUSEPPE RIZZELLO

Trends in grain-based foods

SUSTAINABLE INGREDIENTS, PROCESSES AND PRODUCTS

MARCH 24TH, AFTERNOON

15:00-18:30 SECTION 2: NEW INGREDIENTS IN GRAIN-BASED PRODUCTS
CHAIRS: MANUEL AYUSO AND FILIPA REIS

15:00-15:30 PLENARY SESSION 3: CLAUDIA M. HAROS

15:30-16:30 ORAL SESSION 3

15:30-15:40 MARIA INÊS DIAS
"NON-CONVENTIONAL SEEDS FOR THE DEVELOPMENT OF NEW BAKERY PRODUCTS: A NEW TREND OR MYTH?"

15:40-15:50 CARLOS SHIRAISHI
"FIG (FICUS CARICA L.) BIORESIDUES AS SOURCES OF BIOACTIVE COMPOUNDS AND NATURAL PIGMENTS FOR THE FOOD INDUSTRY"

15:50-16:00 MARTA MESIAS
"RISK/BENEFITS OF NEW INGREDIENTS ADDED TO NOVEL CEREAL-BASED FORMULATIONS"

16:00-16:10 ANABELA RAYMUNDO
"MICROALGAE AS A VALUABLE INGREDIENT FOR BREAD ENRICHMENT: INFLUENCE ON THE DOUGH RHEOLOGY AND BREAD MAKING PERFORMANCE"

16:10-16:20 MARÍA FRANCO
"PSYLLIUM: A NATURAL BAKERY IMPROVER"

16:20-16:30 YAMINA ABSI
"MINERAL AND PROXIMATE COMPOSITION OF COMMERCIAL PLANT-BASED FLOURS"

16:30-17:00 COFFEE BREAK AND POSTER SESSION

17:00-18:00 ORAL SESSION 4
CHAIRS: BRUNO MELGAR AND MIGUEL PRIETO

17:00-17:10 JESÚS MARÍN SÁEZ
"CEREALS AND PSEUDOCEREALS CONTAMINATED WITH TROPANE ALKALOIDS: ANALYTICAL TOOLS TO ASSURE FOOD SAFETY"

17:10-17:20 BEATRIZ NUNES SILVA
"OPTIMISATION OF HYDROCOLLOIDS DOSES IN GLUTEN-FREE BREAD MADE OF FLAXSEED AND RED LENTILS FLOUR BLEND"

17:20-17:30 FERNANDA FERREIRA
"A BREAKTHROUGH ON BREAD FORMULATION: NATURAL MINERAL WATER AS A NOVEL FUNCTIONAL INGREDIENT"

17:30-17:40 ELEOMAR PIRES
"HYDROETHANOLIC EXTRACT OF OCIMUM BASILICUM 'CINNAMON' AS A NATURAL PRESERVATIVE FOR THE FOOD INDUSTRY"

17:40-17:50 VANESSA VIEIRA
"THE POTENTIAL OF AROMATIC EXTRACTS TO ENHANCE THE SENSORY PERCEPTION OF BREAD"

17:50-18:00 ISABEL SOUSA
"DAIRY GLUTEN-FREE BREAD: TECHNOLOGICAL, NUTRITIONAL, AND FUNCTIONAL ENHANCEMENT BY CURD CHEESE SUPPLEMENTATION"

18:00-18:30 PLENARY SESSION 4: LAURA ROMÁN

20:30 DINNER

Trends in grain-based foods

SUSTAINABLE INGREDIENTS, PROCESSES AND PRODUCTS

MARCH 25TH, MORNING

9:00-12:30 SECTION 3: NOVEL TECHNOLOGIES, PROCESSES, AND PRODUCTS
CHAIRS: MARIA INÊS DIAS AND CARLA PEREIRA

09:00-9:30 PLENARY SESSION 5: MARIO MARTÍNEZ

9:30-11:10 ORAL SESSION 5

9:30-9:40 RICARDO N. PEREIRA
"ELECTRIC FIELDS - A PROMISING TECHNOLOGY TOWARDS SUSTAINABLE PROCESSING OF GRAIN-BASED FOODS"

9:40-9:50 ERIKA N. VEGA
"EXTRUDED FORMULATIONS BASED ON RICE AND CHICKPEA: DIETARY FIBER AND OLIGOSACCHARIDES"

9:50-10:00 LIEGE PASCOALINO
"BREAD FREEZING AS A NEW ALTERNATIVE TO CONSUMPTION"

10:00-10:10 CAROLA CAPPA
"STUDY OF THE TURBO-TECHNOLOGY POTENTIAL IN THE PRODUCTION OF GLUTEN-FREE INGREDIENTS AND POTATO-BASED PASTA"

10:10-10:20 ÁNGEL L. GUTIÉRREZ
"APPLICATION OF SHORT-TIME HIGH HYDROSTATIC PRESSURE TREATMENTS TO WHOLE BUCKWHEAT GRAINS TO MODULATE THE FUNCTIONAL PROPERTIES OF THE RESULTING FLOURS"

10:20-10:30 ANTONIO J. VELA
"PHYSICAL MODIFICATION OF RICE FLOUR VIA ULTRASONICATION. INFLUENCE OF TREATMENT TIME AND TEMPERATURE"

10:30-10:40 NATALIA P. VIDAL
"IMPROVING THE NUTRITIONAL VALUE OF COLD-PRESSED OILSEED CAKES THROUGH EXTRUSION COOKING"

10:40-10:50 COSTANZA CECCANTI
"ENRICHMENT OF FRESH EGG PASTA WITH ANTIOXIDANT EXTRACTS OBTAINED FROM WILD ITALIAN PLANTAGO CORONOPUS L. AND CHICORIUM INTYBUS L. AND QUALITY CHARACTERISATION OF THE FRESH END PRODUCT"

10:50-11:00 ROSALIA LOPEZ-RUIZ
"NEW INGREDIENTS IN THE PREPARATION OF COOKIES TO MITIGATE ACRYLAMIDE CONTENT"

11:00-11:10 MIRIAM HERNANDEZ-JIMENEZ
"APPLICABILITY OF NEAR INFRARED SPECTROSCOPY ON WHEAT FLOUR SUPPLEMENTED WITH LENTIL FLOUR"

11:10-11:30 COFFEE BREAK AND POSTER SESSION

Trends in grain-based foods

SUSTAINABLE INGREDIENTS, PROCESSES AND PRODUCTS

MARCH 25TH, MORNING/AFTERNOON

11:30-12:50 SECTION 4: SUSTAINABILITY AND CIRCULAR ECONOMY
CHAIRS: CRISTINA CALEJA AND JOSÉ PINELA

11:30-12:00 PLENARY SESSION 6: MANUELA PINTADO

12:00-12:10 ISABEL MARIA FERREIRA
"FLOURS MADE FROM FRUIT BY-PRODUCTS AS SUSTAINABLE INNOVATIVE INGREDIENTS: ARE THEIR MINERALS BIOACCESSIBLE?"

12:10-12:20 ROSSANA CARDOSO
"CEREAL MILLING BY-PRODUCTS AS SOURCES OF NUTRIENTS AND ANTIOXIDANT PHENOLIC COMPOUNDS"

12:20-12:30 HANINE HACHED
"RESPONSE SURFACE METHODOLOGY APPLIED TO ESSENTIAL OIL EXTRACTION OF EUCALYPTUS LEAVES"

12:30-12:40 TERESA SIGÜENZA-ANDRÉS
"DEVELOPMENT OF A FERMENTED PLANT-BASED BEVERAGE FROM DISCARDED BREAD FLOUR"

12:40-12:50 FILIPA MANDIM
"STUDY OF THE PHENOLIC PROFILE AND BIOACTIVE POTENTIAL OF CARDOON BRACTS AS A PROMISING FUNCTIONAL INGREDIENT"

13:00-14:30 LUNCH TIME

14:30-16:00 DISCUSSION PANEL: "MYTHS AND TRUTHS ABOUT CEREAL CONSUMPTION"
CHAIR:
SILVIA BRANDÃO
SPEAKERS:
ELISABETE FERREIRA
MARIA FRANCO
JORGE PASTOR MORENO
MANUEL GOMES PALLARES
EDUARDO VILLAR ROMO
GEMMA DEL CAÑO
EDUARDO TALLON

16:00-16:30 CLOSING SESSION AND CLOSURE OF THE TRANSCOLAB PROJECT (LANGUAGE: SPANISH & PORTUGUESE)

16:30 PORTUGUESE WINE

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FIG (*FICUS CARICA* L.) BIORESIDUES AS SOURCES OF BIOACTIVE COMPOUNDS AND NATURAL PIGMENTS FOR THE FOOD INDUSTRY

Carlos S. H. Shiraishi[1,2], Yosra Zbiss,[1,4], Custódio L. Roriz[1], Marcio Carocho[1], Sara Domingos[2], Ricardo C. Calhelha[1], Maria José Alves[1], Rui M. V. Abreu[1], Miguel A. Prieto[3], Sandrina Heleno[1] and Lillian Barros[1*]

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The 17 goals of sustainable development address several topics, such as: (2) Zero hunger and sustainable agriculture; (9) Industry, Innovation, and Infrastructure; (12) Responsible consumption and production; that are essential for the promotion of the circular economy, product development and conscious production [1]. Fig is a food matrix, cultivated in Portugal and valued by the Portuguese people for consumption in natura, being also used in wines, liqueurs, and jams. As this fruit is very appreciated and consumed, it´s cultivation leads to the production of tons of leaves, usually discarded [2].

Therefore, in the present work, the leaves of five fig varieties (Figure 1), namely Dauphine (Da), Longue d'Aout (La), Pasteliere (Pa), Marseille (Ma) and Bourjassote Noire (Bn), were nutritionally and chemically characterized to detect possible bioactive molecules. The antioxidant and antimicrobial, activities were also analyzed, to provide the food industry with natural additives in alternative to the artificial ones; and at the same time, promote the circular economy.

Regarding the nutritional profile of the five leaves, La sample exhibited the highest amount in proteins (18.0±0.6 g/100g dw), while Pa revealed the highest content in fats (2.2±0.1 g/100g dw). The highest moisture content was presented by Da leaves (17.3±0.1 g/100g fw), and for the ashes, La sample was the one that presented the highest value (14.18±0.06 g/100g fw).

Concerning the organic acids, these molecules were most abundant in Ma leaves, where it was possible to identify oxalic, malic and citric acids with a total of 139.6±0.4 mg/g dw. For the soluble sugars profiling, in all samples it was possible to identify five sugars, namely, fructose, glucose, sucrose, trehalose, and raffinose in different concentrations; however, Da leaves revealed the higher amount (17±1 g/100g dw). Tocopherols where also analyzed, and in all samples, three of the four isoforms where detected, being Pa sample standing for the predominance of these compounds (4.14±0.05 mg/100 g dw).

For the bioactive analysis, different assays were performed, and Pa sample showed the strongest antioxidant potential for the TBARS assay, with an EC_{50} value of 105±5 mg/mL. For the antimicrobial activity assay, Da leaf extract was the one displaying the best results, by presenting Minimum Inhibitory Concentrations (MIC) ranging from 1.25 to 10 mg/mL against the tested bacterial strains. On the other hand, for the antifungal activity, the samples present very similar profiles, with the exception of the Pa sample, that present the lowest MIC of 5 mg/mL for *Aspergillus fumigatus*.

In general, these leaf extracts can be used in the food industry namely in pastry and bakery products as promising sources of bioactive compounds, and at the same time, this reuse of biowaste promotes circular economy, and reduces the impact of bio-waste resulting from the fig industry, thus meeting some of the goals of sustainable development.

Dauphine | Longue d'Aout | Pasteliere | Marseille | Bourjassote Noire

Figure 1: Fig leaves from the five analyzed species.

References

[1] FAO. 2020. Fruit and vegetables – your dietary essentials. The International Year of Fruits and Vegetables, 2021, background paper. Rome.
[2] PALMEIRA, Luís et al. Nutritional, chemical and bioactive profiles of different parts of a Portuguese common fig (Ficus carica L.) variety. Food Research International, v. 126, p. 108572, 2019.

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