

Book of Abstracts

Trend in grain-based foods

Transecolab Summit

**March 23-25th
2022**

Title

Trends in grain-based foods

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1° 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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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

CEREAL MILLING BY-PRODUCTS AS SOURCES OF NUTRIENTS AND ANTIOXIDANT PHENOLIC COMPOUNDS

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Cereals are staple food crops and major sources of nutrition worldwide, but their processing generates a large amount of by-products. In addition to environmental and economic aspects, cereal milling by-products represent a significant loss of natural resources and nutrients when discarded as useless waste [1,2]. Thus, in order to promote the upcycling of these by-products as valuable raw materials, this study was carried out to provide a compositional and bioactive characterisation of wheat, maize and rye by-products currently produced in large quantities by the cereal grain milling industry. The cereal by-products were studied for their proximate composition following official methods of food analysis, and organic acids, soluble sugars, fatty acids and tocopherols were analysed by different chromatographic techniques [3]. After preparation of hydroethanolic extracts, the detected phenolic compounds were characterised by HPLC-DAD-ESI/MSⁿ and the antioxidant activity was evaluated through *in vitro* assays for the ability to inhibit lipid peroxidation by monitoring the formation of thiobarbituric acid reactive substances (TBARS), and to inhibit oxidative hemolysis caused by free radicals generated in the *in vitro* system [3]. Regarding the compositional results, expressed in dry weight (dw), carbohydrates (56.35–78.12 g/100 g) were the major proximate constituents of the studied cereal by-products, followed by proteins (11.2–30.0 g/100 g). The higher energy value (432.3 kcal/100 g) was presented by wheat germ, which also presented the highest citric acid content (0.86 g/100 g). Sucrose was the most abundant soluble sugar in all cereal by-products, reaching 10.4 g/100 g in wheat germ, 3.84 g/100 g in maize bran-germ mixture, and approximately 2.9 g/100 g in wheat and rye bran samples. Unsaturated fatty acids predominated in all samples, given the high contents of linoleic (53.9– 57.1%) and oleic (13.4–29.0%) acids. Wheat germ had the highest levels of tocopherols (22.8 mg/100 g) and phenolic compounds (5.7 mg/g extract, with a high content of apigenin-C-pentoside-C-hexoside). In turn, while the wheat bran extract was particularly effective in inhibiting the formation of TBARS, the rye bran extract was the only one capable of protecting sheep erythrocytes from oxidative haemolysis. Overall, these results are valid arguments to support the use of cereal by-products as underexploited alternative sources of nutrients and bioactive phenolic compounds with potential health benefits for consumers.

References

- [1] A-F. Monnet, K. Laleg, C. Michon, V. Micardb, Trends in Food Science & Technology, 86 (2019) 131–143.
- [2] A. Saini, D. Panwar, P.S. Panesar, M.B. Bera, Austin Journal of Nutrition & Metabolism, 6 (2019) 1068.
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