

**Book of Abstracts**

# **Trend in grain-based foods**

# **Transcolab Summit**

**March 23-25th  
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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.

# 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

Section 1: Past as key to the future (ancient grains, wholemeal products, and sourdoughs)

<b>OC-01: Acorn flour: an ingredient from the past ready for the future</b>	
Rita Beltrão Martins	35
<b>OC-02: Technological and nutritional characterization of wheat from ancient crops</b>	
Katerina Athinaïou	36
<b>OC-03: Broadening food security through grain-based solutions: african millets and their cabo verde an wild relative</b>	
Vanézia Rocha	37
<b>OC-04: Rice authenticity traceability, elements of sustainability and quality differentiation</b>	
Carla Brites	38
<b>OC-05: Comparative analysis of the chemical composition of different portuguese bread</b>	
Manuel Ayuso	39
<b>OC-06: The impact of <i>Tribolium castaneum</i> infestations on quality of wheat flour for bread-making</b>	
Maria Otilia Carvalho	40
<b>OC-07: Yeast protein extract as an alternative protein in the formulation of mayonnaise</b>	
Ana Catarina Ribeiro	41

Section 2: New Ingredients in grain-based products (Pseudocereals, pulses, and new flour sources)

<b>OC-08: Non-conventional seeds for the development of new bakery products: a new trend or myth?</b>	
Maria Inês Dias	43
<b>OC-09: Fig (<i>Ficus carica</i> L.) bioresidues as sources of bioactive compounds and natural pigments for the food industry</b>	
Carlos S. H. Shiraishi	44
<b>OC-10: Risk/benefits of new ingredients added to novel cereal-based formulations</b>	
Marta Mesias	45
<b>OC-11: Microalgae as a valuable ingredient for bread enrichment: influence on the dough rheology and bread making performance</b>	
Anabela Raymundo	46
<b>OC-12: <i>Psyllium</i>: a natural bakery improver</b>	
María Franco	47
<b>OC-13: Mineral and proximate composition of commercial plant-based flours.</b>	
Yamina Absi	48
<b>OC-14: Cereals and pseudocereals contaminated with tropane alkaloids: analytical tools to assure food safety</b>	
Jesús Marín Sáez	49

## RISK/BENEFITS OF NEW INGREDIENTS ADDED TO NOVEL CEREAL-BASED FORMULATIONS

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The cereal-based food formulations has evolved in the last decades with the inclusion of alternative cereals, pseudocereals and other ingredients in traditional recipes, which allows current consumers' needs to be met. The incorporation of ingredients such as seeds, legume flours or different type of sugars in the innovative formulation of biscuits may be particularly desirable from a nutritional and healthy point of view. However, the dough composition, low moisture and thermal treatment applied during baking can promote the formation of chemical process contaminants, such as acrylamide, which is classified as "probably carcinogenic for humans" [1]. The effect of addition of chia seeds, carob flour and coconut sugar on the nutritional and bioactive properties and the formation of acrylamide in wheat flour-based biscuits was investigated. Different biscuits were formulated replacing wheat flour by chia seeds (percentages in the final weight: 5, 10 and 15%) and carob flour (percentages in the final weight: 1, 5 and 10%) and white sugar by coconut sugar. Biscuit were prepared under controlled conditions and baked for 23 minutes at 180 °C. Nutritional composition (AOAC methods), in vitro bioactivity (antioxidant capacity (TBARs), antibacterial and antifungal activity) and acrylamide content (HPLC-ESI-MS/MS) were determined in both ingredients and biscuits. Results were statistically analyzed using SPSS version 26 (SPSS, Chicago, IL, USA) assuming a level of significance of  $p < 0.05$ . Higher percentages of chia seeds, carob flour and coconut sugar in the formula exhibited similar antibacterial and antifungal activity to the control biscuit (100% wheat flour, 100% white sugar) but increased the antioxidant capacity, protein, fiber and, in the case of chia seeds, the polyunsaturated fatty acids content, then resulting in a nutritionally enhanced product. However, levels of acrylamide were also increased, from 113 to 236 µg/kg, when chia seeds were added in a range of 5-15% of the total weight and reaching values up to 351 µg/kg when carob flour was incorporated in a 10% or even to 1030 µg/kg when biscuit containing 10% carob flour were also formulated with coconut sugar. In these cases, acrylamide concentrations exceeded the benchmark levels (350 µg/kg) established for biscuits in the European Regulation 2158/2017 [2]. This study suggests that the reformulation of traditional recipes with innovative ingredients should be carefully considered, not only looking for nutritionally improved recipes but also taking into account possible changes in the toxicological aspects. To this end, it should be recommended to include a risk/benefit evaluation of the control of process contaminants when designing novel biscuit formulas.

### References

- [1] Some industrial chemicals. In IARC Monographs on the Evaluation for Carcinogenic Risk of Chemicals to Humans. International Agency for Research on Cancer (Eds.), Lyon, France, IARC, 1994.  
[2] European Commission. Commission regulation (EU) 2017/2158. Official Journal, L304 (2017), 24.

### Acknowledgments

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