

Book of Abstracts

Trend in grain-based foods

Transcolab Summit

**March 23-25th
2022**

Title

Trends in grain-based foods

Autor

Lillian Barros - Mountain Research Center (CIMO), Portugal

Co-Autor

Bruno Melgar Castañeda - Mountain Research Center (CIMO), Portugal

Carlos Seiti Hurtado Shiraishi - Mountain Research Center (CIMO), Portugal

ISBNs

978-972-745-299-6

Edition

Instituto Politécnico de Bragança (IPB) - 2022

5300-253 Bragança, Portugal

Tel. (+351) 273 303 382

<http://www.ipb.pt>

URL

<http://esa.ipb.pt/graintrends/>

1° Trends in grain-based foods

Organizing Committee

Lillian Barros¹ - (Chair)

Manuel Gómez Pallarés²

Manuel Ayuso¹

Eliana Pereira¹

Ricardo Calhelha¹

Bruno Melgar¹

Carlos Shiraishi¹

Cristina Caleja¹

Fátima Silva¹

Elisabete Ferreira³

Leonardo Corrêa Gomes¹

Liege Aguiar¹

- ¹Instituto Politécnico de Bragança, Portugal
- ²Universidad de Valladolid, Spain
- ³Pão de Gimonde, Portugal

Trends in grain-based foods

Scientific Committee

Lillian Barros - Instituto Politécnico de Bragança, Portugal

Manuel Gómez Pallarés - Universidad de Valladolid, Spain

Alessandra Marti - Università degli Studi di Milano, Italy

Carlo Giuseppe Rizzello - University of Bolzano, Italy

Claudia Monika Haros - Instituto de Agroquímica y Tecnología de Alimentos (IATA), CSIC, Spain

Laura Román - Aarhus University, Denmark

Mario M. Martinez - Aarhus University, Denmark

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 ATHINAIU
"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 DIFFERENTIATION"
 - 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 CAPPÀ

"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

Oral Session

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

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

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

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

OC-15: Optimisation of hydrocolloids doses in gluten-free bread made of flaxseed and red lentils flour blend	
Beatriz Nunes Silva	50
OC-16: A breakthrough on Bread Formulation: Natural mineral Water as a Novel Functional Ingredient	
Fernanda Ferreira	51
OC-17: Hydroethanolic extract of <i>Ocimum basilicum</i> 'cinnamon' as a natural preservative for the food industry	
Eleomar Pires Jr.	52
OC-18: The potential of aromatic extracts to enhance the sensory perception of bread	
Vanessa Vieira	53
OC-19: Dairy gluten-free bread: technological, nutritional, and functional enhancement by curd cheese supplementation	
Isabel Sousa	54
Plenary session 3: Novel technologies, processes, and products	
OC-20: Electric fields - A promising technology towards sustainable processing of grain-based foods	
Ricardo N. Pereira	56
OC-21: Extruded formulations based on rice and chickpea: dietary fiber and oligosaccharides	
Erika N. Vega	57
OC-22: Bread freezing as a new alternative to consumption	
Liege Pascoalino	58
OC-23: Study of the turbo-technology potential in the production of gluten-free ingredients and potato-based pasta	
Carola Cappa	59
OC-24: Application of short-time high hydrostatic pressure treatments to whole buckwheat grains to modulate the functional properties of the resulting flours	
Ángel L. Gutiérrez	60
OC-25: Physical modification of rice flour via ultrasonication. Influence of treatment time and temperature	
Antonio J. Vela	61
OC-26: Improving the nutritional value of cold-pressed oilseed cakes through extrusion cooking	
Natalia P. Vidal	62
OC-27: Enrichment of fresh egg pasta with antioxidant extracts obtained from wild Italian <i>Plantago coronopus</i> L. and <i>Chicorium intybus</i> L. and quality characterisation of the fresh end product	
Costanza Ceccanti	63
OC-28: New ingredients in the preparation of cookies to mitigate acrylamide content	
Rosalía Lopez-Ruiz	64
OC-29: Applicability of near infrared spectroscopy on wheat flour supplemented with lentil flour	
Miriam Hernandez-Jimenez	65

Plenary session 4: Sustainability and Circular economy

OC-30: Flours made from fruit by-products as sustainable innovative ingredients: are their minerals bioaccessible?	
Isabel Maria Ferreira	67
OC-31: Cereal milling by-products as sources of nutrients and antioxidant phenolic compounds	
Rossana Cardoso	68
OC-32: Response surface methodology applied to essential oil extraction of eucalyptus leaves	
Hanine Hached	69
OC-33: Development of a fermented plant-based beverage from discarded bread flour	
Teresa Sigüenza-Andrés	70
OC-34: Study of the phenolic profile and bioactive potential of cardoon bracts as a promising functional ingredient	
Filipa Mandim	71

BREAD FREEZING AS A NEW ALTERNATIVE TO CONSUMPTION

Liege Aguiar Pascoalino^{1,2}, Manuel Ayuso¹, Eliana Pereira¹, Elisabete Ferreira³, Isabel C.F.R. Ferreira¹, Lillian Barros^{1*}

¹Centro de Investigação de Montanha (CIMO), Instituto Politécnico de Bragança, Campus de Santa Apolónia, 5300-253 Bragança, Portugal.

²Nutrition and Bromatology Group, Faculty of Food Science and Technology, University of Vigo, Ourense, Spain.

³Pão de Gimonde, M. Ferreira & Filhas, LDA, EN218, n° 3798, 5300-553, Gimonde, Portugal.

*lillian@ipb.pt

The growing consumer interest in health and food safety, as well as the increased consumption of fresh food, make frozen bread an increasingly popular alternative. This type of bread has several advantages, such as, large-scale manufacturing, economize manpower and equipment, and lowering production costs. Furthermore, one of the ways to extend shelf-life of ready-to-eat bread is to use deep freezing systems [1–3]. In the present study, the effect of frozen storage time on the bread quality made from frozen dough, were studied, through the nutritional and chemical composition evaluation. Six equal multicereal breads were frozen, submitted to different storage times under deep freezing (190, 225, 251, 310, 344 and 694 days), and compared to the fresh multicereal bread. The nutritional profile was evaluated through the protein, ash, fat, and carbohydrate content, using official analysis methodologies (AOAC) and the energetic value was also estimated. The chemical composition regarding sugars and fatty were determined by chromatographic techniques, using a HPLC- RI and a GC-FID, respectively.

In general, the results revealed that moisture content is similar in all frozen breads, with values around 40%, while the fresh bread showed a content of 43.4%. The ash content presented values ranging between 1.51 ± 0.02 and 1.02 ± 0.02 g/100 g fresh weight (fw); and the mean value of the protein content in the samples was approximately 7 g/100 g fw. On the other hand, fiber showed values of 4% of total dietary fiber (TDF) fw for breads with longer frozen time, while the bread frozen for less time (190 days) and fresh bread showed values around 6% TDF fw. The fat content was also variable between fresh and frozen breads, however, the presence of polyunsaturated fatty acids (PUFA) in all samples was predominant, namely linoleic acid (C18:2n6c). Regarding the sugars profile, fructose, glucose, and maltose were detected in all bread samples, showing a total sugar value between 1.78 and 2.97 g/100g fw; and as expected, the most abundant sugar was maltose, a common sugar found in cereal. Regarding the carbohydrate evaluation, the obtained results ranged between 40.4 and 43 g/100g fw for frozen breads and 38.3 g/100 g fw for fresh bread; and the energetic value presented values greater than 220 kcal/100g in all samples.

The results obtained show that freezing may be a promising alternative for bread conservation, contributing to the reduction of the high percentage of disposal that happens in all industrialized countries.

References

- [1] Yi J, Kerr WL. Combined effects of freezing rate, storage temperature and time on bread dough and baking properties. *LWT - Food Science and Technology* 2009;42:1474–83. <https://doi.org/10.1016/J.LWT.2009.05.017>.
- [2] Frauenlob J, Moriano ME, Innerkofler U, D'Amico S, Lucisano M, Schoenlechner R. Effect of physicochemical and empirical rheological wheat flour properties on quality parameters of bread made from pre-fermented frozen dough. *Journal of Cereal Science* 2017;77:58–65. <https://doi.org/10.1016/J.JCS.2017.06.021>.
- [3] Zhao Y, Kweon M. Formula optimization of ready-to-proof and ready-to-bake frozen dough of sweet bread using response surface methodology. *LWT* 2021;139:110581. <https://doi.org/10.1016/J.LWT.2020.110581>.

Acknowledgments

The authors are grateful to the Foundation for Science and Technology (FCT, Portugal) for financial support by national funds FCT/MCTES to CIMO (UIDB/00690/2020); national funding by F.C.T. and P.I., through the institutional scientific employment program-contract for L. Barros contracts. The authors are also grateful to FEDER-Interreg España-Portugal programme for financial support through the project TRANSCoLAB 0612_TRANS_CO_LAB_2_P.