

BOOK OF ABSTRACTS

11th International Congress of
Food Technologists, Biotechnologists and
Nutritionists



Unlocking Science and Technology for
a Healthier and Sustainable World

Published by:

University of Zagreb Faculty of Food Technology and Biotechnology,
Zagreb, Croatia
Croatian Society of Food Technologists, Biotechnologists and Nutritionists,
Zagreb, Croatia

ISSN 2975-710X

The official language of the Congress is English.

The information provided in the Book of abstracts is based on abstracts submitted by Congress participants. The accuracy, spelling and presentation of the submitted abstract are the sole responsibility of the authors. Statements and opinions given in the Book of abstracts are those of the contributors. For full or partial use of any data from this publication, proper acknowledgement of the original source should be made.

Biotechnological Valorisation of Rice Okara for High-Protein Fruit Purées: From Protein Hydrolysis to Functional Food Prototypes

María Emilia Brassesco^{1,*}, Ana C. Cassoni¹, João D. Calixto², Tiago Duarte², Daniela Correia³, Bruna Figueiredo⁴, Maria João Alegria⁵, Manuela Pintado¹

¹ Universidade Católica Portuguesa, Centro de Biotecnologia e Química Fina, Laboratório Associado, Escola Superior de Biotecnologia, Rua Diogo Botelho 1327, Porto, Portugal

² SimplYeast, Rua do Rio Novo n^o450, 4495-145, Póvoa de Varzim, Portugal

³ MC Shared Services S.A, Lugar do Espido, Via Norte 4470-177 Maia, Portugal

⁴ White&Green, S.A, Zona Industrial de Vagos, Lote 104, 3840-385 Vagos, Portugal

⁵ SUMOL+COMPAL, Rua Dr. António João Eusébio, 24, 2790-179 Carnaxide, Portugal

* Presenting author: mbrassesco@ucp.pt

This study describes a multi-actor biotechnological approach for the valorisation of rice okara into stable, high-protein fruit purées. Fresh okara supplied by White&Green was stabilised by SimplYeast through dehydration (OAD) and hydrolysis (thermal, OAT; enzymatic, OAE), generating protein-rich flours containing 68.7 ± 0.2 to $69.8 \pm 0.5\%$ protein, 1.7 ± 0.0 to $2.8 \pm 0.0\%$ ash, and 1.3 ± 0.0 to $2.2 \pm 0.1\%$ lipids. Characterization showed that both hydrolysis treatments improved flour properties, increasing solubility from 24.8 ± 3.2 (OAT) to $49.7 \pm 1.8\%$ (OAE2) and degree of hydrolysis from 0.50 ± 0.10 (OAE1) to $12.66 \pm 0.56\%$ (OAE2). Enzymatic hydrolysis markedly enhanced bioactive potential, raising total phenolics from 114.9 ± 6.7 to 453.8 ± 65.9 mg GAE g⁻¹ and antioxidant capacity from 400.5 ± 37.9 to 27.090 ± 2.046 $\mu\text{mol TE g}^{-1}$ (ORAC), confirming strong functional improvement for food use. Based on these results, fruit purées combining apple pomace (Compal) and banana with 5% okara flour were developed. Two stages were followed: (i) exploratory testing with all flours, including physicochemical and sensory analyses, and (ii) optimisation using OAD and OAT, adjusting the recipe and standardising the protocol—pre-hydration of okara flour with water and xanthan gum (5 min at 100 °C) followed by stepwise mixing of fruit components and acidifiers. Pilot-scale trials at Yogan confirmed process reproducibility, and SONAE supports market integration. Optimized purées reached 3.5 g protein 100 g⁻¹, with 21% of total energy from protein, fulfilling EU “high-protein” standards. Improved texture, colour and sensory performance, particularly for OAT-based purées, were observed. Protein solubility, emulsifying capacity and antioxidant activity confirmed the positive effect of hydrolysis on structure–function behaviour.

This work exemplifies a circular bioeconomy model, showing how controlled protein hydrolysis transforms underutilised co-products into sustainable, value-added ingredients.

Keywords:

Protein hydrolysis, Circular bioeconomy, Functional food development

Acknowledgements

This work was supported by Agenda VIIAFOOD - Platform for Valorisation, Industrialization and Commercial Innovation for Agro-Food (no. C644929456-00000040), funded by the Portuguese Recovery and Resilience Plan (PRR) and European funds NextGeneration EU. We would also like to thank the scientific collaboration under the FCT project UID/50016/2025.