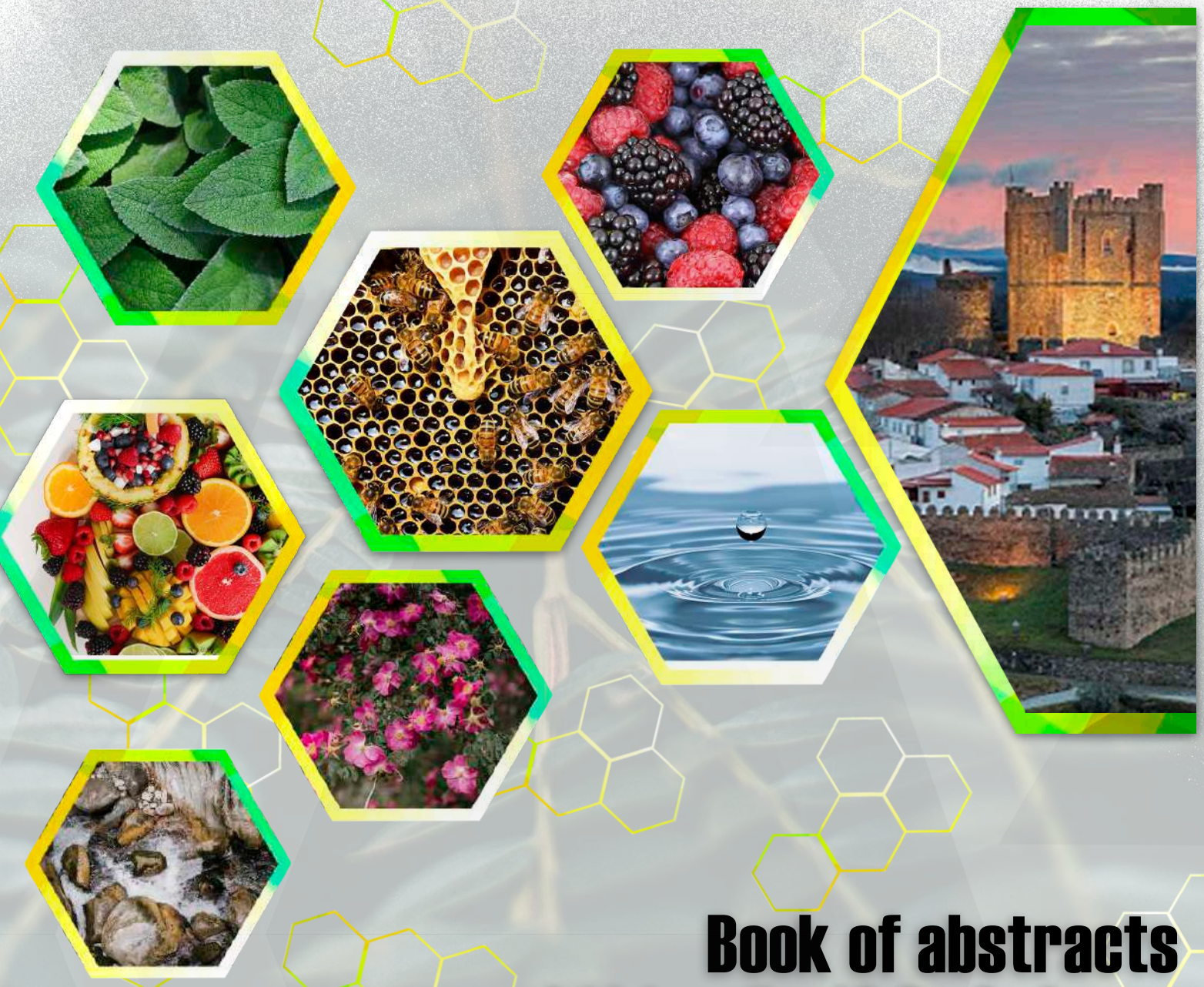
Natural products application: Health, Cosmetic and Food

Provided by nature, adapted scientifically for industry



Book of abstracts

1st International Online Conference

4th - 5th February 2021

ipb INSTITUTO POLITÉCNICO DE BRAGANÇA

CIMO Centro de Investigação de Montanha

montanhas de investigação

AQUA VALOR

Title

1st Natural products application: Health, Cosmetic and Food: book of abstracts

Editors

[1]Lillian Barros

[1]Bruno Melgar Castañeda

[1]Carlos Seiti Hurtado Shiraishi

Suport

Eletronic

Format

PDF

Edition

Instituto Politécnico de Bragança (IPB)

http://www.ipb.pt

5300-253 Bragança, Portugal

Tel. (+351) 273 303 382

ISBN

978-972-745-286-6

URL

http://hdl.handle.net/10198/22068

OPF-05

NATURAL FOOD PRESERVATIVES: APPLICATION OF ROSEMARY, BASIL AND SAGE IN YOGURTS AS AVIABLE ALTERNATIVE TO ARTIFICIAL ONES, USING SUSTAINABLE, LOW COST AND EFFICIENT PROCESSES

Jonata M. Ueda,[1,#] Mariana C. Pedrosa,[1,#] Filipa Fernandes,[1] Ricardo C. Calhelha,[1] Bruno Melgar,[1] Paula Rodrigues,[1] Maria Inês Dias,[1] José Pinela,[1] Marija Ivanov,[2] Marina Soković,[2] Rafael P. Ineu,[3] Márcio Carocho[1], Isabel C.F.R. Ferreira,[1] Sandrina Heleno,[1*] Lillian Barros[1]

[1]Centro de Investigação de Montanha (CIMO), Instituto Politécnico de Bragança, Campus de Santa Apolónia, 5300-253, Bragança, Portugal. [2]University of Belgrade, Institute for Biological Research "Siniša Stanković" – National Institute of Republic of Serbia, Blvd. despot Stefan 142, 11000 Belgrade, Serbia, [3]Universidade Tecnológica Federal do Paraná, Campus Campo Mourão (UTFPRCM), 87301-899 Campo Mourão, Brasil. #This authors contributed equally to this work. *sheleno@ipb.pt

Foods are susceptible to various forms of degradation, either by oxygen present in the atmosphere, microbiological factors, enzymatic degradation and others, being essential to study new ways of preserving food. Due to the need of creating "stock" and preserve food in the pre-industrial era, consumers were essentially concerned on obtaining food as quickly as possible, opting for "industrialized" food. Nowadays, the demand for non-processed foods or with a minimum of artificial additives is increasing due to an increased awareness of consumers towards healthier diets, studies related to health risks and public opinions generated in the media [1,2]. Plants are known to be rich sources of bioactive compounds, since these are considered a defense mechanism against external agents such as microorganisms, oxidizing agents and ultraviolet radiation, and for these reasons their extracts are investigated as promising sources of natural additives for the food industry [3]. Thus, the main objective of this work was the exploitation of rosemary (*Rosmarinus officinalis* L.), basil (*Ocimum basilicum* L.) and sage (*Salvia officinalis* L.) as sources of preservative molecules, for incorporation in yogurts. This included: i) the optimization of the extraction of bioactive molecules through ultrasound assisted extraction (UAE), a sustainable and lowcost extraction technology, using green solvents (water and ethanol); ii) chemical characterization of the extracts obtained by HPLC-DAD-ESI/MS techniques; iii) evaluation of the bioactivities of the extracts (antioxidant, antimicrobial and cytotoxic activities); iv) incorporation of the most promising extracts into the yogurts, and v) the evaluation of the stability of the ingredients over the shelf-life through physical parameters (texture, color and pH); microbiological analysis [4]; nutritional value [5] and monitoring the molecules with preservative capacity. All the formulations were compared with control samples (without additives and with potassium sorbate, a common artificial additive used in yogurts). According to the obtained results, for the extraction optimization, it was found that the percentage of solvent is the most relevant factor for obtaining an extract rich in rosmarinic acid, followed by the extraction time and ultrasonic power. For the antioxidant and antimicrobial activity, rosemary extract showed the best result, followed by sage and basil. Moreover, none of the three plant extracts showed hepatotoxicity, at the maximum concentration tested. Finally, the plant extracts did not show changes in the physico-chemical and nutritional characteristics of the yogurts and the incorporation of the preservative extracts did not affect the normal lactic bacteria growth, which are fundamental for the yogurt manufacturing process. Moreover, the extracts were obtained through sustainable, green and low-cost process, providing the industry with safer and economically viable alternatives.

References

[1] M. S. Rahman. Chapter 1 – Food Preservation: Overview. In: M. S. Rahman. Handbook of Food Preservation. CRC Press. Florida. (2007) 3-18. [2] N. Gokoglu. Journal of the Science of Food and Agriculture, 99 (2018) 2068-2077. [3] L. B. Chibane, P. Degraeve, H. Ferhout, J. Bouajila, N. Oulahal. Journal of the Science of Food and Agriculture, 99 (2018) 1457-1474. [4] International Organization for Standardization (ISO). ISO 4833-2:2013; ISO 4832:2006; ISO 21527-1/2:2008; ISO 15214:1998.[5] Association of Official Analytical Chemists (AOAC). Official Methods of Analysis, 17th edition. Washington DC, 2016.

Acknowledgments

The authors thank FCT, Portugal for financial support through national funds FCT/MCTES to the CIMO (UIDB/00690/2020) and to Filipa A. Fernandes PhD grant (SFRH/BD/145467/2019). L. Barros, M.I. Dias and R.C. Calhelha also thank the national funding by FCT – Foundation for Science and Technology, P.I., through the institutional scientific employment program-contract for their contracts, and M. Carocho (CEECIND/00831/2018), J. Pinela (CEECIND/01011/2018) and S. A. Heleno (CEECIND/03040/2017) to the national funding by FCT – Foundation for Science and Technology, P.I., through the individual scientific employment program-contracts. ERDF, through the Incentive System to Research and Technological development, within the Portugal2020 Competitiveness and Internationalization Operational Program for the financial support to BIOMA(POCI_01_0247_FEDER_046112); ERDF through the Regional Operational Program North 2020, within the scope of Project GreenHealth (Norte-01-0145-FEDER-000042).