



retaste



rethink food waste

Athens, 6-8 May, 2021



Hellenic Mediterranean
University

The RETASTE Conference
was co-organized by
Harokopio University



The RETASTE Conference
was organized under the
auspices of the Green
Fund that offers sponsored
participation to selected
participants.



RETASTE:

Rethink Food Waste

Athens, Greece, May 6-8, 2021

Editors

Thrassyvoulos Manios, Hellenic Mediterranean University

Katia Lasaridi, Harokopio University

Ioannis Daliakopoulos, Hellenic Mediterranean University

Publication

Hellenic Mediterranean University, School of Agriculture, Department of Agriculture
Estavromenos, 71 410 Heraklion, Greece

First published on May 26, 2021, in Heraklion, Greece by Hellenic Mediterranean University, School of Agriculture, Department of Agriculture.

ISBN: 978-618-84774-2-1

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, nor be otherwise circulated in any form of binding or cover, without prior permission of the publisher.

© Copyright 2021 by the Hellenic Mediterranean University, School of Agriculture, Department of Agriculture. The individual essays remain the intellectual properties of the contributors.

The 2021 RETASTE Conference was co-organized by the Hellenic Mediterranean University and Harokopio University, under the auspices of the Green Fund that offered sponsored participation to selected participants.

VAL: Valorization of Food Processing By-Products

The Food industry is a continuously growing sector due to the increasing population and globalization that create the need of a wide variety of food products. During food processing, many by-products are thrown away and accumulate as an environmental burden. The problem is greater in developing countries, where 40% of food waste is generally generated at post-harvest and processing levels. Valorization of food processing by-products offers sustainability by circumventing landfilling or disposal and aims to recover matter, energy, and biomass in the form of “secondary” products and energy contributing to circular economy.

The RETASTE Session on Valorization of Food Processing By-Products focuses on the significant efforts of the contributors to address these issues in all major food industries: meat, poultry, fish and seafood, fruits and vegetables, dairy, and cereal. Secondary products presented have a vast area of application, from food additives to cosmetic products.

Blueberry Bagasse, a Bioactive Residue to Be Included in New Food Products

¹Emanueli Backes, ¹Maria Gabriela Leichtweis, ¹Cláudia Novais, ²Adriana K. Molina, ¹Carla Pereira, ¹Maria Inês Dias, ¹Isabel C.F.R. Ferreira and ¹Lillian Barros

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

²*Centro de Investigação de Montanha (CIMO), Instituto Politécnico de Bragança, Campus de Santa Apolónia, 5300-253 Bragança, Portugal; Grupo de Nutrição e Bromatologia, Faculdade de Ciência e Tecnologia de Alimentos, Universidade de Vigo, Ourense, Espanha*

Abstract

Blueberry (*Vaccinium myrtillus* L.) is a very popular fruit, native to the northern hemisphere and consumed worldwide. It has been widely studied for being a rich source of bioactive compounds with recognized beneficial properties for human health. For this reason, several industrialized products, such as juices and derivatives, have been developed from blueberries. However, its manufacture produces about 20-30% of solid waste, which is usually discarded without recovery. In juice processing, for example, there is a large amount of residue generated (bagasse), which represents an environmental issue and a high cost of waste treatment for the industry. Because of light stimulation and other environmental reasons, the phytochemical content of a fruit is usually greater in the epicarp, which is the most representative part of the production of blueberry juice residues (Paes et al., 2014). In this sense, the present work aimed to analyse the phenolic composition of blueberry bagasse hydroethanolic extract, by HPLC-DAD/ESI-MS, and to evaluate its bioactivity, namely the antioxidant capacity, through TBARS and OxHLIA assays, and the antimicrobial activity against a set of eight bacterial strains of interest in the health field, by the microplate microdilution method using a colorimetric assay (INT), as well as its cytotoxicity through the *in vitro* sulforodamine B (SRB) assay, tested in a primary culture of cells prepared from porcine liver. Eight anthocyanin compounds were identified in significant amounts, with cyanidin-3-*O*-glucoside and malvidin-3-*O*-glucoside as the most abundant compounds, and four non-anthocyanin compounds, with *cis* 5-*O*-caffeoylquinic acid and *trans* 5-*O*-caffeoylquinic acids as the most representative ones. Regarding bioactive properties, as expected considering its chemical composition, the extract also revealed a strong antioxidant capacity, being able to inhibit lipid peroxidation and oxidative hemolysis. In terms of antimicrobial activity, the studied extract did not show bactericidal action at the tested concentrations; however, it inhibited the growth of four of the five gram-negative bacteria and two of the three gram-positive bacteria. The best results were achieved against *Morganella morganii* and methicillin resistant *Staphylococcus aureus* (MRSA). Regarding cytotoxicity, the effect of inhibiting non-tumour cell growth was not observed, which is of great importance for considering its inclusion if foodstuff. The results

obtained in the present study validate the bioactive quality of the extract obtained from blueberry bagasse, justifying its application in the development of novel and functionalized foods.

Keywords: Blueberry bagasse, bioresidue, phenolic compounds, bioactive properties, food ingredient.

References

J. Paes et al., *J. Supercrit. Fluid*, 95 (2014) 8.

Acknowledgments: The authors are grateful to the Foundation for Science and Technology (FCT, Portugal) for financial support through national funds FCT/MCTES to CIMO (UIDB/00690/2020); national funding by FCT, P.I., through the institutional scientific employment program-contract for C. Pereira, M.I. Dias, and L. Barros contracts, and A.K. Molina (2020.06231.BD) and M.G. Leichtweis (2020.06706.BD) PhD grants. To ERDF through the Regional Operational Program North 2020, within the scope of Project GreenHealth - Norte-01-0145-FEDER-000042.