



**BOOK OF
ABSTRACTS**
2022.

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PUBLISHED BY:

Faculty of Food Technology and Biotechnology,
University of Zagreb, Croatia

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COVER&LOGO DESIGN:

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PRINTED BY:

Hendrih Feldbauer d.o.o.

TEXT PREPARED BY:

The information provided in the BOOK OF ABSTRACTS is based on the submitted abstracts of conference participants. Authors are fully responsible for the text and its quality. Language corrections were not made.



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Faculty of Food Technology and Biotechnology, University of Zagreb
Faculty of Forestry and Wood Technology, University of Zagreb
Institute for Adriatic Crops and Karst Reclamation
Croatian Society of Biotechnology
Academy of Forestry Sciences
Croatian Chamber of Forestry and Wood Technology Engineers
"Zeleni prsten" Public Institution of Zagreb County

SUPPORTED BY

International Union of Forest Research
Organizations (IUFRO)
European Forest Institute (EFI)
European Biotechnology Thematic
Network Association (EBTNA)

UNDER THE AUSPICES OF

Rector of University of Zagreb
Ministry of Economy and Sustainable Development
Ministry of Science and Education
Ministry of Agriculture
Croatian Academy of Science and Arts
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Croatian Accreditation Agency
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A letter of support to the organization of the conference was given by the Office of the president of the Republic of Croatia.

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Dear colleagues and

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We are honored and delighted to welcome you for the 4th time to the International scientific and expert conference "Natural resources, green technology and sustainable development/4-GREEN2022" organized by Croatian Forest Research Institute and Faculty of Food Technology and Biotechnology, University of Zagreb and supported by Faculty of Forestry and Wood Technology, University of Zagreb, Institute for Adriatic crops and karst reclamation, Croatian Society of Biotechnology, Croatian Chamber of Forestry and Wood Technology Engineers, Academy of Forestry Sciences and "Zeleni prsten" Public Institution of Zagreb County.

We are pleased that the Conference is taking place once more in Zagreb, the capital city of the Republic of Croatia.

We feel very proud to organize this Conference with the support of International organizations IUFRO, EFI and EBTNA.

leagues friends,

The conference is dedicated to challenges, risks and opportunities in environment and ecosystem management, while emphasizing potential of plant extracts, functional food and useful products coming from nature as well as implementation of green technology and biomass in general.

Beyond any expectations, more than 150 abstracts written by experts from 19 countries have been acknowledged for the presentation at GREEN2022. Researchers from eminent institutions will present their recent achievements, give their valuable insights and provide predictions for the future. This sharing of cutting edge knowledge will serve to help fighting challenges, reduce risks and enlighten the best way to capitalize on the opportunities which await us. The multidisciplinary approach will bring together scientists and experts to exchange and discuss the latest achievements in science, illustrate new policies, demonstrate innovative techniques and

outline sustainability of natural resources and new challenges rising with the climate change.

We use this opportunity to express gratitude to our patrons and Auspices, International Scientific and Organizing Committee as well as to all of you for your scientific involvement which will certainly contribute to the success of the Conference. Special thanks are addressed to sponsors who enabled the preparation of this event.

Thank you for joining us!

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Session C:

SUPERCRITICAL CO₂ EXTRACTION OF BILBERRY (*Vaccinium myrtillus*) FRUIT

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KEYWORDS:
*bilberry, extraction,
supercritical co₂, total
phenolic content*

Bilberries (*Vaccinium myrtillus*) are believed to have one of the highest antioxidant levels of all common fruits and vegetables. As a source of antioxidants, they have been used in traditional medicine to reduce inflammation and protect against diseases associated with oxidative stress, such as cardiovascular disease, diabetes, and age-related cognitive decline, as well as a remedy for eye conditions. The biological activity of bilberries is associated with the high content of anthocyanins, a large group of water-soluble flavonoids. Besides the complex anthocyanin profile, bilberries also contain other phenolic compounds including flavonols, tannins, and phenolic acids. Supercritical fluid extraction (SFE) is a green and environmentally friendly process based on the use of supercritical fluids, most commonly CO₂, as an alternative to organic solvents, to obtain solvent-free and highly valuable plant extracts. Utilization of supercritical CO₂ (scCO₂) extraction also enables the preservation of thermally labile compounds working at low temperatures, and good selectivity accomplished by the appropriate choice of operating pressure and temperature. In this study, scCO₂ extraction was investigated as a method for isolating the extract from bilberry dried fruit. Extractions were performed at temperature of 70 °C and pressures of 15 and 30 MPa, with and without the ethanol as co-solvent, with the aim to optimize the yield of the obtained extract based on the composition. The obtained extraction yields ranged from 1.2 to 7% and the highest yield was obtained, as expected, at a higher pressure of 30 MPa. The effect of ethanol as co-solvent in the scCO₂ extraction was studied with the goal to modify scCO₂ selectivity and enhance the solubility of polar substances. The results showed a positive effect on the extraction yield, while total phenolic content (TPC) analysis revealed that extracts obtained using co-solvent have higher TPC values. Chemical analysis of the obtained extracts was performed in order to qualitatively evaluate their composition.

Acknowledgment: Financial support of the Ministry of Education, Science and Technological Development of the Republic of Serbia (Contract No. 451-03-68/2022-14/200135 and 451-03-68/2022-14/200287) and EUREKA Programme (Network Projects ID E!13632) is gratefully acknowledged. Work was carried out in the frame of the COST-Action "Green Chemical Engineering Network towards upscaling sustainable processes" (GREENERING, ref. CA18224) funded by the European Commission.

