BOOK OF ABSTRACTS

February 2021
15th - 16th

COST Action GREENERING
CA 18224
Green Chemical Engineering Network
towards upscaling sustainable processes

1st GREENERING INTERNATIONAL CONFERENCE

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EUROPEAN COOPERATION IN SCIENCE & TECHNOLOGY

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COSTA DA CAPARICA, PORTUGAL
15th-16th FEBRUARY 2021

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IN SCIENCE & TECHNOLOGY

Welcome address

The 1st Greenering International Conference is a join organization between VALORIZA Research Centre, Polytechnic Institute of Portalegre, Portugal, HES-SO University of Applied Sciences and Arts Western Switzerland – School of Engineering and Architecture Fribourg (HEIA-FR) and Faculdade de Ciências e Tecnologia from Universidade Nova de Lisboa, framed in the Greenering COST Action. These 2-day conference, hosted by DES Solutio, will take place online, due to the pandemic situation, on the 15th and 16th February 2021.

The main objective of conference is to join academics, researchers, and companies in an international forum to promote industrial application of green chemistry and sustainable technologies, into industries, with environmental, innovation, economic and policy aspects in focus. Our intention is to consolidate a multidisciplinary network actively involved in green technologies and sustainable development to create an area of exchange between academic institution and companies, which are active in the field of "Green Chemistry".

The success of the conference has been demonstrated by the more than 130 abstracts submitted for presentation and more than 150 registered participants, from 23 different countries. With 5 keynote lectures, 4 from which presented by industrial participants, this clearly demonstrated the interest of industry to the adoption of more sustainable processes. The conference has gathered interest not only from participants of the Greenering network but also from another relevant COST Action (CA18112) - Mechanochemistry for Sustainable Industry.

Thank you for helping us organizing such an interesting scientific meeting. We wish you a pleasure and prolific conference.

The Organizing Committee

Title: The Book of Abstracts of the 1st GREENERING International Conference

Publishes abstracts from the following fields: Alternative solvents, Biofuels and Bioenergy, Cosmetics, Food technology, Pharmaceuticals, Raw materials, Waste treatment/valorization, and Green policies and innovation.

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CHEMICAL STRUCTURE OF PHENOLIC ACIDS DURING THE ADSORPTION PROCESS ONTO β-GLUCAN

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Polyphenols are large groups of secondary plant metabolites. They showed many bioactivities like interactions with dietary fibre. These interactions can influence their accessibility for absorption (bioaccessibility) and their amount that is being absorbed (bioavailability). Interactions between polyphenols and dietary fibre like β-glucan can be studied through adsorption process. Many factors can have influence on adsorption process like chemical structures of polyphenols. The aim of this study was to investigate the adsorption between phenolic acids (gallic acid, *p*-coumaric acid, caffeic acid and chlorogenic acid) and β-glucan and to see how chemical structure influenced the adsorption process. Adsorption was carried out at 25 °C and pH 5.5 for 16 hours. The non-linear Dubinin-Radushkevich model was applied in order to analyze the data and to obtain the informations about chemical bounds between phenolic acid and β-glucan. The results showed that hydroxybenzoic acid (gallic acid) showed the higher adsorption capacity than hydroxycinnamic acids (caffeic, *p*-coumaric and chlorogenic acid). This could be related to the chemical structure of polyphenols. The order of adsorption capacity can be connected with the chemical structure of polyphenols. The higher number of hydroxyl groups can favor the adsorption of phenolic acids onto β-glucan. Gallic acid has the highest number of hydroxyl groups attached on the ring of all phenolic acids and showed the highest adsorption capacity, followed by caffeic acid and *p*-coumaric acid. The chlorogenic acid showed the lowest adsorption capacity. In this case the esterification between caffeic acid and quinic acid which are the building blocks of chlorogenic acid could lowered the adsorption capacity on β-glucan. From the Dubinin-Radushkevich model the bonds between phenolic acids and β-glucan could be physical bonds like hydrogen bonds and Van der Waals forces.

Keywords: Adsorption, Chemical structure, Polyphenols, β-glucan

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