2nd CIRCUL-A-BILITY CONFERENCE

BOOK OF ABSTRACTS

cost
EUROPEAN COOPERATION IN SCIENCE & TECHNOLOGY

Funded by the European Union

PULP AND PAPER INSTITUTE, LJUBLJANA
Innovative Cellulose Products

Ljubljana, 12-14 September 2022

BOOK OF ABSTRACTS OF THE 2nd CIRCUL-A-BILITY CONFERENCE

Publishers

Pulp and Paper Institute, Bogišićeva 8, 1000 Ljubljana, Slovenia
COST Action 191249

For the publishers

PhD David Ravnjak
PhD Milena Corredig

Editors

PhD Igor Karlovits
PhD Milena Corredig

Layout and design

PhD Urška Kavčič
PhD Igor Karlovits
MSc Gregor Lavrič

Kataložni zapis o publikaciji (CIP) pripravili v Narodni in univerzitetni knjižnici v Ljubljani
COBISS.SI-ID 120741635
ISBN 978-961-90424-7-2 (Pulp and Paper Institute, PDF)

BOOK OF ABSTRACTS

2nd CIRCUL-A-BILITY CONFERENCE

Ljubljana, 12-14 September 2022

ORGANIZED BY

COST Action 191249 Re-Thinking Packaging for Circular & Sustainable Food Supply Chains of the Future

Pulp and Paper Institute, Ljubljana, Slovenia (local organizer)

SCIENTIFIC AND REVIEWING COMMITTEE

Dr Milena Corredig, Department of Food Science, Aarhus University, Denmark

Dr Giancarlo Colleli, Department of Agriculture, Food, Natural resources, and Engineering (DAFNE), University of Foggia, Italy

Dr Tim C. Claypol, Welsh Centre for Printing and Coating, Swansea University, Wales

Dr Matthijs Dekker, Food Quality and Design, Wageningen University, The Netherlands

Dr Begonya Marcos, IRTA, Food Quality and Technology, Spain

Dr Marit Kvalvåg Pettersen, Nofima AS, Norwegian Institute of Food, Fisheries and Aquaculture Research, Norway

Dr Johanna Lahti, Faculty of Engineering and Natural Sciences, Tampere university, Finland

Dr Alexander Bardenstein, Danish Technological Institute, Taastrup, Denmark

Dr Antonio Martín Esteban, INIA-CSIC, Madrid, Spain

Dr Victoria Krauter, FH Campus Wien, University of Applied Sciences, Austria

Dr Ilke Uysal Ünalan, Department of Food Science, Aarhus University, Denmark

Dr Elena Arranz, Complutence University, Madrid, Spain

Dr Nadica Maltar Strmečki, Ruđer Bošković Institute, Croatia

Dr Paola Scarfato, DIIN, University of Salerno, Italy

Dr Ramune Rutkaite, Kaunas University of Technology, Kaunas, Lithuania

Dr Cláudia Nunes, CICECO - Averio Institute of Materials, University of Averio, Portugal

Gregorz Ganczewski, Sustainability Researcher affiliated with Kozminski University, Warsaw, Poland

Dr Mia Kurek, Faculty of Food Technology and Biotechnology, University of Zagreb, Croatia

Dr Danijela Ranđelović, ICTM - Centre of Microelectronic Technologies, University of Belgrade, Serbia

Dr Igor Karlovits, ICP - Pulp and Paper Institute, Slovenia

ORGANIZING COMMITEE

Dr Milena Corredig, Department of Food Science, Aarhus University, Denmar

Dr Giancarlo Colleli, Department of Agriculture, Food, Natural resources, and Engineering (DAFNE) University of Foggia, Italy

MSc Gregor Lavrič, ICP - Pulp and Paper Institute, Slovenia

Dr Urška Kavčič, ICP - Pulp and Paper Institute, Slovenia

Dr Igor Karlovits, ICP - Pulp and Paper Institute, Slovenia

ORGANIZED BY

cost
EUROPEAN COOPERATION
IN SCIENCE & TECHNOLOGY

Funded by the
European Union

PULP AND PAPER
INSTITUTE, LJUBLJANA
Innovative Cellulose Products

SUPPORTED BY

ŠTAJERSKA
GOSPODARSKA
ZBORNICA

SRIP CIRCULAR
ECONOMY

EUROPEAN UNION
EUROPEAN REGIONAL
DEVELOPMENT FUND

REPUBLIC OF SLOVENIA
MINISTRY OF ECONOMIC DEVELOPMENT
AND TECHNOLOGY

frontiers
in Sustainable
Food Systems

CHARACTERISATION OF BLEND FILMS BASED ON MICROBIAL POLYSACCHARIDE LEVAN AND GELATIN

Branka Lončarević, Vladimir Nikolić, Danijela Randjelovic, Predrag Poljak, Gordana Gojgić-Cvijović, Vladimir Beškoski

University of Belgrade, Institute of Chemistry, Technology and Metallurgy, National Institute of the Republic of Serbia, Belgrade, Serbia; Inovation Centre, Faculty of Chemistry, University of Belgrade, Serbia; Faculty of Chemistry, University of Belgrade, Serbia

e-mail: branka.loncarevic@ihtm.bg.ac.rs

Food packaging ensures safety and hygiene, while reducing food waste, therefore it is and essential component of the food supply chain. A sustainable and biodegradable alternative to conventional food packaging is edible packaging which contributes to the reducing waste and the economic efficiency of packaging materials [1]. The numerous biopolymeric materials could be used as source such as polysaccharides (starch, cellulose, chitosan) and proteins (gelatin, soy protein, whey). Exopolysaccharides (EPS) are fermentation-based biopolymers, secreted outside the cell wall and synthesized by various microbial species including bacteria, fungi and blue-green algae [2]. Microbial levan is fructose-based EPS and convenient due to its biocompatibility, renewability, high molecular weight, low viscous nature, antioxidant and prebiotic effects [3].

Levan used in this work was produced by the B. licheniformis NS032 strain [4] and its hydrophobic derivatives were obtained using octenyl succinic anhydride (OSA). Degree of substitution (DS) for modified levans were 0.025 and 0.032 for LH22 and LH26 respectively. Three different film compositions were prepared: levan/LH22/LH26 with gelatin in proportions 1:1. Films were prepared by casting technique and evaporated at room temperature. Morphology of the obtained films were studied by AFM (Atomic force microscopy), AutoProbe CP-Research SPM (TM Microscopes-Bruker) and mechanical properties were examined by Shimadzu EZ-LX tensile tester.

The samples had thickness of 150 µm. Based on morphological measurements, it can be concluded that use of levan derivatives change roughness of the

levan/gelatin blend film. The best mechanical properties (tensile strength and elongation at break) were obtained with pure levan. Obtained films are composed from edible and biodegradable components and therefore are potentially applicable in food industry. Future investigation will be focused on optimization of levan/gelatin proportion and more extensive structural and mechanical properties of obtained films.

Keywords: *edible packaging, exopolysaccharides, levan, gelatin*

References:

[1] T. A. Petkoska, D. Daniloski, M. N. D'Cunha, N. Naumovski, T. Broach Food. Res. Int, 2021, (109981) 140, 1-15.

[2] M. Asgher, S. A. Qamar, M. Bilal, H. M. N. Iqbal. Food. Res. Int, 2020, (109625) 140, 1-12.

[3] R. Srikanth, S. S. H. C. Sundhar Reddy, G. Siddartha, J. M. Ramaiah, B. K. Uppuluri, Carbohydr. Polym, 2015, 120, 102-114.

[4] B. D. Kekez, D. D. Gojgic-Cvijovic, D. M. Jakovljevic, J. R. Stefanovic Kojic, M. D. Markovic, V. P. Beskoski, M. M. Vrvic, Appl. Biochem. Biotechnol, 2015, 175, 3068-3083.