studentská konference

CHEMIE JE ŽIVOT

26–27. 11. 2020

SBORNÍK ABSTRAKTŮ

VYSOKÉ UČENÍ TECHNICKÉ V BRNĚ
FAKULTA CHEMICKÁ

Studentská odborná konference
CHEMIE JE ŽIVOT 2020
Sborník abstraktů

Editor: Ing. Petr Dzik, Ph.D.
Nakladatel: Vysoké učení technické v Brně, Fakulta chemická,
Purkyňova 464/118, 612 00 Brno

Vydání: první
Rok vydání: 2020
Náklad: 100 ks
ISBN: 978-80-214-5920-0
Tato publikace neprošla redakční ani jazykovou úpravou

OBSAH

POSTEROVÁ STŘEDOŠKOLSKÁ SEKCE

SEKCE BAKALÁŘSKÝCH A MAGISTERSKÝCH STUDENTŮ

SEKCE DOKTORSKÝCH STUDENTŮ

Utilization of Grape Seed Lignin in Polyhydroxyalkanoate Blends

Pavel Vostrejš [1, 2*]
Adriana Kovalcik [1]

[1]Brno University of Technology, Faculty of Chemistry, Institute of Food Science and Biotechnology

Purkynova 118, 612 00 Brno, Czech Republic,

[2]Brno University of Technology, Faculty of Chemistry, Institute of Physical and Applied Chemistry

Purkynova 118, 612 00 Brno, Czech Republic
Pavel.Vostrejs@vut.cz

Lignin is one of the most widespread biopolymers in the world. It is a complex polyphenol compound with a branched three-dimensional structure. This structure is formed by aromatic monolignols derived from hydroxycinnamyl alcohol. Nowadays, lignin is mostly obtained as a by-product in the pulp and paper industry. Lignin is most often used as a waste fuel. Laboratory lignin can be isolated by various technics, including the most common methods such as Kraft, sulfite, soda or organosolv process. the fundamental effect on lignin properties has the presence of sulfur in the structure. Sulfur compounds arise through Kraft and sulfite processes. Lignin obtained from the sulfite process is soluble in water, Kraft lignin only in alkaline solutions. the main advantage of organosolv and soda lignin is that they are sulfur-free. However, both are insoluble in water.

Lignin due to its bio-origin, aliphatic-aromatic composition and high abundancy possess theoretically a wide range of applications. Attention is mostly focused on the copolymerization and blending of lignin with various kinds of polymers, such as polyurethanes, phenol-formaldehyde and epoxy resins, polyesters and others.

In our research, we used lignin isolated from grape seeds that are waste products in the wine industry. Lignin was isolated by soda process and showed a high antioxidant activity thanks to its phenolic structure. Our work summarizes the effect of lignin addition on the properties of polyhydroxyalkanoate films. Principally, grape seeds lignin was mixed with crystalline poly(3-hydroxybutyrate) and amorphous polyhydroxyalkanoate via solution casting. the PHA/lignin films showed improved mechanical, thermal and gas barrier properties. the further advantage of these films was high antioxidant efficiency. All prepared samples proved their compostability comparable with a paper standard. Moreover, the obtained biomass after composting enhanced the plant growing.

Acknowledgement: This work was funded through the Internal Brno University of Technology project FCH-S-20-6316

Keywords: *lignin, grape seeds, polyhydroxyalkanoates, films, composting, physico-mechanical properties*

STUDENTSKÁ KONFERENCE: CHEMIE JE ŽIVOT