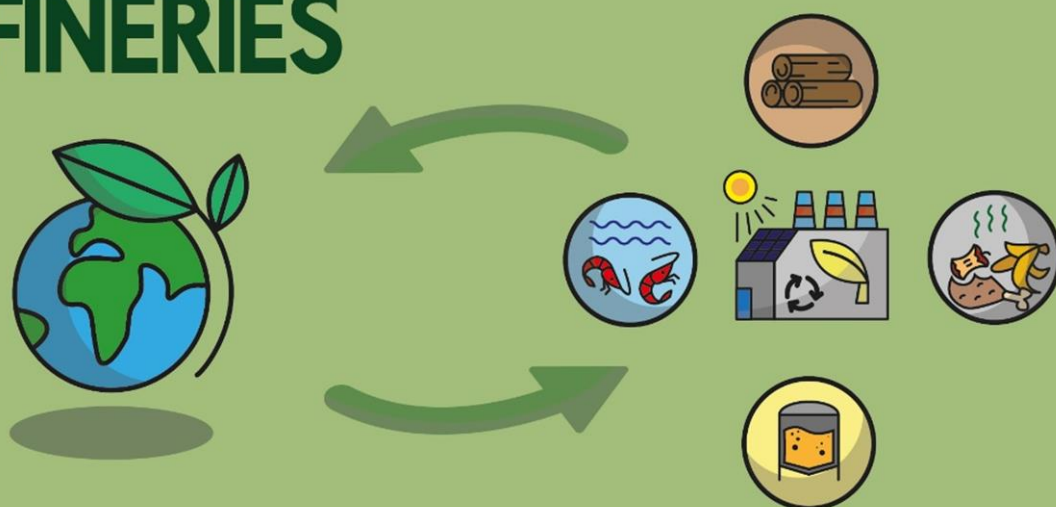


3rd BioSPRINT Workshop

2nd Bilateral Workshop Portugal – Slovenia

Next Challenges of **BIOREFINERIES**



BOOK OF ABSTRACTS

June 14-15, 2023

Department of Catalysis and Chemical Reaction Engineering

National Institute of Chemistry, Slovenia

3rd BioSPRINT Workshop
2nd Bilateral Workshop Portugal – Slovenia

Next Challenges of Biorefineries

BOOK OF ABSTRACTS

June 14-15, 2023

Department of Catalysis and Chemical Reaction Engineering

National Institute of Chemistry, Slovenia

Publisher:

Department of Catalysis and Chemical Reaction Engineering
National Institute of Chemistry, Ljubljana, Slovenia
Ljubljana, June, 2023

Editors:

Ana Jakob, Filipa A. Vicente

Organizing Committee:

Ana Jakob, Jorge F. B. Pereira, Filipa A. Vicente

Issued by

National Institute of Chemistry

Printed by

Infokart d.o.o., Ljubljana

Place and year of publication

Ljubljana, 2023

Circulation

55 issues

Complimentary publication

Bio-based unsaturated polyester resins – a step towards a biorefinery solution

Olga Pantic,^a Sanja Savic,^a Vesna Panic,^b Maja Markovic,^b Pavle Spasojevic^b

^a University of Belgrade, Innovation Center of Faculty of Technology and Metallurgy, 4 Karnegijeva Street, 11000 Belgrade, Serbia

^b University of Belgrade, Institute of Chemistry, Technology and Metallurgy, 12 Njegoseva Street, 11000 Belgrade, Serbia

E-mail: olga.pantic@ihm.bg.ac.rs

The importance of producing thermoset polymers from natural resources has grown due to environmental concerns. Implementing the biorefinery concept is vital for replacing petroleum-based raw materials and transferring to cleaner technologies. Unsaturated polyester resins (UPRs) are a significant class of thermosetting polymers, with a wide range of properties gained from a considerable number of materials that are used for their synthesis. They can be used as pure resins or resins reinforced with suitable fillers in composite material production, which is the focus of this research. Generally, UPRs consist of two main components, prepolymer and reactive diluents, commercially both of which are commonly derived from petroleum. So, it is important to find an adequate bio-based alternative not only for styrene as a reactive diluent, but also for monomers that are used for prepolymer synthesis. Many bio-based monomers (propylene glycol, isosorbide, neopentyl glycol) and reactive diluents (vinyl levulinate, butanediol dimethacrylate, dimethyl itaconate) were investigated in formulating a bio-based UPR. Alongside this, many different bio-based fillers (hemp fibres, spent coffee grounds, rosehip seed flour) were also examined, to conclusively obtain a fully bio-based composite material. Sole introduction of bio-based raw materials is insufficient for proper implementation of the biorefinery principle. It is equally important that the final formulation of the obtained composite material demonstrates that it is environmentally and economically feasible. The quality and market price of the bio-based composite material must be at least be comparable to or better than those of a product from a conventional process in order to be competitive.