

Abstract for 11th International Conference on Bio-based Materials, 15 - 16 May 2018, Maternushaus, Cologne

Zero Waste Ligno-Cellulosic Biorefineries by Integrated Lignin and Humins Valorisation (ZELCOR)

Richard Gosselink¹ and Stéphanie Baumberger²

¹Wageningen Food & Biobased Research, Wageningen, The Netherlands, richard.gosselink@wur.nl

²Institut Jean-Pierre Bourgin, INRA, AgroParisTech, CNRS, Université Paris-Saclay, 78000 Versailles, France, stephanie.baumberger@inra.fr

ZELCOR is a BBI-JU funded H2020 EU project (GA 720303) consisting of 17 partners from 8 countries which started in October 2016. ZELCOR's overall goal is to demonstrate the feasibility of transforming recalcitrant by-products considered as waste, namely lignin- and humins-rich streams, into high added value materials, including functional biopolymers, lignin and furanic oligomers and phenolic monomers. Valorisation of these recalcitrant by-products will enable a lignocellulosic biorefinery to become a zero waste biorefinery and more economically feasible.

A strategy combining chemical and enzymatic catalyses with microbial conversion has been under investigation to obtain a wide range of valuable products from lignin and humins, a side product in the conversion of carbohydrates into furanic building blocks. Targeted applications are high added-value end-products in the field of coating materials, packaging bioplastics and cosmetics.

Following a cascading process, lignin and humins-rich recalcitrant materials are sequentially fractionated, catalytically depolymerised by chemical and microbial processing, functionalised and refined. Streams generated at each stage are all valorised, thus fulfilling the 'zero-waste' goal.

The targeted end-products and applications match the demand of the chemical and cosmetic industries for functional bio-based molecules with both biological activities and structuring properties.

ZELCOR considers two pathways to set-up lignin and humins new value chains. Beyond the zero waste and economics gains targets, multicriteria analysis of main value chains is further developed including considerations of industrial and ecological risks.

This presentation will explain the overall goals and ambition of this zero-waste lignocellulosic biorefinery concept and will present the first results obtained.

More information can be found on <https://www.bbi-europe.eu/projects/zelcor>