

SElectiveLi

Conceptual Study of Electrochemical based novel process using Lignosulfonates to produce bio-based monomers & polymers

Summary

Bio-based industries are central to building a European circular economy; meanwhile, using Europe's own biomass resources improves raw material security by reducing reliance on fossil-based feedstock imports.

However, extracting higher-value compounds from lignin (a by-product of paper and pulp production), one of the most important low-cost feedstocks, is currently inefficient and expensive. The SElectiveLi project will address this challenge by using electrochemical processes that take advantage of surplus energy available via smart grids. This should reduce the cost of production as well as making it more effective and environmentally superior.

Using this approach, SElectiveLi will extract a range of aldehydes for potential food, adhesive, and pharmaceutical applications and intermediates for conversion into polymers. It will also develop downstream separation and purification processes for the latter.

Objectives

As well as its overall objective of establishing the value of electrochemical processes in bio-based feedstock and future commercialisation, SElectiveLi will deliver a number of potential environmental and societal impacts. It will:

- Create and preserve numerous jobs in Europe, as a core aspect of the industrial biotechnology's key enabling technologies (KETs) for the circular economy. By 2030, some 700,000 jobs are predicted in the bio-based materials supply chain sector.
- Support Europe's SMEs, who will be able to use the continuous electrochemistry biorefinery system for lignosulfonates valorisation intermittently or seasonally, adapted to their specific needs and demands.
- Build on Europe's work in becoming leaders in renewable energy sources to help decarbonise industrial chemical production. As many of the chemical processes are batch-based, rather than continuous, they can look to renewable



<https://selective-li-project.uni-mainz.de/>

Type of Action:

Research & Innovation Action

Value Chain: VC2 – forest-based

Start date: 01 May 2019

End date: 30 April 2023

BBI JU contribution: € 2,497,224.00

Expected impacts

The SElectiveLi project aims to deliver a number of impacts. It seeks to:

- Improve sustainable biomass feedstock supply for both existing and new value chains. It will use a supply of sustainable lignosulfonate feedstock to validate the chemical production process at scale. This will ultimately improve how existing feedstock sources from pulp and paper are used.
- Research, develop and innovate ways to improve the efficiency of integrated biorefineries. This will produce higher-value chemicals at a lower cost and will use less energy.
- Develop innovative bio-based products for identified markets. These will include aldehydes and derivatives suitable for use in common polymers.
- Create and accelerate the uptake of bio-based products and applications, by working closely with industrial companies already supplying lignin-based products to



energy, avoiding periods of peak demand.

This will provide a significant contribution to making industry less energy intensive and more competitive.

- Develop a green and sustainable strategy opening access to basic chemicals which does not compete with food sources.

global markets.

Project coordination

- Johannes Gutenberg-Universität Mainz (Germany)
- Sappi Papier Holding GmbH (Austria)
- Vlaamse Instelling voor Technologisch Onderzoek NV (Belgium)
- Optimizacion Orientada a la Sostenibilidad SL (Spain)
- SINTEF AS (Norway)
- Acondicionamiento Tarrasense Asociación (Spain)
- Life Cycle Engineering SRL (Italy)
- Chimar (Hellas) AE – Anonymi Viomichaniki Kai Emporiki Etaireia (Greece)

Organisation name: Johannes Gutenberg-Universität Mainz (Germany)