

SmartLi

Smart Technologies for the Conversion of Industrial Lignins into Sustainable Materials



Summary

Currently, almost all aromatic chemicals and building blocks originate from fossil fuels like oil. Lignin is a phenolic natural polymer with the potential to replace these non-renewable resources.

SmartLi will develop valorisation routes for lignin, creating materials – notably composite materials and resins - with the potential to replace those that presently depend on fossil raw material sources. Importantly, it will source them from underutilised lignin by-products from pulp and paper industry.

SmartLi will add value to the underexploited biomass sidestream lignin and deliver quality homogeneous raw materials for users. At the same time, it will reduce dependence on fossil fuel based raw materials and enhance sustainability by reducing greenhouse gas emissions.

<http://clcinnovation.fi/activit y/smartli/>

Type of Action:

Research & Innovation Action

Value Chain: VC2 – forest-based

Start date: 01 July 2015

End date: 30 June 2018

BBI JU contribution: € 1.481.258

Objectives

- Develop and demonstrate technologies and processes to use technical lignin (kraft lignins, lignosulphonate and bleaching effluents) as raw materials to produce biomaterials, such as components with improved properties for composites, plasticisers and different types (PU, PF, epoxy) of resins.
- Replace oil-based product by bioproducts from lignin (e.g. to substitute 25-75% of phenol in formaldehyde resins, to replace at least 50-70% of polyols in polyurethane foams).
- Perform a Life Cycle Analysis to assess the economic, environmental and social sustainability of the developed products and identify a strategy for market penetration.

Expected impacts

- Development of applications for technical lignins which are presently not valorised and which allow the replacement of fossil-based products in 4 product categories: thermoplastic composites, PF resins, PU foams and epoxy resins.
- Facilitation of market penetration of these bio-based products in the respective sectors with high demand, thereby creating business opportunities and jobs.
- An expected reduction of 20% in GHG emissions.

Achievements & milestones

Lignin in the chemical industry

10 October 2018

Today nearly all aromatic chemicals are made from oil-based sources. European researchers proposed to use lignin, a structural component of many plants and algae, as an alternative raw material in chemical production. [Read more](#)

Project coordination

- CLIC Innovation (Finland)
- Tecnaro Gesellschaft zur Industriellen Anwendung Nachwachsender Rohstoffe Mbh (Germany)
- Aep Polymers Srl (Italy)
- Fraunhofer Gesellschaft zur Forderung der Angewandten Forschung EV (Germany)
- De Vlaamse Instelling Voor Technologisch Onderzoek N.V. (Belgium)
- Metsa Fibre Oy (Finland)
- Teknologian Tutkimuskeskus VTT OY (Finland)
- Sappi Netherlands Services B.V. (The Netherlands)
- Foresa Industrias Quimicas Del Noroeste Sa (Spain)
- Kompetenzzentrum Holz Gmbh (Austria)
- Prefere Resins Finland Oy (Finland)
- Kotkamills Oy (Finland)
- Andritz Oy (Finland)

Organisation name: CLIC Innovation (Finland)