

IMPRESS - New optimized method of preparation of spherical lignin nanoparticles from the Dawn process lignin has been developed

Project:

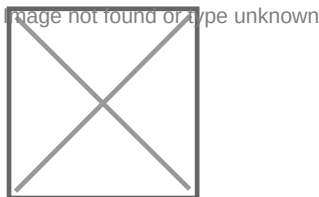
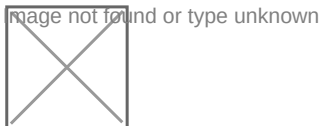
Integration of efficient downstream ProcessEs for Sugars and Sugar alcohols

Project website: <https://www.aspire2050.eu/impress>

IMPRESS integrates disruptive upstream and downstream technologies developed by the project partners. IMPRESS concept uses 2nd generation biomass and turns process streams into value added products and green chemicals to replace existing fossil-based products.

The IMPRESS consortium consists of 10 leading European companies as well as research, development and educational organisations.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 869993.



Sector:

Chemicals

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Engineering

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Refining

Summary:

Despite of its antioxidant, UV-shielding and antimicrobial properties, lignin is undervalued plant-based material most of which is burned as fuel. Limited use of crude lignin is caused by its heterogeneous structure, low solubility of most of industrial lignins in water. Preparation of spherical lignin nanoparticles with well-defined surface structure allows to overcome many limitations of crude lignin and opens up new application possibilities.

Lignin from the Dawn process had the same limitations but appeared quite challenging also for converting into nanoparticles. Nevertheless, researchers from Aalto University revealed which specific process conditions during isolation of Dawn process lignin that had a negative impact on lignin chemical structure and thus hindered converting lignin into lignin nanoparticles. This finding was made possible through effective communication and support from Avantium.

Obtained knowledge allowed to develop optimized method of preparation of spherical nanoparticles from the Dawn process lignin. Master's Thesis was completed in February 2022 based on the results of this work: Fengyang Wang, '[Supramolecular Colloidal Assembly of Flow Hydrolysis Hardwood Lignin from Dawn Technology™ Process](#)'.

Spherical lignin nanoparticles made of the Dawn process lignin. AFM 3D image.

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Theme:

[Efficient integrated downstream processes - CE-SPIRE-04-2019](#)

Keywords:

IMPRESS, H2020, biorefining, greentech, resources efficiency, separation, purification, education, elearning

Type:

[Case study](#)

Rights:

Open Access

Resources

Link:

[IMPRESS project video](#)

[IMPRESS leaflet](#)

[IMPRESS E-platform \(Free MOOC\)](#)

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