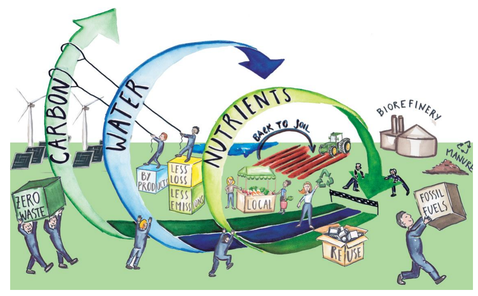
WUR Knowledge Base Programme

Circular and climate neutral society



KB34-3A-6. Establishment of a Pan-European Network on the Sustainable Valorisation of Lignin (LignoCOST)

Project Team: Richard Gosselink, Ted Slaghek, Gijs van Erven (WFBR), participants: Mirjam Kabel (FCH), Luisa Trindade (WPR), Arend van Peer (WPR) and >300 participants from 44 countries

Background

Lignin has the potential to become the future aromatic resource for industry, but it is largely underexploited due to lack of (information on) industrial availability, sustainable applications and environmental footprint. LignoCOST brings together all actors in the whole value chain to deliver this information and stimulate the use of lignin in industrial applications.
LignoCOST is a network in which exchange of research results, topics and identification of lacking information to stimulate the use of lignin in industrial applications occurs. This is achieved by organizing working group meetings, events, conferences, training schools and short-term scientific missions for young researchers in this field.

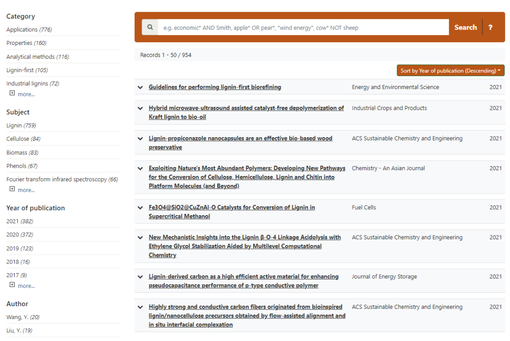
Project objectives

The main objective of LignoCOST is to establish a sound network covering the entire value chain in which relevant information can be produced with a focus on lignin valorisation towards sustainable industrial applications.

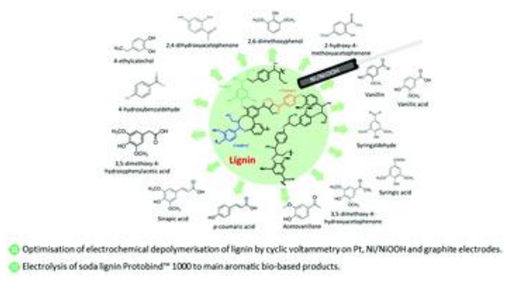
Results so far

This LignoCOST network has broad together > 310 participants from 44 countries to jointly work on the stimulation and development of lignin valorisation value chains. Not only academic participants, but also > 20 small and larger industrial parties joined this network.

LignoCOST made large progress on the following topics:
1) Many joint peer reviewed papers, presentations and dissemination activities have been realised. 2) Many projects and ideas have been realised with help of this network. 3) A so-called wikilignin database has been defined with more than 950 literature references and is still growing in numbers. 4) Most important lignin production and conversion technologies have been selected and information has been collected. 5) 7 priority, most promising, lignin value chains and products were selected. 6) For a number of these selected value chains factsheets and documentation were prepared and completed. 7) Techno-economic and life cycle assessment was started by a joint literature review. The value chain on "lignin based resins" was chosen to work on for the techno-economic evaluation. 8) A collaboration with IEA Task 42 Biorefineries has been started and will result in a joint report on sustainable lignin valorization (to be published in Nov 2021). 9) A dedicated website (www.lignocost.eu) has been created.
10) In 2021, an online working group day was held on April 26. A MC committee meeting was organized in June and a conference on lignin + working group meetings were organized online on 1-2 September 2021.



Wikilignin portal



Joint papers

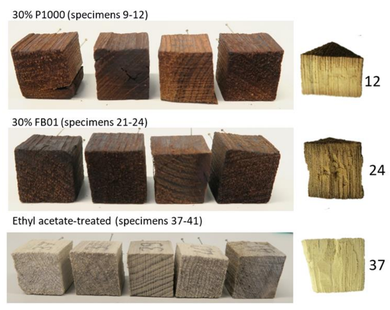
Expected impacts

This network will deliver information on how to stimulate the industrial use of lignin in new value chains towards sustainable and circular products. Lignin is a large side stream of the current pulp & paper industry and of the upcoming biorefinery industry. Valorizing lignin will complete the total use (zero waste) of lignocellulosic biomass resources into marketable products. Creating these value chains will have a large impact on the circular and climate neutral society as lignin will be used to substitute fossil resources and store biogenic CO_2 in products with a long lifetime (e.g. in building materials and bio-asphalt).
To achieve these impacts, reports with inventory of industrial market application requirements versus lignin properties will be delivered, hence stimulating the cooperation at international level between the different actors involved (lignin production, fractionation-conversion and end-users). These developments will be supported by evaluation of technical and sustainability aspects. For WUR the development of processes to convert lignin rich side streams into sustainable products for the building, infra, materials sectors is very important. Additionally, to further understand the possibilities of lignin and how to tune lignin properties for different applications will help WUR researchers to focus on whole crop utilisation.

Research and outreach plans remaining time

In the coming year several networking activities will be organized:
- 10-15 Short term scientific missions to train young researcher at partner organisations
- Training school
- Lignin conference organized by WUR (June 2022)
- Working group, stakeholder and management committee meetings

- Wikilignin portal will be further strengthened
- Lignin process development will be ranked at TRL
- Priority value chains including product – lignin combinations will be described with feedback from industrial stakeholders
- Factsheets about lignin type and characteristics will be completed
- More detailed information on techo-economic and LCA will be generated for the selected value chains
- Joint report on sustainable lignin valorization together with IEA Task 42 biorefineries



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https://www.wur.nl/en/Research-Results/Research-funded-by-the-Ministry-of-LNV/Expertisegebieden/kennisonline/EU-Cofin-2018-Lignocost-1.htm

LignoCOST project website: www.lignocost.eu

www.cost.eu

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