

ALIGN project launched:

Developing bio-based aromatics from lignin

Over the next three years, the eight project partners Axxence, CLIB2021, Fraunhofer CBP, KU Leuven, LXP Group, Phytowelt, UPM and VITO join forces to develop “Aromatics from LIGNin”. Phenolic resins will be applied for the production of high-pressure-laminates as well as natural vanillin for food and beverages. The German project partners will receive 1.3 m EUR from the Federal Ministry of Education and Research (BMBF).

Lignin, the second most abundant terrestrial polymer and the only large source for bio-based aromatics, is currently used in limited amounts. Conventional lignin extraction processes are often optimised towards the fractionation and purification of cellulose for pulp production, with lignin regarded as a by-product, resulting in a poor lignin quality i.e. an undefined structure and a low degree of functionalisation. Usually, only its energy content is recovered by combustion. However, converting lignin into high-value products is essential to render biorefineries profitable.

The use of lignin extraction processes, which maintain the structure and functionality of lignin, in combination with innovative chemical and biotechnological conversion routes enable the production of functionalised bioaromatics. New, hitherto not accessible structures including new functionalities and, thus, new performances, which can be used in a variety of industrial applications, can be detected. To valorise large amounts of lignin the ALIGN project team addresses the platform (bulk) chemical sector.

The ALIGN project focuses on upscaling three extraction processes that lead to both a high-value lignin fraction and a pure cellulose/sugar fraction: The LX process (LXP), a Organosolv process combined with base-catalysed depolymerisation (BCD) and the lignin-first process (LFP). The lignin fractions derived from the three processes differ in their composition in regard to the degree of depolymerisation and functionalisation.

Starting with this broad range of different lignin derivatives combined with tailor-made downstream processing (DSP) strategies, a wide variety of bioaromatics with unique properties can be produced. The project aims at applying these bioaromatics as phenolic resins for the production of high-pressure-laminates as well as natural vanillin for food and beverages.

To foster an industrial implementation, the consortium covers stakeholders from the whole value chain starting from lignin extraction (Fraunhofer CBP, LXP Group, KU Leuven) via DSP (VITO) to application (UPM, Phytowelt, Axxence) under the coordination of CLIB2021. Apart from the above-mentioned ones, the processes can be adjusted in future projects for a wide variety of applications in the aromatics sector from fine chemicals to bulk products.



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The BIG-Cluster Initiative

This project is a unique cross-border cooperation between the Flanders region of Belgium and the German state North Rhine-Westphalia (NRW). Together with The Netherlands, these regions are part of the BioInnovation Growth mega-Cluster (BIG-Cluster): a cross-border Smart Specialisation Initiative aiming at making Europe's industrial mega-cluster a global model in comprehensive bio-based value chains. BIG-Cluster was initiated by the three cluster organisations BE-Basic (The Netherlands), Catalisti (Flanders, Belgium), and ALIGN project coordinator CLIB2021 (NRW, Germany) <https://www.bigc-initiative.eu/>