

SUSBIND



Development and pilot production of SUSTainable bio BINDer systems for wood based panels

<https://susbind.eu/>

Type of Action:

Research & Innovation Action

Value Chain: VC4 – organic waste

Start date: 01 May 2018

End date: 30 April 2022

BBI JU contribution: € 4,414,419

Summary

Currently, wood boards such as Particle Board (PB) and Medium Density Fibreboard (MDF) rely on the use of fossil-based binders, mainly formaldehyde-based binders. Although there has been a great deal of investigation into potential alternatives, to date none of the bio-based alternatives have performed satisfactorily on an industrial scale.

By bringing together partners with an extensive technological background built up in recent years, the SUSBIND project aims to successfully produce and test bio-based binders as alternative to fossil-based binders. It will identify adequate feedstocks for production; develop new and greener production techniques including novel epoxidizing enzymes. In addition, it will produce and validate binders for Particle Board (PB) and Medium Density Fibreboard (MDF) with leading manufacturers.

The SUSBIND resulting binder system will prove better performance in PB and MDF in terms of 50 - 75% reduction of emissions than current fossil-based wood boards. The active participation of industry and a consumer brand owner secures post-project scale up into existing plants. On the basis of cost analyses performed, an economically viable and better performing precursor will increase the marketability of bio-based furniture products concerned. The results of SusBind will not only benefit consumer health and help mitigate climate change, but also strengthen the European furniture industry by providing cost efficient bio-based binders.

Objectives

The overall objective of the SUSBIND project is to produce and test, in an industrially relevant environment (TRL5), bio-based binders in the production of wood-based panel board as alternative to those using formaldehyde. The specific objectives are to:

- Identify and select the most sustainable feedstock from Europe's starch- and vegetable oil-based bio-refineries as raw material for the producing thermoset resins as bio-based binders for making particle boards and medium density fibre boards;
- Develop, scale up and validate, to TRL5, chemical routes for synthesising carbohydrate-based amino-plastic and other wood adhesive systems using in-situ

Expected impacts

The overall impact of SUSBIND will be to benefit public health and help mitigate climate change by providing cost-efficient bio-based binders. It also aims to provide a boost to Europe's furniture industry with a competitive green advantage. Specifically, it expects to:

- Reduce the carbon footprint by 25 percent compared to current state-of-the-art;
- Keep the cost of production increase of using the new binders to an acceptable level, ideally less than 15 percent;
- Reduce formaldehyde emissions from particle and MDF board manufacture by 50 – 75 percent;
- Establish two new cross-sector cooperations, supplying the new resins to

- polymerisation of urea and other monomers and use the chemicals as bio-based binders for wood board production;
 - Develop, scale up and validate, to TRL5, a new enzymatic technology for selective epoxidation of unsaturated plant fatty acids and oils with peroxygenases; Test these products as ingredients for binders and mainly as cross-linker for the carbohydrate based amino-plastic resins and as reactive alternative of wax emulsion normally used in wood board production.
 - Validate these novel bio-based binders in industrially relevant environments, at TRL5 - particularly for particle board and medium density fibre board - for comparable or superior mechanical properties and lower emissions profiles than the current state-of-the-art;
 - Ensure that the produced bio-based resin developed has a smaller carbon footprint and a lower human health impact and that the new binder meets all relevant market, standardisation and regulatory requirements;
 - Develop and implement a dissemination, exploitation and communication plan to enhance innovation capacity and integrate the new insights, both from the project partners and the wood-based board sector as a whole.
- both particle board and medium density fibreboard manufacturers, replacing current supply from chemical manufacturers to ingredients company;
 - Establish two new bio-based value chains; one from the source carbohydrates to wood based panel boards, the other from the source vegetable oils to wood based panel boards.

- RTDS – Verein Zur Forderung der Kommunikation und Vermittlung Von Forschung, Technologie Und Innovation (Austria)
- Cargill Deutschland GMBH (Germany)
- CE - Onderzoek, Advies Enconsultancy voor Duurzaamheid BV (The Netherlands)
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- Kompetenzzentrum Holz GmbH (Austria)
- Technische Universitaet Dresden (Germany)
- Valbopan - Fibras De Madeira SA (Portugal)
- Ikea of Sweden AB (Sweden)

Project coordination

Name: Stephen Webb

Organisation name: RTDS Group (Austria)

Phone: +43 (0)1 3231000