

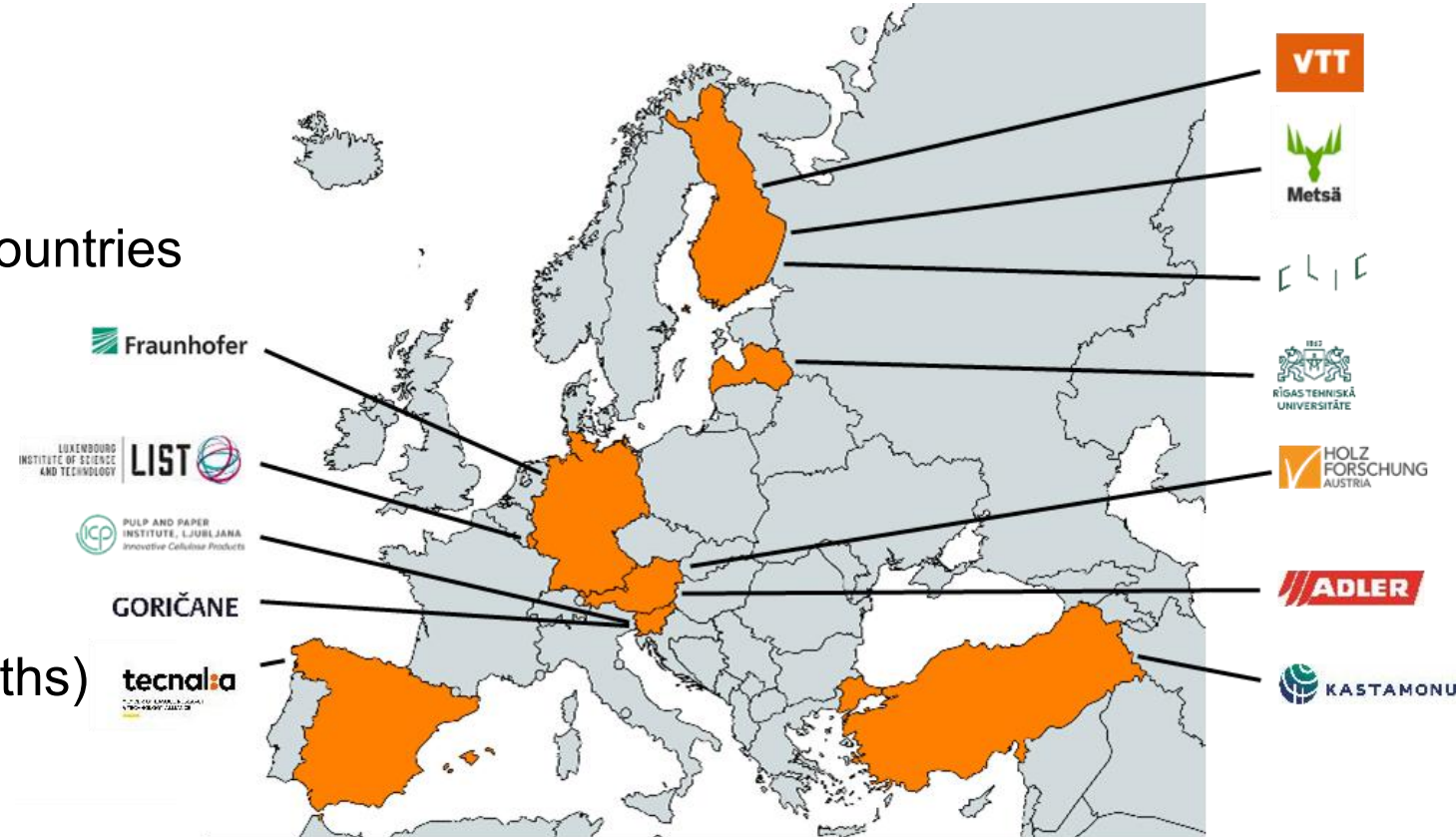
SuperBark – Safe and sustainable adhesives and coatings from industrial softwood bark

European Bioplastics meeting, 23rd June 2026

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General information

- Funded by CBE JU: 4 468 890 €
- Consortium: 12 partners from 8 EU countries
 - 6 RTO
 - 1 University
 - 1 SME
 - 4 large companies
- Coordinator: VTT
- Duration: 09.2023 - 08.2027 (48 months)



Motivation behind SuperBark

- More than **12 M tons (dry)** of industrial softwood bark in the EU, mostly in Sweden and Finland.
- Bark is mainly combusted at the mills for energy → **low value**.
- Softwood **bark contains valuable compounds** such as polyphenols or cellulose that can be exploited in a wide range of applications (e.g., adhesives and coatings).



Objectives

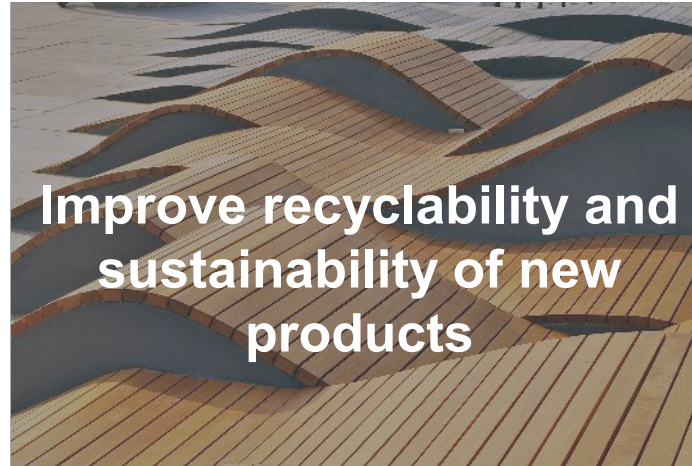
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|--|---|---|
| 1 Produce bio-based components for adhesives and coatings from industrial softwood bark, using novel alkaline extraction and membrane-assisted separation technologies. | 2 Develop adhesives with $\geq 95\%$ bio-based content from polyphenols extracted from bark for plywood, particleboard and medium-density fibreboard. | 3 Develop coatings with $\geq 95\%$ bio-based content from bark-based cellulose nanofibrils and polyphenols for plywood and packaging paper. |
| 4 Apply a Safe-and-Sustainable-by-Design framework to support the design of safe and sustainable adhesives and coatings using bark components. | 5 Develop digital tools including process design, data analytics and system dynamics modelling to support the scale-up and market integration of the adhesives and coatings. | 6 Communicate, disseminate and exploit the outcomes of the project to relevant stakeholders to increase awareness of the new technologies, products, and associated opportunities. |

Impacts



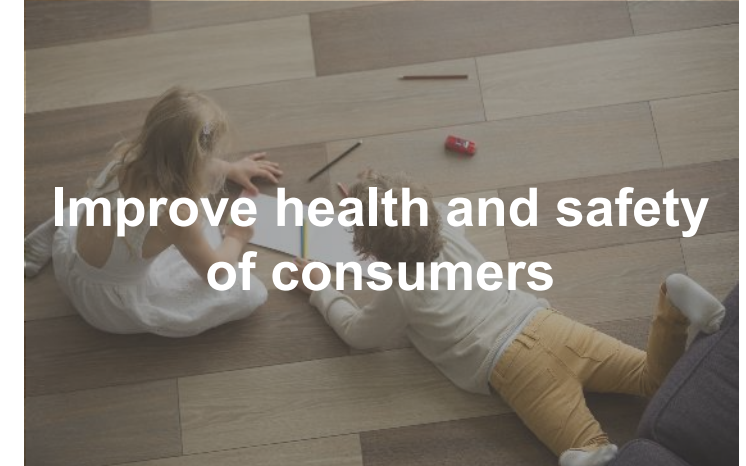
Increase bio-based product portfolio

SuperBark will develop and validate **adhesive and coating formulations with $\geq 95\%$ bio-based content** to replace fossil-based solutions in wood panels and packaging paper. Industrial replication of the SuperBark technologies will **increase availability of bark-based components and bioproduct portfolio**.



Improve recyclability and sustainability of new products

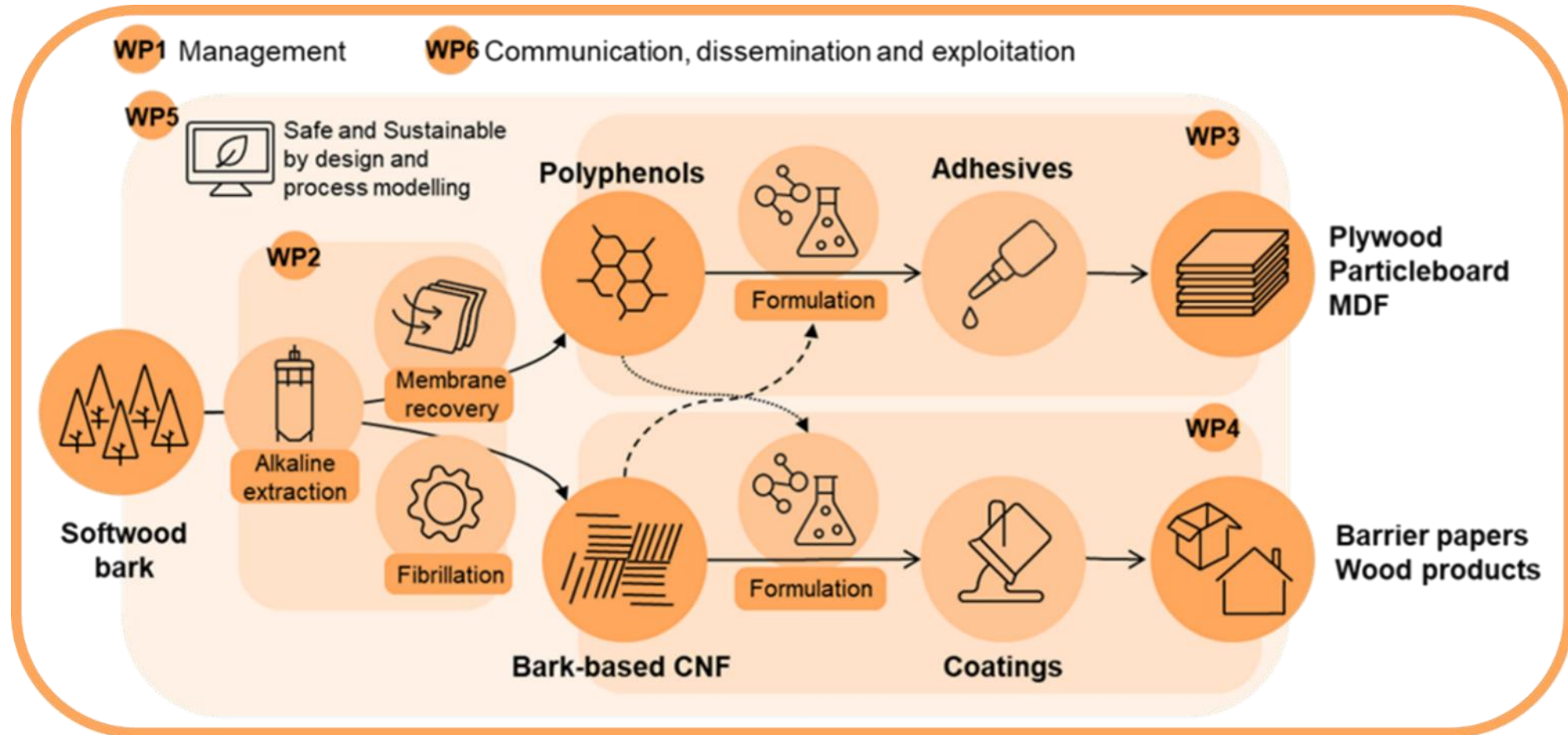
SuperBark will utilize **bark residues that are typically combusted** for energy generation to develop bio-based adhesives and coatings. The **new bio-based products will be recyclable at the end of their service life**, further improving their sustainable profile.



Improve health and safety of consumers

SuperBark products will **reduce demand of harmful fossil-based chemicals** and polymers. Replacing e.g., formaldehyde and PFAS in adhesives and coatings with bark-based alternatives will **improve public health by eliminating consumer and occupational exposure** to these harmful chemicals.

Concept scheme



Production of bark-based components

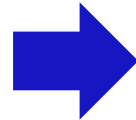


- Barks from Norway spruce, Scots pine, and Calabrian pine are used in the project.
- As alternative to membrane separation, polyphenols are also recovered by acid precipitation.

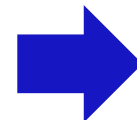
Bark polyphenols for wood adhesives



Bark polyphenols



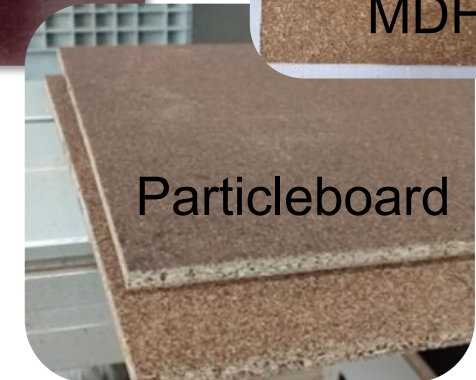
Polyphenol-based resin



Plywood



MDF



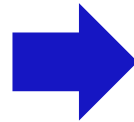
Particleboard

Four different adhesive formulations containing bark polyphenols and $\geq 95\%$ bio-based content are developed to replace fossil-based resins (e.g., PF and UF) used in wood panels.

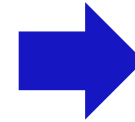
Bark polyphenols for wood coatings



Bark polyphenols



Impregnation of overlay paper



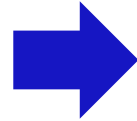
Coated plywood samples

- Bio-based (100%) resin for paper impregnation and coating of plywood.
- Coating properties (abrasion and scratch resistance, hardness) comply with requirements for demanding applications (e.g., transportation).

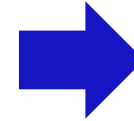
Bark-based CNF for wood coatings



Bark-based CNF



Bark-based CNF paste



Coated plywood samples

Small addition (1 wt.%) of unbleached bark-based CNF to coating formulation improves scratch and abrasion resistance of wood for e.g., flooring applications.

Bark-based CNF for barrier coatings



Bleached bark CNF



Coating formulation



Coated packaging paper

Coating formulation containing bark-based CNF meets the target barrier properties (oxygen and water vapor transmission, grease resistance) for use in food packaging paper.

Bark-based CNF for barrier films



Bark residue



Mechanical fibrillation



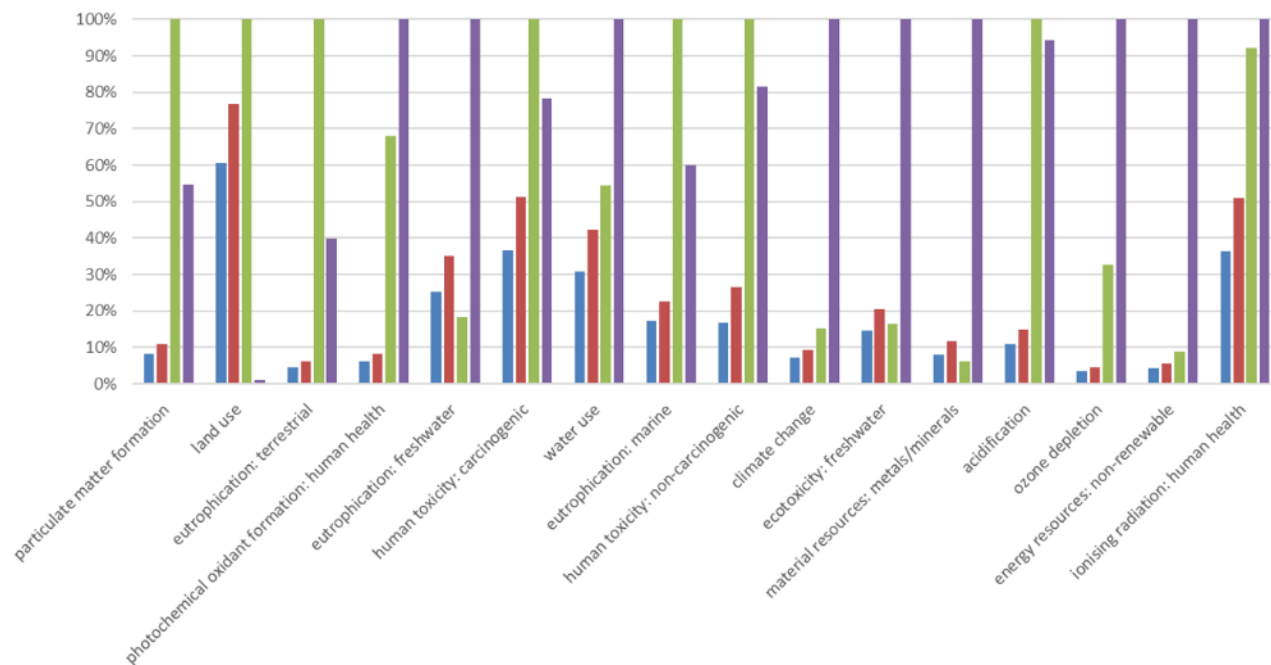
Bark-based CNF grades



Bark-based CNF films

Bark-based CNF films, especially after bleaching, show strength and barrier (oxygen, water vapor) properties comparable to wood-based CNF films.

SSbD assessment & techno-economics

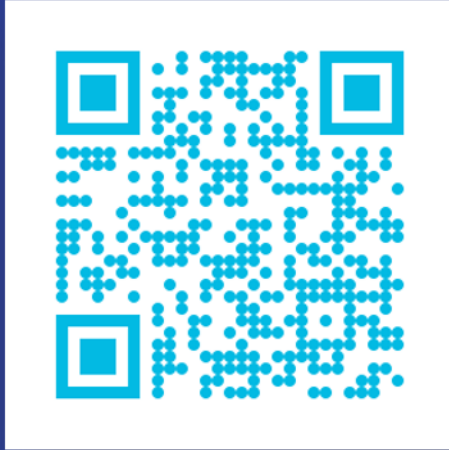


- Safety and sustainability assessment of the value chains to support the technical developments.
- TEA of different scenarios for production of bark-based components.

Next year outlook

- Validate the adhesive and coating formulations in semi-pilot scale (TRL 5) and build sample demonstrators.
- Recyclability and biodegradability of end-products containing the SuperBark adhesives and coatings.
- Finalize LCA with the most promising solutions for each value chain.
- Communication and dissemination of project results, update plans for exploitation.





Thank you!

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