Tree bark as a renewable source of wood protection materials for building applications *(BarkBuild)*

presented by

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ForestValue2

BarkBuild

ERA-NET Cofund Action "ForestValue — Innovating forest-based bioeconomy"

BarkBuild raw materials

Spruce bark

Birch outer bark

BarkBuild intermediates

VTT

Polyphenols

Other

Fibre fraction

Suberinic acids

Fibre fraction

Stockholm University

Binder

BarkBuild products

Wood coating

Stockholm University

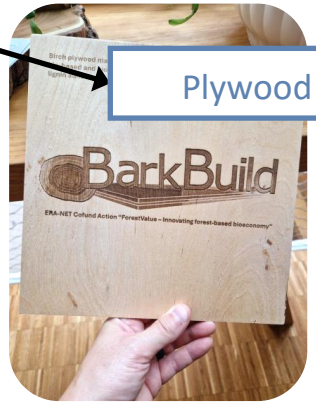
Heat and power

Biocarbon

Particle board

Fiber board

Plywood



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Network of partners from 6 European countries

List of partners

Partner No *	Partner organisation name	Country
1 (Coordinator)	Stockholms universitet (SU)	Sweden
2	Latvian State Institute of Wood Chemistry (LSIWC)	Latvia
3	Renewable Materials and Healthy Environments Research and Innovation Centre of Excellence, InnoRenew CoE (IR)	Slovenia
4	Teknologian tutkimuskeskus VTT Oy (VTT)	Finland
5	Norsk Institutt for Bioøkonomi (NIBIO)	Norway
6	Warsaw University of Life Sciences (WULS)	Poland

Stockholm University

VTT

LATVIAN STATE INSTITUTE OF WOOD CHEMISTRY

NIBIO

WARSAW UNIVERSITY OF LIFE SCIENCES

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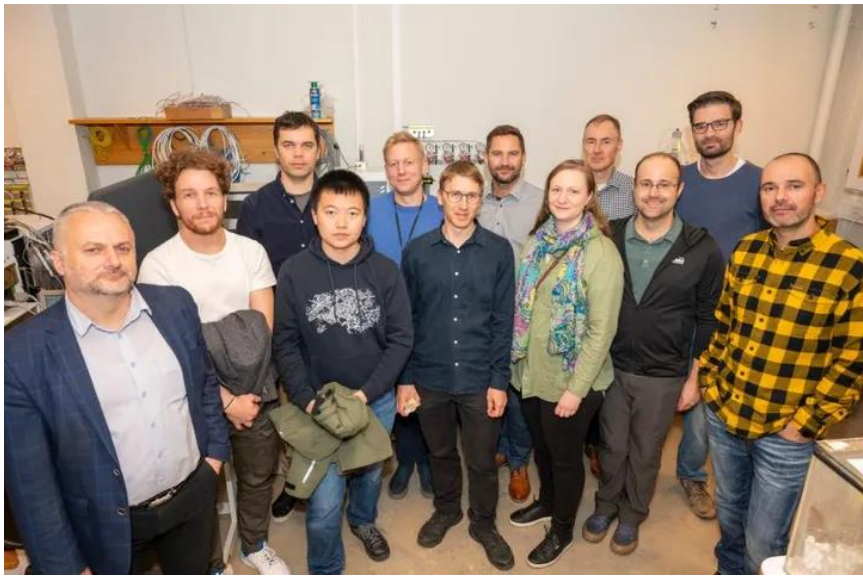
BarkBuild Team: The unique combination of skills

- Biorefinery processes and products
- Forest products and bioeconomy
- Lignin valorization
- Sustainable building materials
- Materials chemistry
- Furniture and wood technology
- Life cycle assessment



Stockholm University

VTT

INNORENEW COE

LATVIAN STATE INSTITUTE OF WOOD CHEMISTRY

NIBIO

1816 SGGW WARSAW UNIVERSITY OF LIFE SCIENCES

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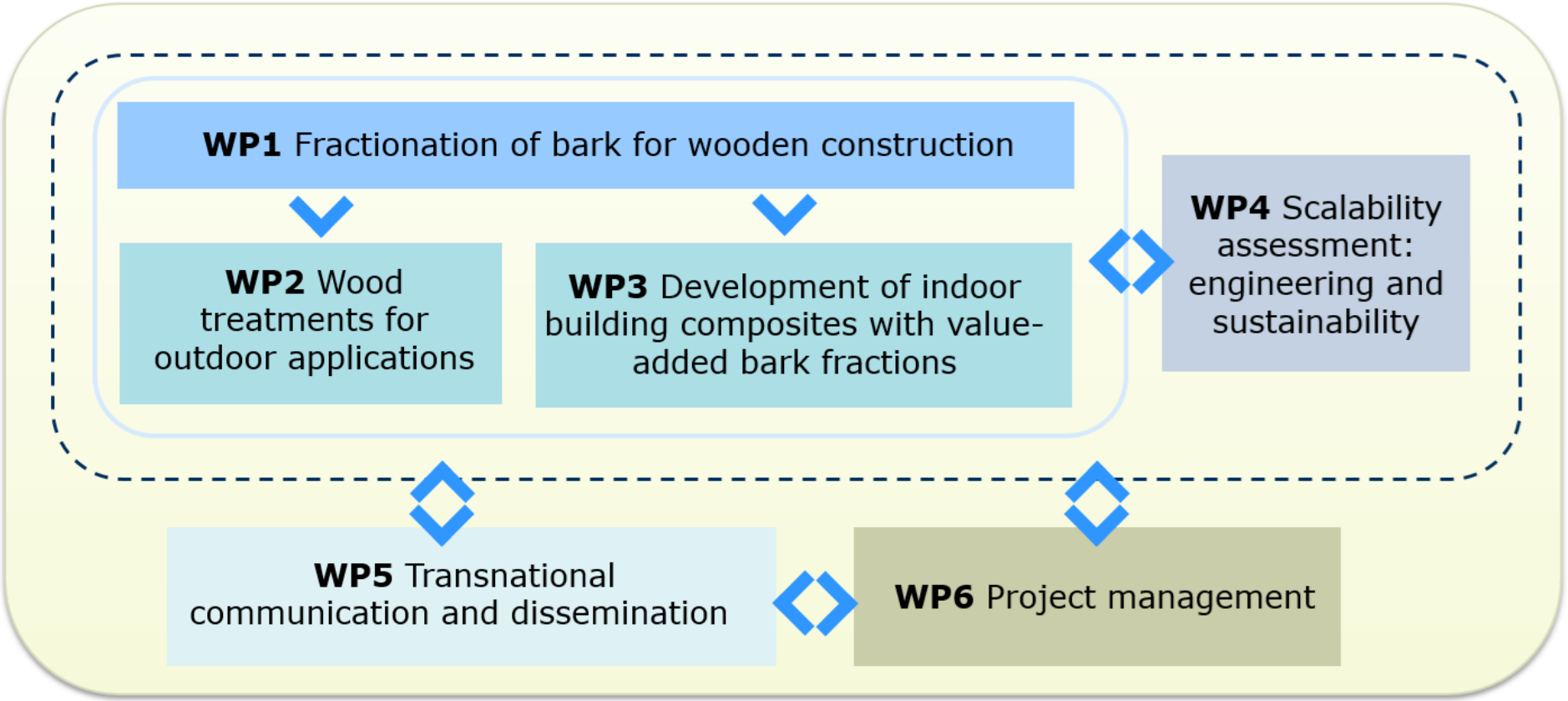
Overview of work packages



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WP1: Bark fractionation: polyphenols

VTT

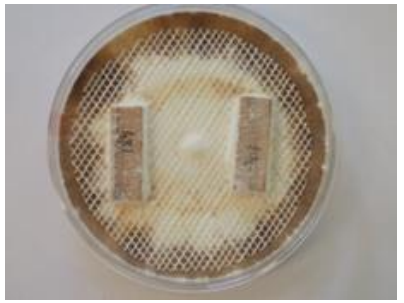
Spruce bark

Alkaline extraction

Bark polyphenols

Pressure impregnation

Pine wood impregnated with polyphenols



Fungal decay testing

Coating

Spruce wood coated with polyphenols and biochar

VOC absorbance testing

Bark polyphenols act as natural preservative and prevent wood decay caused by brown rot.

Coatings based on bark polyphenols act as binder for VOC absorbents to improve air quality.

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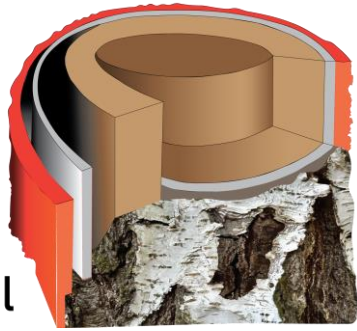
WP2: Wood treatment for outdoor applications - overview



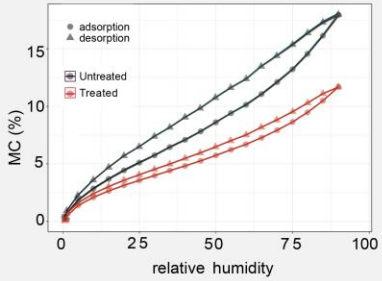
Wood impregnation

Wood coating

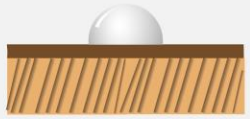
- A: Suberinic acid from birch bark
- B: Polyphenols from spruce bark
- C: Suberinic acids and Polyphenols

Mode of action

Fungicidal properties



Reduced water accessibility



Hydrophobicity

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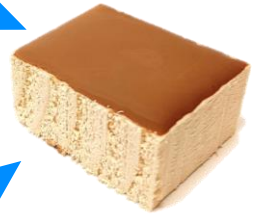
WP2: Wood treatment for outdoor applications - overview

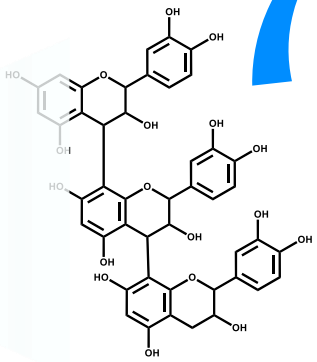
Birch bark

Suberinic acids



Curing

Spruce bark



Polyphenols

Wang et al., *Mater. Horiz.*, 2024,11, 6504-6515

This article is part of the themed collections: Materials Horizons most popular articles 2024 and Materials Horizons HOT Papers

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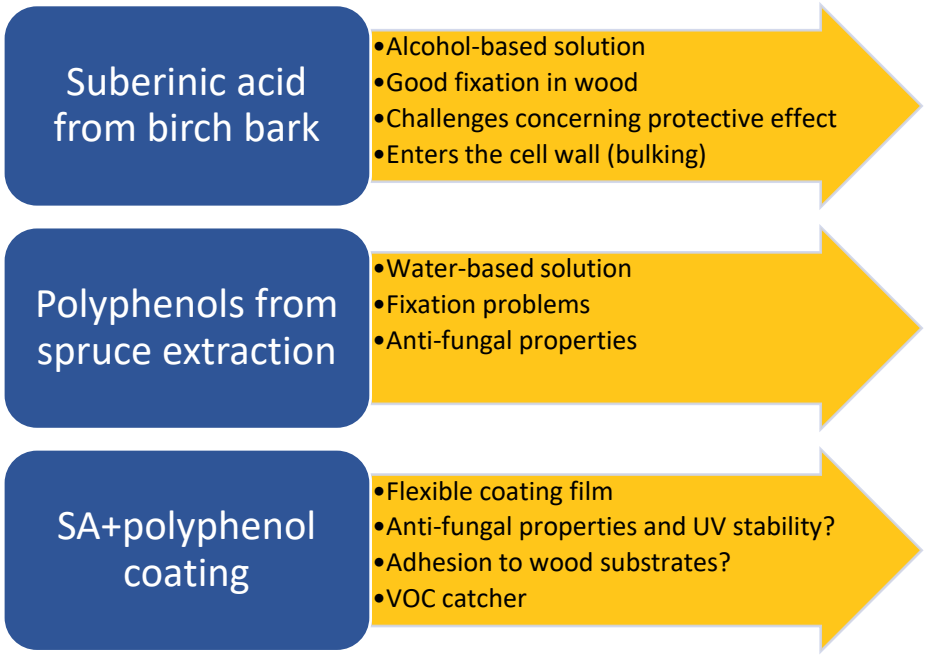
WP2: Wood treatment for outdoor applications - overview



- The Hydrophobic effect could be used in some applications
- Modification and/or combination with other protection agents

- Higher loadings are necessary
- Chemical modification and/or combination with other protection agents

- Indoor applications

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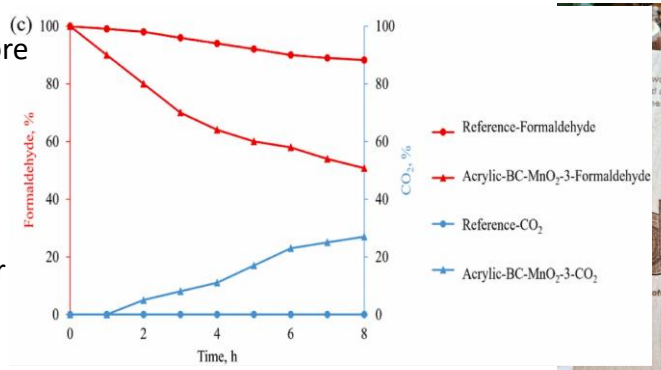
WP3: Indoor applications of bark compsites (formaldehyde-free)

Coatings for indoor formaldehyde removal (InnoRenew)

before

after



Formaldehyde-free plywood (InnoRenew + SU)

Formaldehyde-free fiberboard production (WULS + InnoRenew + SU)

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Results in brief

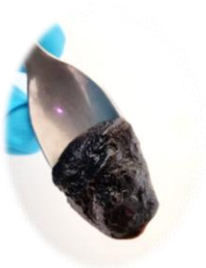
> 6 MSc or PhD theses

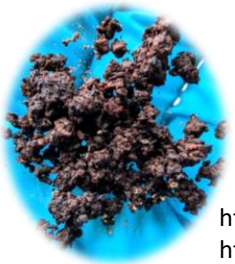
> 15 publications

> 25 conference abstracts

> 250 followers in LinkedIn







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Final steps, and the new opportunities

- Continued collaboration
- TEA and LCA – Case study for efficient use of bark
- Dissemination and exploitation, collaboration with industry (Latvijas Finieris, Holmen, Lumir, Koskisen)
- "The full potential of bark is not yet fully utilized."

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Thank you for your attention!

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