High Performance Bio-based Functional Coatings for Wood and Decorative Applications

# PERFECOAT

## High Performance Bio-based Functional Coatings for Wood and Decorative Applications

## Bio-based innovations for industrial applications

**BIP Meeting Centre, Brussels**

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European Union Funding
for Research & Innovation

This project receives funding from the Bio-based Industries Joint Undertaking (JU) under the European Union's Horizon 2020 research and innovation programme under grant agreement No 101022370. The JU receives support from the European Union's Horizon 2020 research and innovation programme and the Bio-based Industries Consortium.

# TOWARDS A SUSTAINABLE COATING INDUSTRY

**Sustainability** is the development that **meets the needs of the present without compromising** the ability of future generations to meet their own needs.

For us, this involves the development of fossil free materials (e.g. bio-plastic, bio-based coatings) and chemicals, use of energy (e.g. bio-fuels), better solutions for agriculture and food/feed resources and CCUS technologies.

## *Increasing Bio-renewable Content in Coatings Raw Materials*

**Innovative bio-based ingredients**

Substituting raw materials derived from fossil fuels as well as from 1st generation-based biomass and plants used for oil production.

# TOWARDS A SUSTAINABLE COATING INDUSTRY
## The framework of the PERFECOAT project

*"**Bioeconomy** is the production and utilization of biological resources - including knowledge - to provide products, processes and services in all sectors within the framework of a sustainable economy."* Source: Bioeconomy Concept and Elements. German Bioeconomy Council (2015).

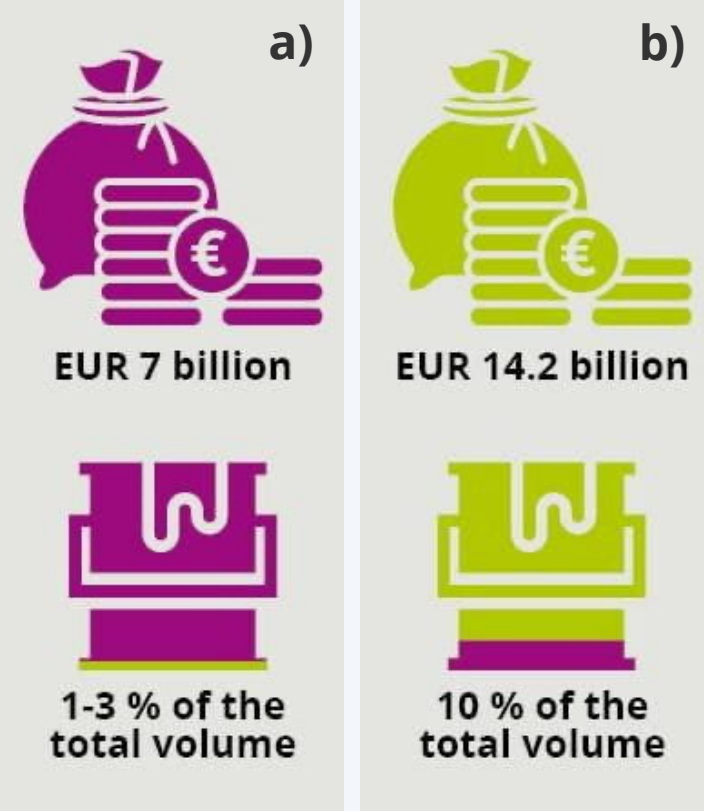
**The PERFECOAT project was initiated in the framework of Sustainable growth and based on the principles of bioeconomy with the specific target of addressing the coating market.**

*Why coatings?*

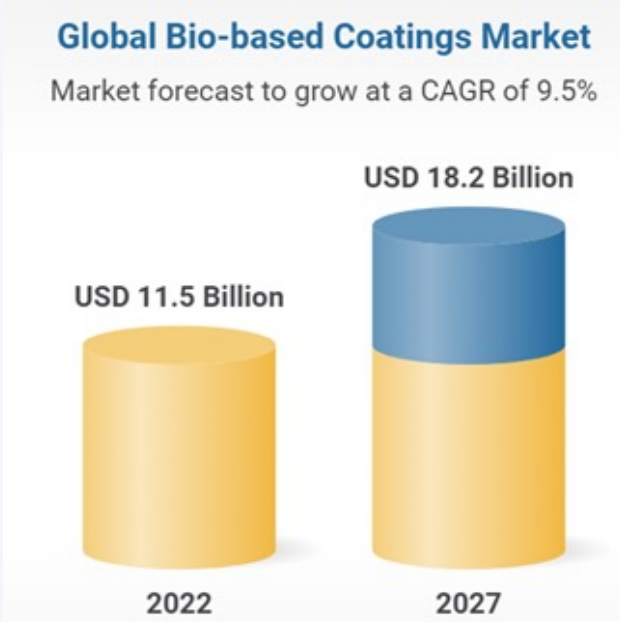
Only 5% of the coating and paints market share by sales values is occupied by bio-based systems. **The demand for bio-based paints and coatings is set to increase.**

# TOWARDS A SUSTAINABLE COATING INDUSTRY
## The framework of the PERFECOAT project

Why coatings? Only 5% of the coating and paints market share by sales values is occupied by bio-based systems. **The demand for bio-based paints and coatings is set to increase.**




**a)** Market size in EUR and market share of 100 % bio-based systems. **b)** Market size of formulations with a merely higher content of bio-based raw materials. Source: EC Technology Forum | Bio-based Coatings in October 2019 in Berlin




The bio-based coatings market is projected to grow from USD 11.5 billion in 2022 to USD 18.2 billion by 2027, at a CAGR of 9.5% between 2022 and 2027.

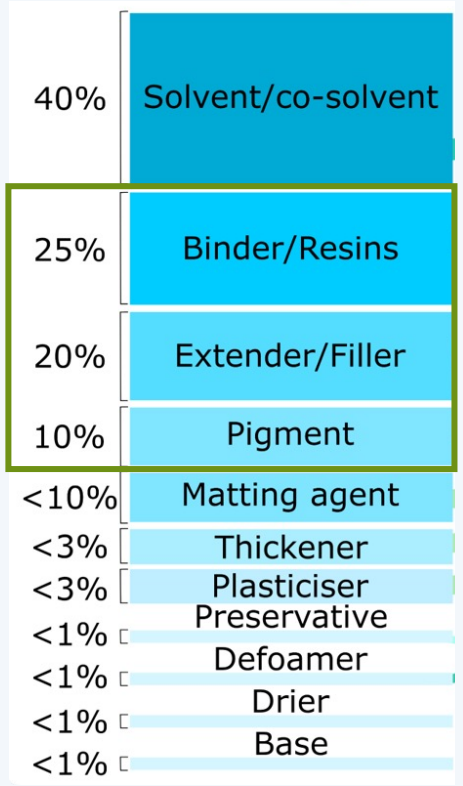
Source: www.researchandmarkets.com/reports/5636774

# TOWARDS A SUSTAINABLE COATING INDUSTRY
## The development of the PERFECOAT project

### How R&D and advancements in Biotech can fill the gaps and contribute to the sustainable future of chemical and coating industries

Within the coating R&D there is an interest in **alternative raw materials** and novel advanced **bio-based building blocks.** However, all these alternatives must be carefully assessed to match (and possibly surpass) the quality and performance of the existing solutions.

**Introduction of bio-based ingredients in existing formulations**




**General composition of coatings**

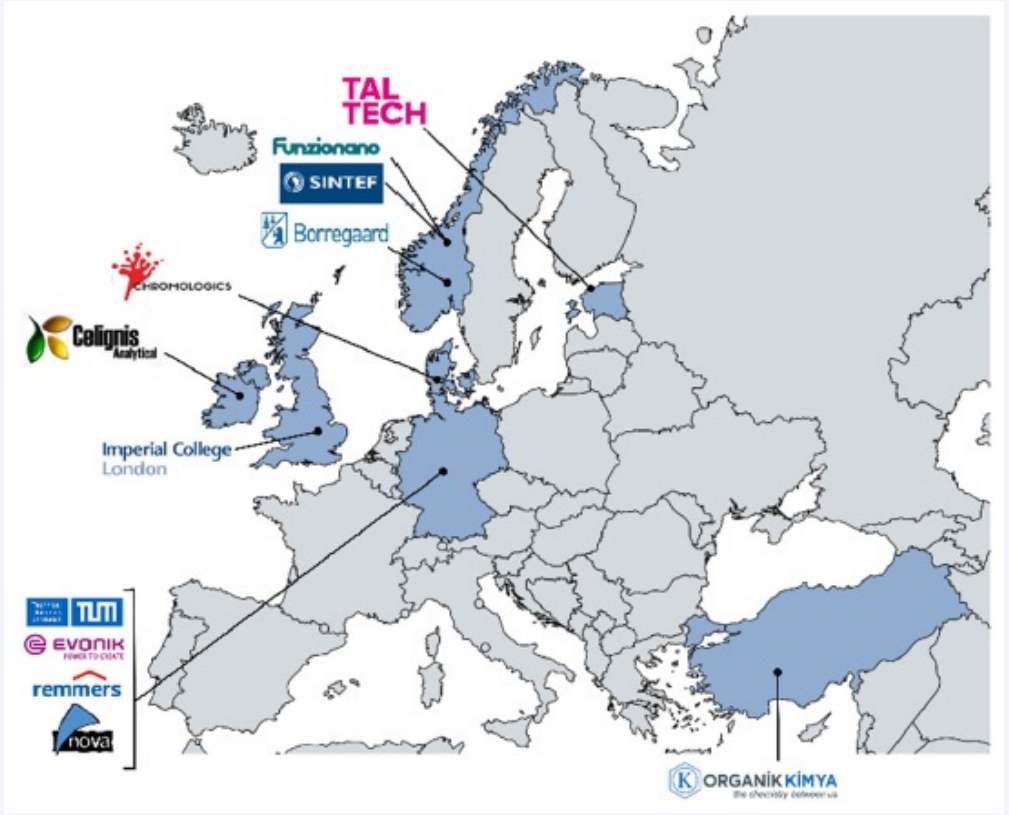
**The ambition of PERFECOAT is to identify alternatives to replace major components**

# TOWARDS A SUSTAINABLE COATING INDUSTRY

## The development of the PERFECOAT project


The goal of the **PERFECOAT** project is to develop and validate a new generation of industrial wood and decorative coatings with at least 25% bio-based components that meet and even surpass the current quality and sustainability standards. Our concept is based on a **flexible platform of novel technologies to produce and functionalize new, bio-based bulk coating components and assemble them into new coating formulations.**

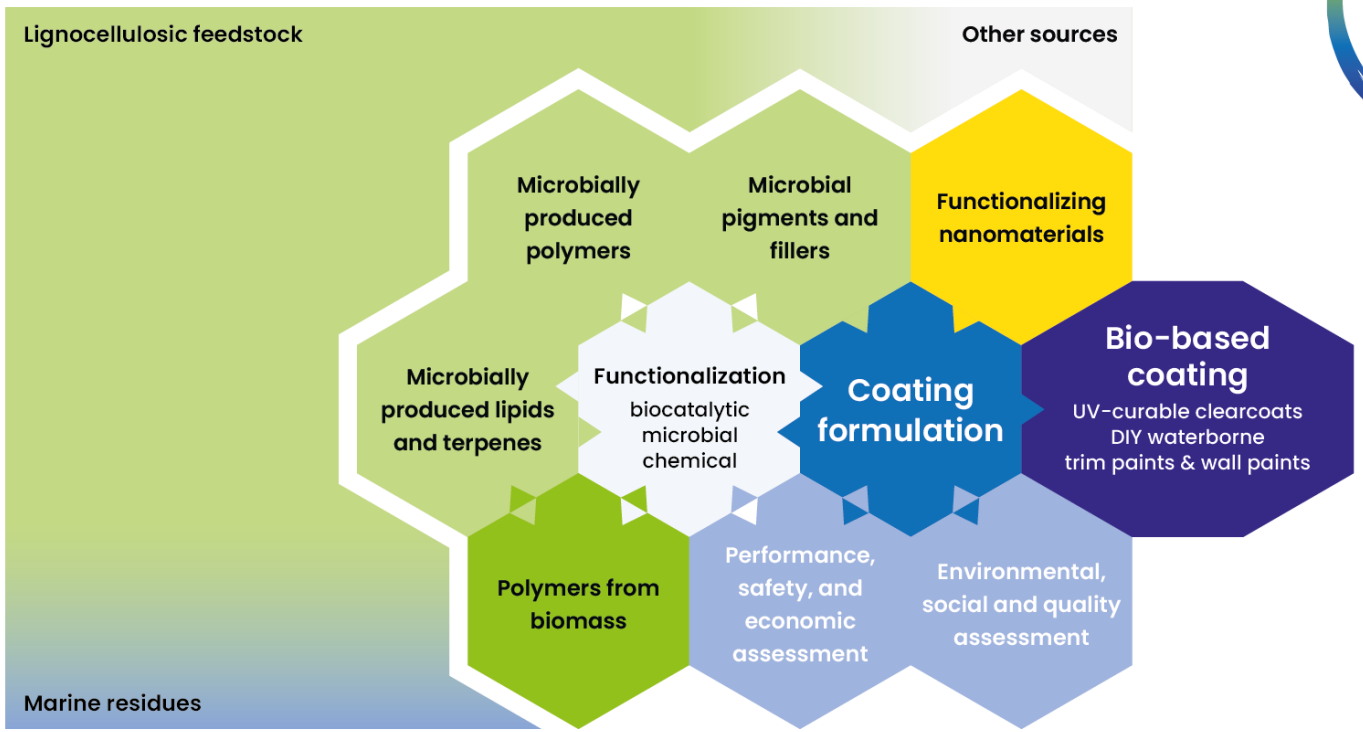
| Term | BBI JU contribution | Type of action | Feedstock origin |
|---|---|---|---|
| 01 May 2021 – 30 April 2024 | € 4,999,567.50 | Research & Innovation Action | Forest-based & Agri-based |




**12 Partners from 7 countries**
3 Universities; 1 RTOs; 4 SMEs; 4 LE
**Project coordination:** SINTEF AS

# THE PERFECOAT PROJECT
## The modular approach

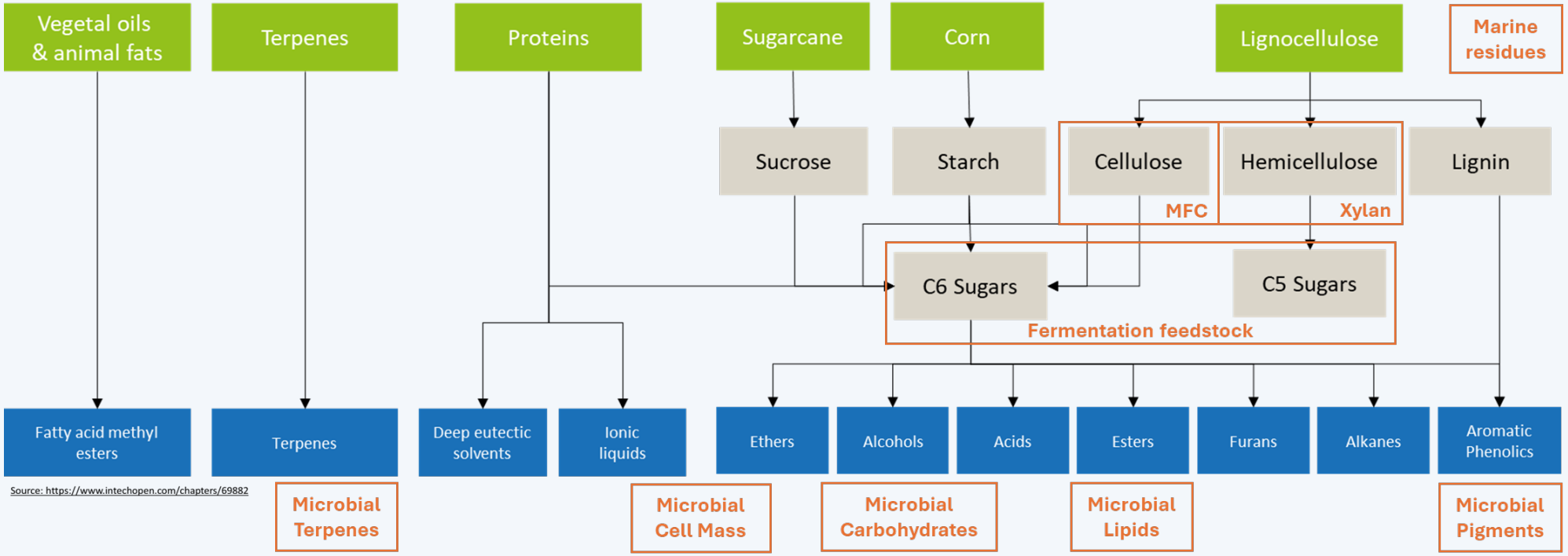
### Modular Approach for the PERFECOAT Coatings Development and Validation






To answer the clear need for innovation and new breakthrough technology in this field, the **PERFECOAT** consortium is building and operating a **modular and flexible technology platform for producing innovative bio-based binders, fillers and pigments** from a range of **biopolymers** and **functionalised materials.**

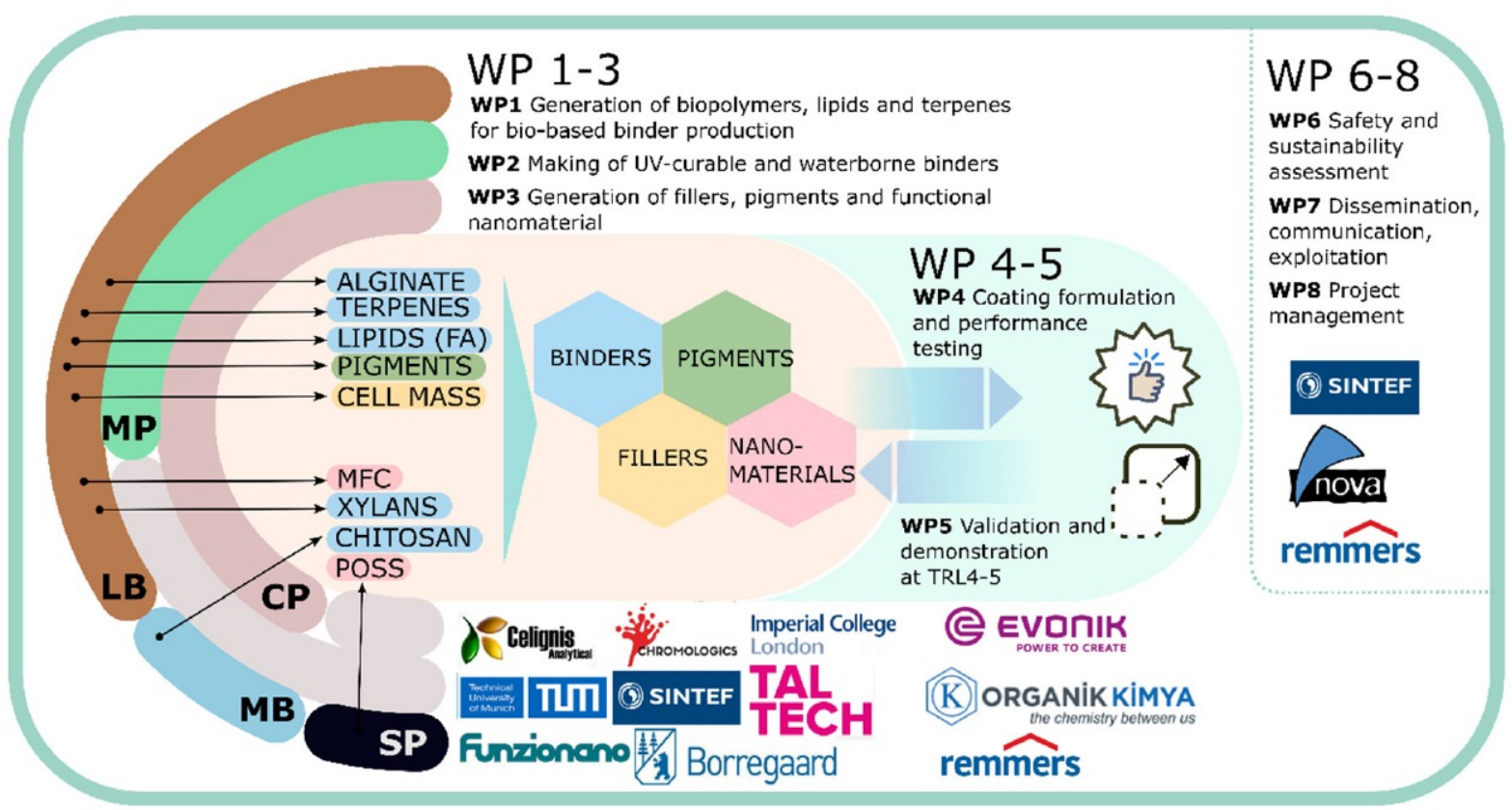
# THE PERFECOAT PROJECT
## Biotechnological approaches in PERFECOAT




The PERFECOAT project **applies biotechnology to produce microbial polymers**, lipids, terpenes, pigments, and cell mass from biomass sugars, as well as biopolymers through chemoenzymatic extraction from lignocellulose and marine residues. **Chemical upgrading of these base compounds, guided by rigorous testing provides the required physical and chemical properties and activation for use as bio-based ingredients in new paint formulations with desired performances.**

# THE PERFECOAT PROJECT

## The project value chain, work plan integration and partners roles



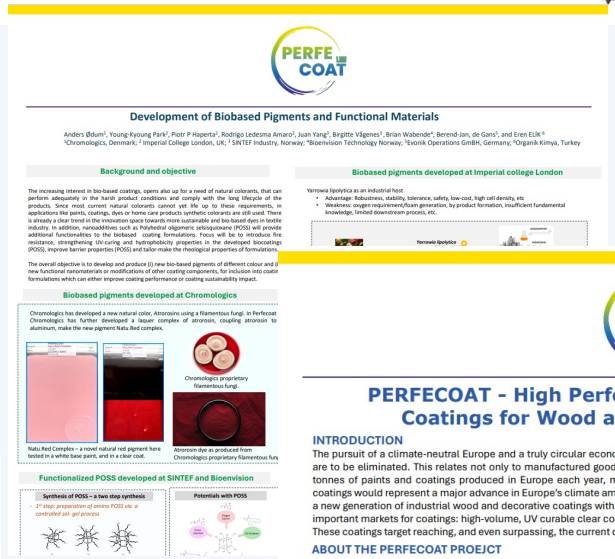

Land-based biomass LB, marine biomass MB, synthetic production SP, microbial production MP, chemoenzymatic processing CP.

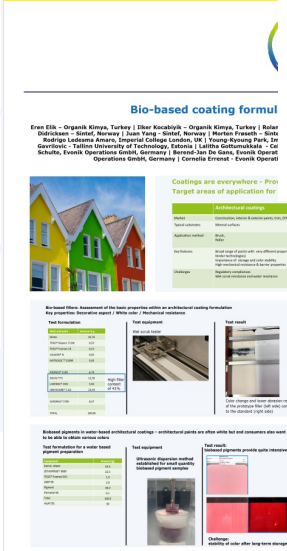
The overall concept of **PERFECOAT** is to develop a **complete value chain (from substrate provision to industrial scaleup and quality assessments) by creating a flexible platform.** Starting with a very high initial bio-based content of close to 100% is crucial since, during the process of coating testing and optimization, part of the bio-based share may need to be traded to meet the performance requirements for each demonstrator.

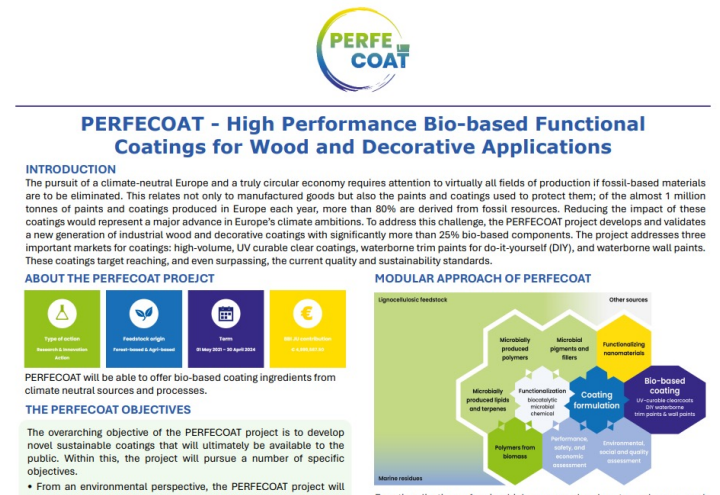
# THE PERFECOAT PROJECT

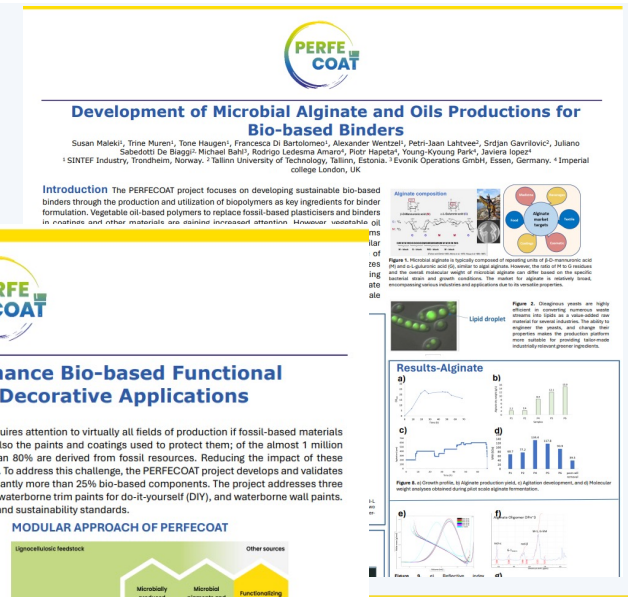
## A lot more to learned about PERFECOAT today!

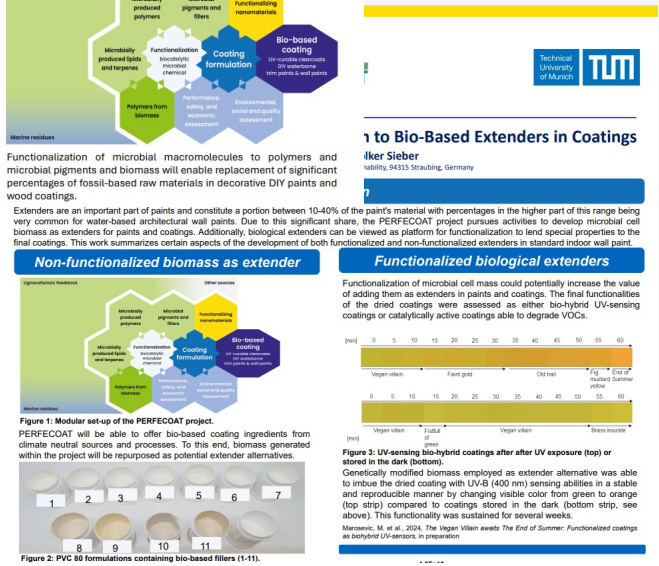
| | |
|---|---|
| **10:55 – 12:15** | **Session 2: Making Bio-based Compounds** |
| 10:55 | Oscar Bedzo and Lalitha Gottumukkala (Celignis)<br>Developing Bio-based Binders for Wood Coatings |
| 11:25 | Amelie Skopp (Technische Universität München) and Anders Odum (Chromologics SA)<br>Developing Bio-based Paint Ingredients: from Fillers to Pigments and Functional Additives |
| **13:15 – 14:25** | **Session 3: Sustainability, Safety and Toxicity** |
| 13:15 | Harrie Besselink (BioDetection Systems) and Andy Booth (SINTEF)<br>Safety and Toxicity Assessments and Methodology |
| 13:35 | Ángel Puente (nova-Institute) and Assiya Kenzhegaliyeva (SINTEF Digital)<br>Environmental and Social Sustainability Assessment |
| **14:25 – 15:50** | **Session 4: Industrial Applications** |
| 15:15 | Simone Schulte (Evonik Coating Additives)<br>Bio-based Coating Formulation and Application Testing |



# ACKNOWLEDGEMENTS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**SINTEF coordination team**

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**SINTEF research team**

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**Our industry partners**

EVONIK Leading Beyond Chemistry

CHROMOLOGICS

Funzionano

Borregaard

Celignis Analytical

ORGANİK KİMYA the chemistry between us

remmers

**Our research partners**

TAL TECH

Technical University of Munich

Imperial College London

**Our communication partner**

nova

Bio-based Innovations for Industrial Applications

24 April 2024, 09:00–17:00 CET

BIP Meeting Center, Rue Royale 2-4, B-1000 Brussels

Free Registration • In-person Event

CHAMPION circular bio-based polymers

PERFECOAT

These projects receive funding from the Bio-based Industries Joint Undertaking (JU) under the European Union's Horizon 2020 research and innovation programme under grant agreement No 887398 and No 101022370. The JU receives support from the European Union's Horizon 2020 research and innovation programme and the Bio-based Industries Consortium.

# Thanks for your attention!

**High Performance Bio-based Functional Coatings for Wood and Decorative Applications**


**Visit our website!** http://www.perfecoat-project.eu/

**Get all the updates by signing up for our newsletter!**


Horizon 2020
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