BIO-SUSHY

NEWSLETTER 7

# De-risking PFAS Free Coatings

## What Industry Needs to Know

Funded by the European Union

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# WELCOME

## Newsletter 7

> The challenge is not only to remove PFAS, but to design alternatives that are safer, functional, and fit for future use.

Dear BIO-SUSHY community,

Welcome to the 7th BIO-SUSHY e-Newsletter, which covers months 36 to 42 of our project. As the project enters its final phase, our work is moving from formulation development towards validation, evidence-building, and integration of Safe-and-Sustainable-by-Design principles across the three BIO-SUSHY value chains: food packaging, textiles, and glass cosmetic packaging.

The transition away from PFAS is no longer only a regulatory concern. It is becoming a practical challenge for companies seeking safer materials without compromising performance, durability, or sustainability. BIO-SUSHY is contributing to this transition by testing PFAS-free and bio-based coating solutions, identifying remaining technical limitations, and developing tools to support future decision-making.

In this issue, we highlight what has been validated so far, what challenges remain, and what industry, research, and policy stakeholders should keep in mind as PFAS-free alternatives progress.

*Warm regards,*
***The BIO-SUSHY Team***


BIO-SUSHY Consortium, hosted by ZSI, during the last meeting with the External Advisory Board and Project Officer for its M36 meeting on 20-22 January 2026 in Vienna, Austria.

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# IN THIS ISSUE

# PROGRESS

BIO-SUSHY is developing PFAS-free, bio-based coating solutions for three value chains.

**Food packaging**

Barrier coatings for fiber-based and molded food packaging

**Textile**

Water-repellent and stain-resistant coatings for textile applications

**Glass packaging**

Easy-empty and cleanable coatings for reusable glass containers

**Validated**

- Functional PFAS-free formulations
- Strong water and oil repellency
- Initial processing feasibility

**Challenges**

- Durability in textiles
- Cost optimization
- Industrial scaling

**Under investigation**

- Long-term impact
- Predictive modelling
- Stakeholder acceptance

### M36 Meeting and Stakeholder Workshop

Meeting hosted by ZSI partner in Vienna.

### BIO-SUSHY at IFAT Munich

Materia Nova and AXIA Innovation took part in the largest European fair for environmental technologies.


Jan. 2026

Apr. 2026

May 2026

June 2026

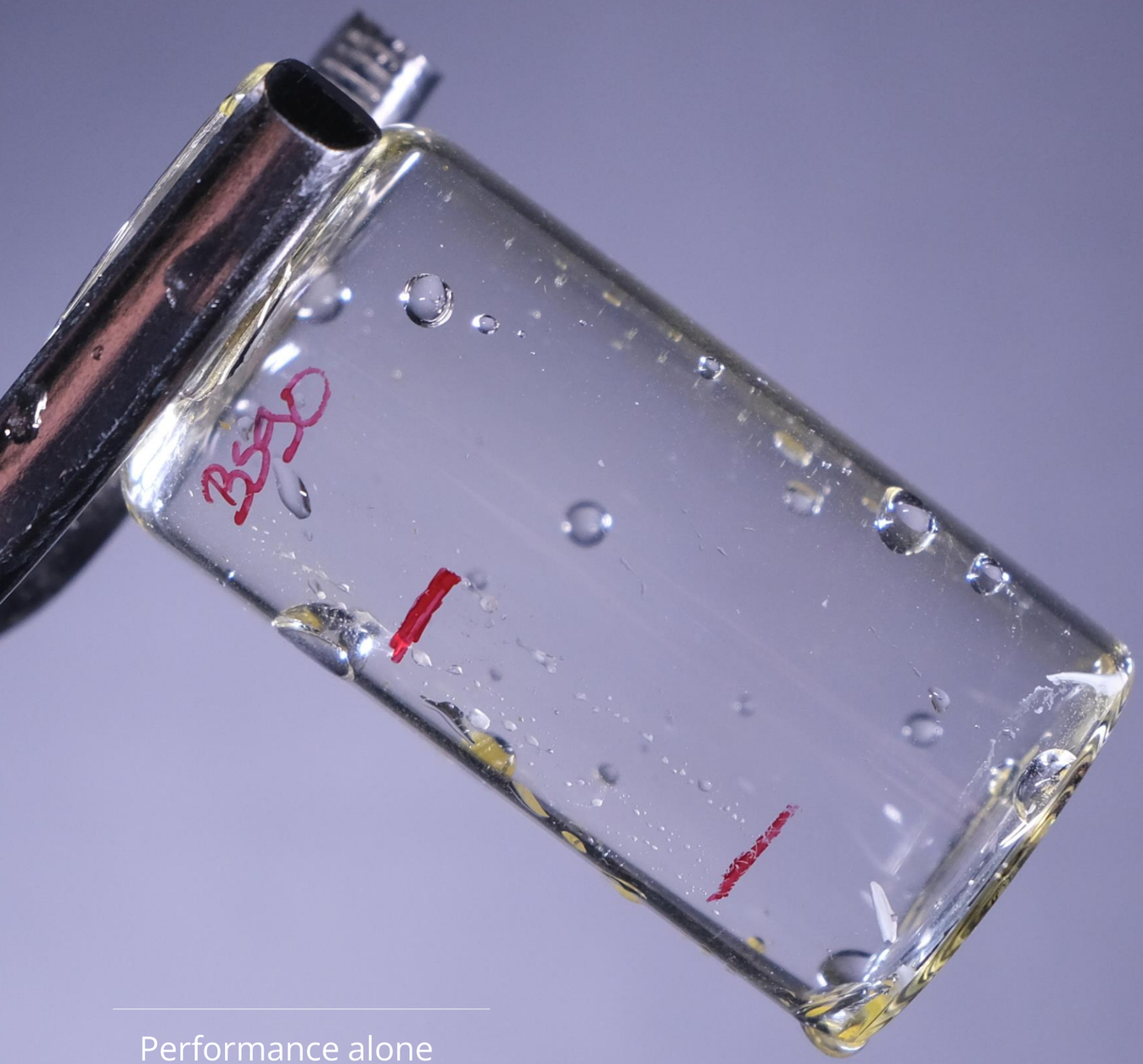
Dec. 2026

Project end

### BIO-SUSHY at Coatings 2026

Athens, Greece

### Training #3




© Materia Nova

Performance alone
is no longer sufficient.

# WHAT WE KNOW SO FAR

BIO-SUSHY results show that PFAS-free coatings can already achieve promising functional performance in several applications.
At the same time, the project confirms that replacing PFAS is not a simple one-to-one substitution. Each value chain has different requirements, different constraints and different trade-offs.

### PFAS-based solutions

- Established performance
- High durability
- Mature supply chains
- Known environmental and health concerns
- Single-function optimization

### PFAS-free alternatives

- Performance being validated
- Durability improving
- Scale-up still developing
- Lower-risk alternatives under assessment
- Safety and sustainability considered from design

The transition to PFAS-free coatings requires balancing technical performance with safety, sustainability, cost, and industrial feasibility.

# FOOD PACKAGING

PFAS-free coatings for fiber-based food packaging are progressing beyond laboratory formulation.
The next step is to improve processing efficiency and validate performance under more realistic production conditions.

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## Barrier performance and processing feasibility

Food packaging is one of the most advanced BIO-SUSHY value chains in terms of functional validation.
Wood K Plus has adapted thermoplastic powder coatings for fiber-based materials and recently spray-coated fiber-molded products with BIO-SUSHY coating formulations. These results support the development of PFAS-free barrier solutions for food packaging applications.
The work confirms that thermoplastic powder coatings can be applied to fiber-based substrates, though further optimization is needed to reduce coating weight, improve particle size distribution, and enable cost-efficient processing.

**What has been validated**

- Spray coating of fiber-molded products
- Adaptation of thermoplastic powder coatings for fiber-based materials
- Promising grease and water barrier performance
- Processing trials on coated substrates

**What still needs work**

- Cost reduction
- Coating weight optimization
- Grinding and particle size distribution
- Consistency at a larger scale
- Continued safety and sustainability screening

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# TEXTILE

## Functionality achieved, durability remains the key barrier

Textile applications remain one of the most demanding areas for PFAS-free coatings.

Partners have validated promising intrinsic performance, including hydrophobicity and stain-repellent properties. IFTH reported that the dip-pad-dry-cure application method and washing resistance show encouraging results for selected formulations. Some formulations even showed improved performance after up to two washing cycles.

At the same time, textile durability remains a central challenge. Applus+ RESCOLL reported that washing resistance still needs improvement, as coating anchoring to the fabric remains limited.

**What has been validated**

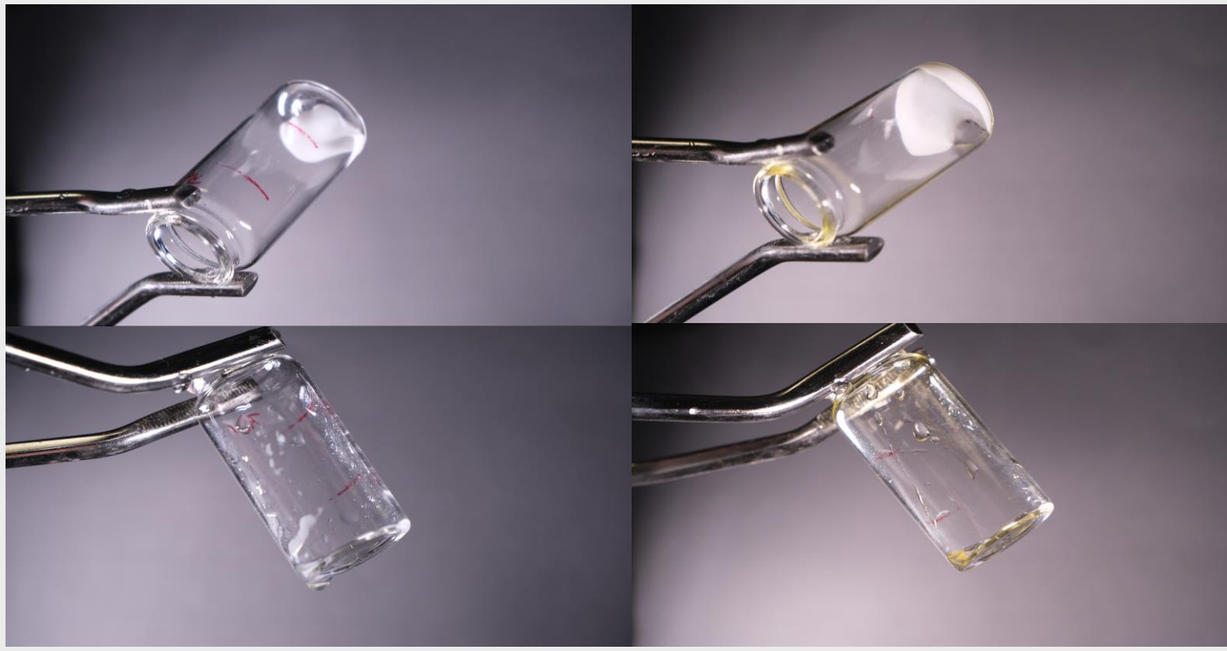
- Stain-repellent behavior observed
- Hydrophobic performance confirmed
- Dip-pad-dry-cure application method tested
- Increasing bio-based content explored in water-based formulations
- Some formulations showed improved performance after initial washing cycles

**What still needs work**

- Cost-performance balance
- Long-term washing resistance
- Coating anchoring to textile fibres
- Shelf-life of two-component formulations
- Maintaining performance while increasing bio-based content

Durability is the textile sector's critical test for PFAS-free alternatives.

# GLASS COSMETIC PACKAGING



*Water cleaning of uncoated (left) and coated (right) glass packaging containing fresh cosmetic cream before and after cleaning. © Materia Nova*

## Easy-empty performance and cleanability

Glass cosmetic packaging offers a promising pathway for PFAS-free coatings, particularly where easy-empty performance, cleanability and reuse are important.

Materia Nova adapted coating formulations to improve compatibility with industrial application processes. The resulting PFAS-free transparent thin layer favours easy emptying of packaging and shows excellent cleanability, even with water, compared to uncoated packaging.

A slip effect in glass containers has been reported, reducing product residue and improving emptying behavior, resulting in a significant positive sustainability impact.

**What has been validated**

- Transparent PFAS-free thin coatings
- Improved easy-empty behaviour
- Excellent cleanability with water
- Slip effect reducing residue in glass containers
- Compatibility with reusable packaging concepts

**What still needs work**

- Verifying the absence of harmful or undesired substance release
- Validating the coating application under industrial conditions (curing temperature and duration adaptation)

Glass cosmetic packaging is a promising value chain for PFAS-free coatings, especially where cleanability, reuse and product recovery are priorities.

# SSBD IN PRACTICE

Considering safety early reduces the risk of costly redesigns and future product withdrawal.

BIO-SUSHY applies the SSbD approach to ensure that performance improvements do not come at the expense of safety, sustainability or long-term responsibility. The goal is to avoid regrettable substitution: replacing PFAS with alternatives that later reveal similar or new risks.

## Why SSbD matters?

SSbD helps integrate safety and sustainability considerations from the early stages of material design. In BIO-SUSHY, this means assessing:

**Hazard and exposure**
Are the coating components safe for people and the environment?

**Functionality**
Does the coating meet application requirements?

**Sustainability**
Does the solution support lower environmental impact?

**Life cycle performance**
Does the coating remain beneficial across production, use and end-of-life?

**Socio-economic relevance**
Can stakeholders accept and value the solution?

## SSbD in food packaging

For food packaging, SSbD supports the screening of coating components with respect to safety and sustainability from the earliest development stages.

Food-contact relevance | Barrier performance | End-of-life compatibility

## SSbD in textile

For textiles, SSbD is particularly important because durability and environmental impact are closely connected. A coating that performs only briefly may require more frequent replacement or treatment.

Washing durability| Chemical safety | Long-term performance

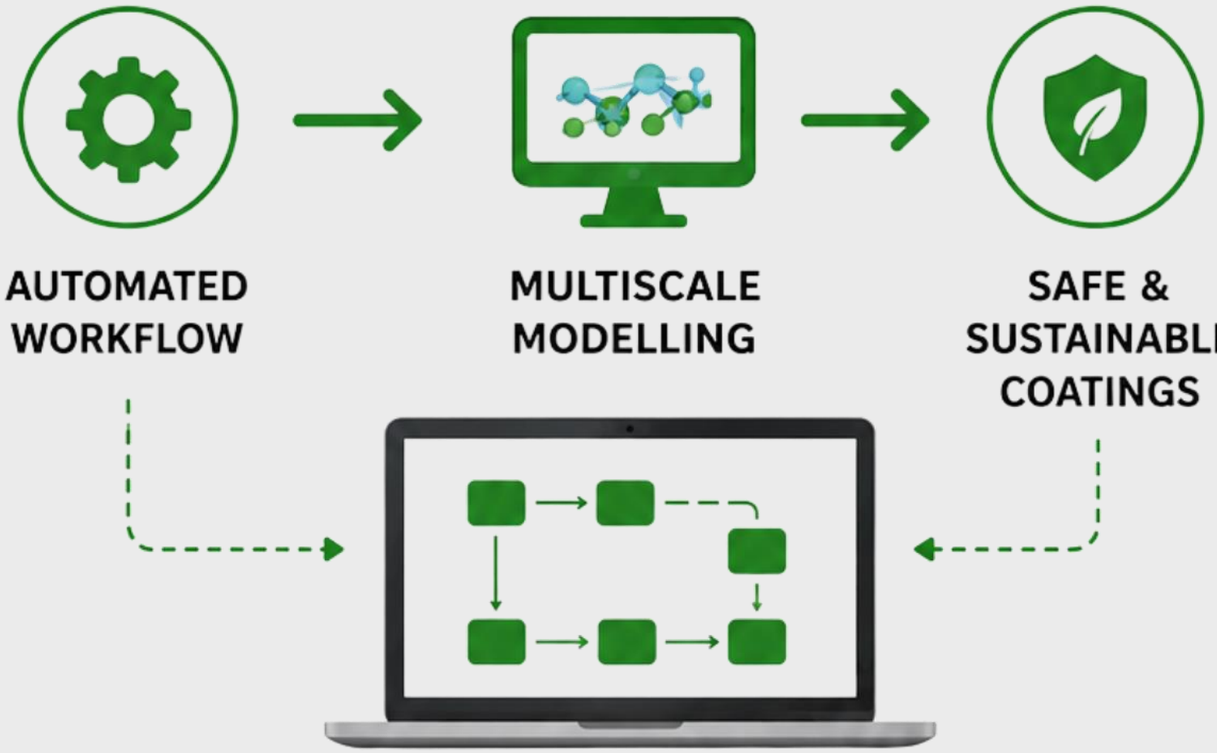
## SSbD in glass packaging

For glass packaging, SSbD helps assess how easy-empty coatings can support both performance and circularity.

Cleanability | Reuse potential | Substance release | Product recovery

# FROM DATA TO . . . . DECISION-MAKING

Computational tools are helping BIO-SUSHY partners reduce trial-and-error in coating development.
QSAR models, data-mining methods and modelling workflows support the early assessment of safety and performance indicators. These tools can help identify promising candidates and guide experimental work before extensive laboratory testing is required.




**What has been validated**

- Use of QSAR models to support SSbD assessment
- Computational approaches supporting material screening
- Integration of safety information into formulation decisions
- Data-mining workflows for collecting experimental evidence

**Why this matters**

Predictive tools can help:

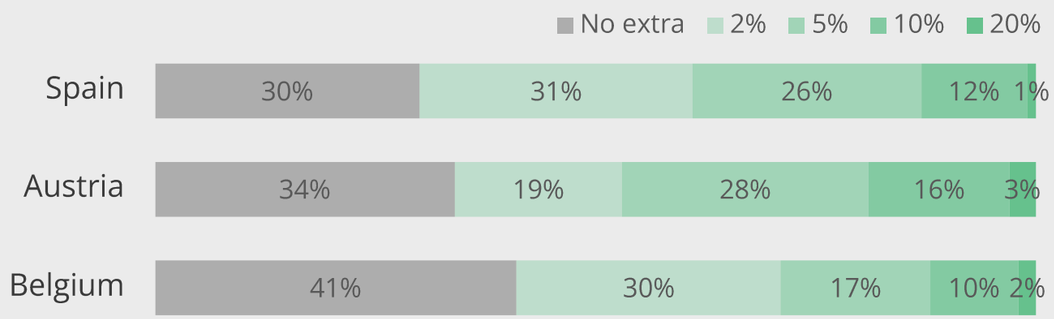
- Reduce development time
- Identify potential risks earlier
- Support safer material selection
- Strengthen SSbD decision-making
- Connect experimental-computational

Computational tools are becoming essential to guide formulation before testing.

# SOCIAL ACCEPTANCE

## Are markets ready?

ZSI completed a willingness-to-pay study providing insights into how consumers and markets may respond to PFAS-free coating solutions.
The findings suggest that markets are increasingly ready for new types of sustainable coatings, especially when alternatives approach the functionality of current products. However, acceptance depends strongly on whether PFAS-free solutions can match real product expectations.




*Willingness to pay in EU countries shows that more than 60% of citizens are ready to pay more for safer and more sustainable materials (n=800).*

# STANDARDIZATION

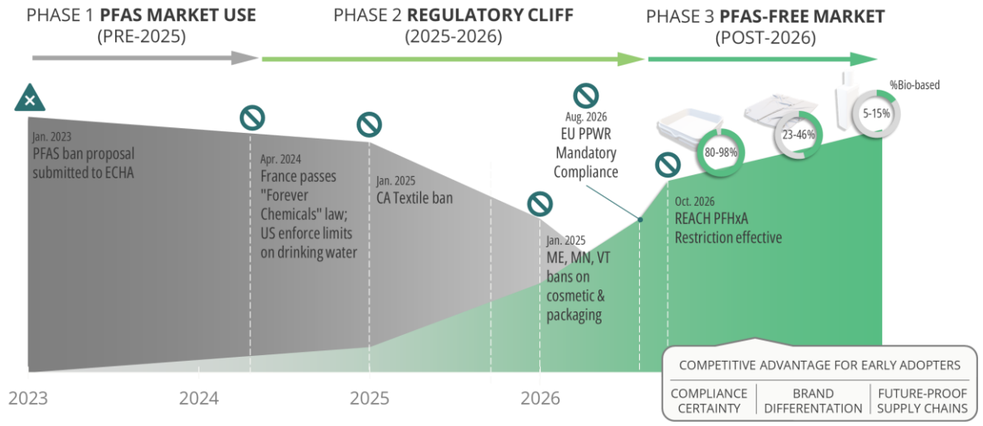
## Building common ground

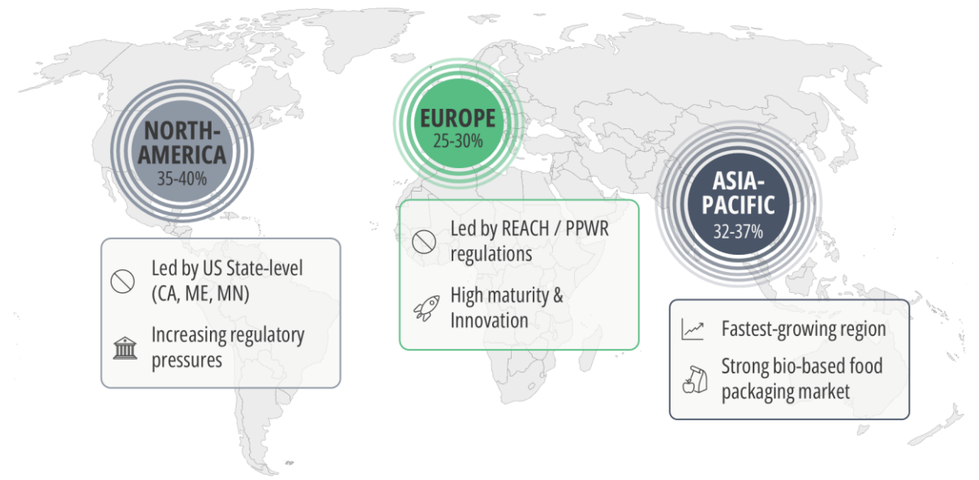
Standardisation is essential for future uptake of PFAS-free and bio-based coatings. UNE continues to identify relevant topics and project outcomes that may contribute to standardisation discussions. This work helps clarify which testing methods, benchmarks and assessment criteria may be needed to support future development.

# EXPLOITATION

## PFAS-free coatings market is expanding rapidly mainly thanks to PFAS-bans in EU and US

Through a strategic regulatory and market analysis, AXIA found that the market of PFAS-free coatings market is growingly rapidly from €1.3B (2024) to €1.8B (2030). Early adopters can capture market share, while competitors face fines and restricted access. Companies choosing PFAS-free gain compliance certainty, brand differentiation, and future-proof supply chains.



# WHAT SURPRISED US MOST

BIO-SUSHY partners highlighted several unexpected findings from the latest validation phase

> Scale-up revealed process sensitivities.

> Excellent cleanability was achieved, even with water, compared to non-coated glass packaging.

> Oleophobicity remains a challenge and needs further development.

> The anchoring issue in textile coatings was not anticipated.

> Some textile formulations improved performance after initial washing cycles.

# PFAS-FREE COATINGS ARE PROGRESSING, *BUT...*

> ...aligning high performance with scalability, cost-efficiency and SSbD compliance remains essential.

> ...technical and economic challenges persist, including the difficulty of achieving high bio-based content while maintaining performance.

> ...they need to become one of the drivers of the EU's new industrial growth.

> ...they still face challenges in balancing cost and performance as effectively as PFAS-based solutions.

# NEWS

Here's what's been happening in BIO-SUSHY: the latest news, new releases, and recent project achievements.

Image by AXIA Innovation GmbH / Canva

## BIO-SUSHY Consortium Meeting in Vienna

From January 20 to 22, 2026, project partners gathered in Vienna for a three-day meeting hosted by the ZSI Centre for Social Innovation. This Month 36 meeting of the four-year project (ending December 2026) brought together the consortium, external advisory board, and the European Commission project officer to review progress, plan final steps, and discuss the revised 2025 Safe and Sustainable by Design (SSbD) framework.

The last day began with a stakeholder workshop called "Stakeholder Insights for BIO-SUSHY, BIO-SUSHY Insights for Stakeholders." Four expert speakers shared different views on PFAS-free innovations and their impact on society.

## New blog article

In the past few months, we published a new blog articles. **Blog 9** explains what it takes to bring PFAS-free coatings from the lab to real products. we go beyond the science and into the reality of scaling up:
From grams in the lab… to thousands of kilos in production.
From promising results… to market-ready solutions.

We break down:

- Why scaling up is the hardest step
- How we ensure performance, safety, and consistency
- Why working with industry partners is critical
- What it takes to bring PFAS-free coatings to the market

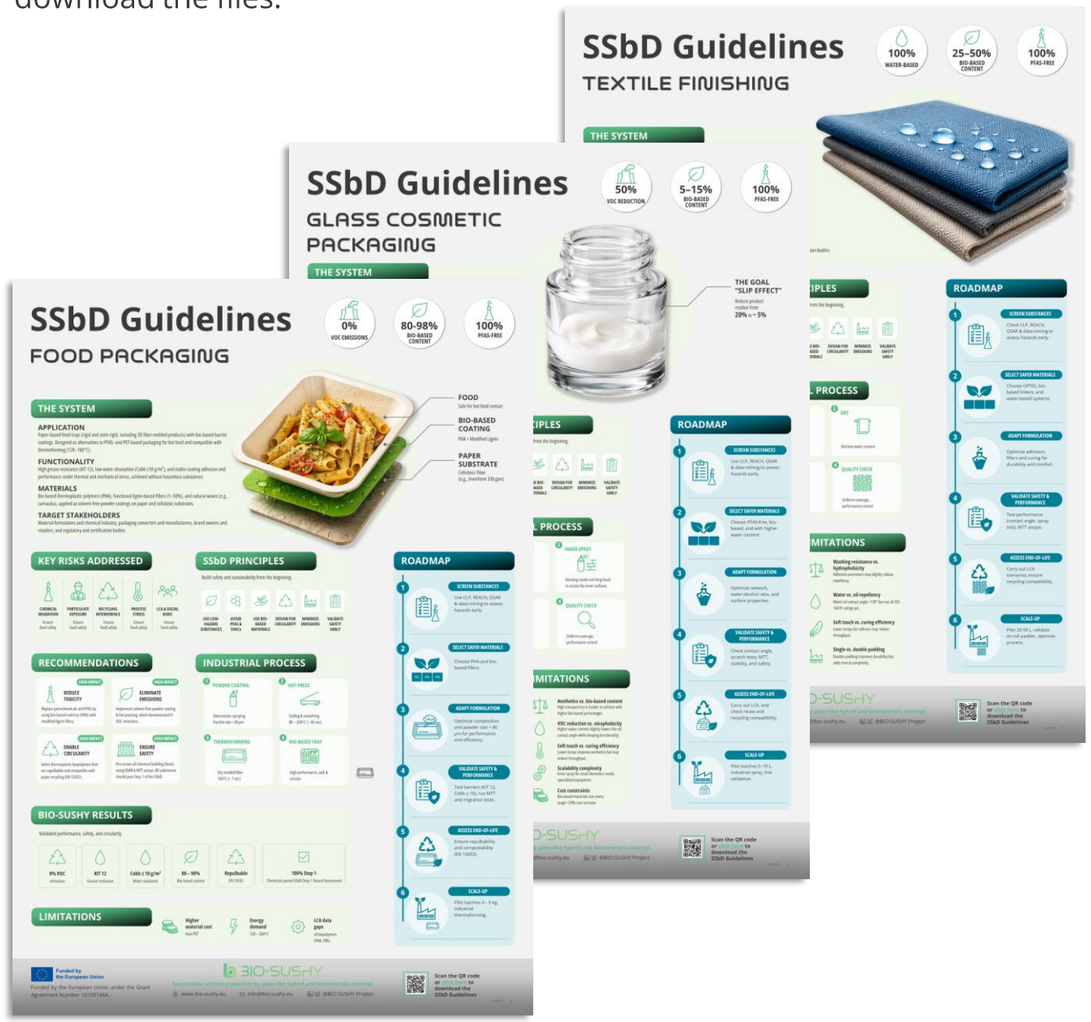
This is where innovation either stops… or starts making an impact.


## Functional compound scale-up

SiKEMIA completed the scale-up of functionalised $CaCO_3$ and is currently progressing with related components for advanced coating systems.

## SSbD Guidelines

ITENE has prepared SSbD guidelines summarising key achievements from the assessment of BIO-SUSHY case studies.
These guidelines translate project results into practical, transferable SSbD recommendations that other developers can apply to similar materials or coatings, beyond the specific BIO-SUSHY case studies. These SSbD guidelines are intended for industry, researchers, and policymakers, and are publicly available on our website (**D&C materials**) and **Zenodo** community. Below you can find the infographic versions developed by AXIA Innovation for each value chain. Click on them to enlarge and download the files.

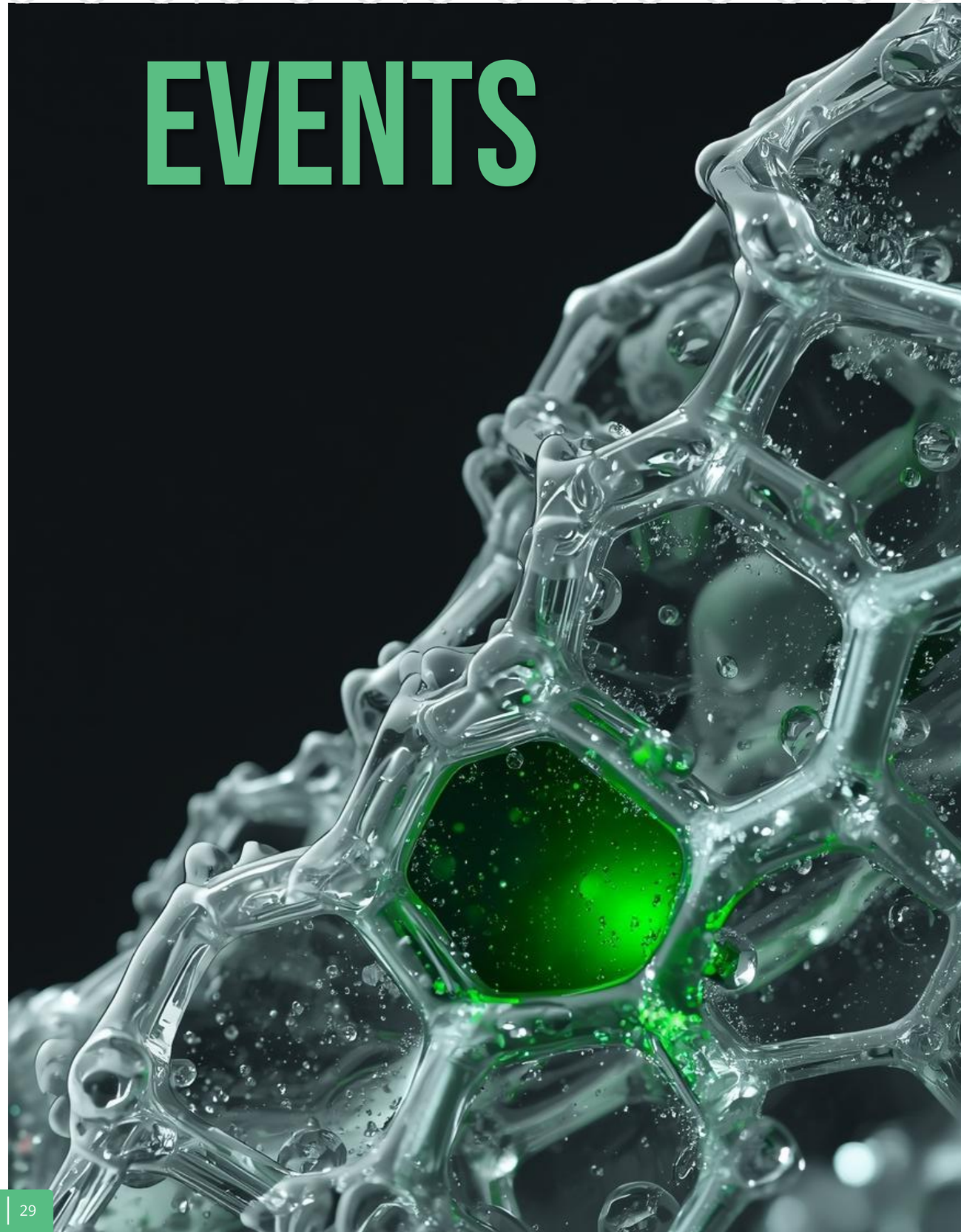


# Clustering & Activities To Boost Collaboration

BIO-SUSHY is working closely with other EU initiatives to increase adoption and align SSbD practices across the coatings sector.

On April 14th we presented in the second Circular, Sustainable and Biobased Coatings (CSBC) Cluster workshop. During the event, BIO-SUSHY partner WOOD K PLUS presented recent project developments on: “Dry powder lignin-based coatings for electrostatic spray applications – paper-based food trays”. The CSBC Cluster plays a crucial role in fostering collaboration among projects such as BLUECOAT, SUPREME, BIO4COAT, and BIO-SUSHY, enabling alignment between research, industry needs, and policy development. The workshop proceedings are available for download.

On April 20th we took part and pitched our project in the “SSbD in Practice” event just before the COATINGS 2026 in Athens, where with sister projects and industry stakeholders we shared and compared our approaches to safety, and sustainability.

## BIO-SUSHY at Coatings 2026

Materia Nova and AXIA presented an oral talk and a poster, respectively, during the Coatings 2026, which took place in Athens on April 20-22, and gathered more than 120 academics and professionals working in the coatings field.
Materia Nova presented the latest development of the glass cosmetic packaging value chain, while AXIA exhibited a poster on the market opportunity that the PFAS-free coatings are unlocking.



## Materia Nova and AXIA at IFAT

BIO-SUSHY participated at IFAT 2026, the world's leading trade fair for environmental technology in Munich from May 4 to 7. Materia Nova had a booth at the Walloonia stand and also the local partner, AXIA, joined. The event registered more than 140,000 participants and lasted four days from May 4 to 7.


# UPCOMING EVENTS & RESOURCES

## Upcoming training by CNR

BIO-SUSHY

# TRAINING #3

## INTRODUCTION TO AUTOMATED MULTISCALE PHYSICS-BASED MODELLING FOR SAFE AND SUSTAINABLE COATINGS

Discover how BIO-SUSHY uses automated multiscale modeling to support the design and assessment of PFAS-free coatings.


**Presented by**

**Consiglio Nazionale delle Ricerche (CNR)**

- Interactive Online Training
- Max. 30 participants
- Hands-on guided format
- Browser-based tutorial examples

**Register Now**

**16 June, 2026**

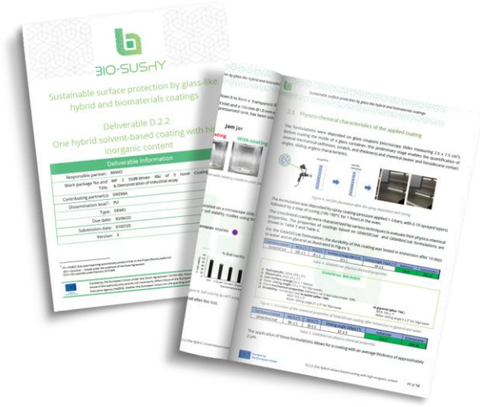
**10:00 - 12:00 (CEST)**

## Explore BIO-SUSHY Resources

BIO-SUSHY public materials are available for stakeholders interested in PFAS-free coatings, SSbD methods and sustainable material development.

You can access:

- Public deliverables
- Posters and presentations
- Technical materials
- Project publications
- Blog articles
- SSbD-related resources



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