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SUStainable Antimicrobial and Antiviral Nanocoating

https://susaan-project.com/

SUSAAN EU-Project

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SUStainable Antiviral and Antimicrobial Nanocoatings

Newsletter N°6, July 2025

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SUSAAN Meetings:
The Second Review Meeting highlighted the consortium's steady progress

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As the project advances into its final year, the consortium remains committed to sustaining momentum and fostering robust collaboration among all partners to successfully achieve its objectives.

Five months have passed since our second review meeting in February, when the SUSAAN consortium convened in Brussels with the Project Officers. Over one intensive and productive day, the consortium showcased key milestones that garnered highly positive feedback from the reviewers, they commended the scientific rigor and quality of the deliverables and research, encouraging the consortium to continue its ongoing efforts to disseminate results.

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SUSAAN Meetings:
At the M36 meeting, the consortium focused on setting the stage for the final tests

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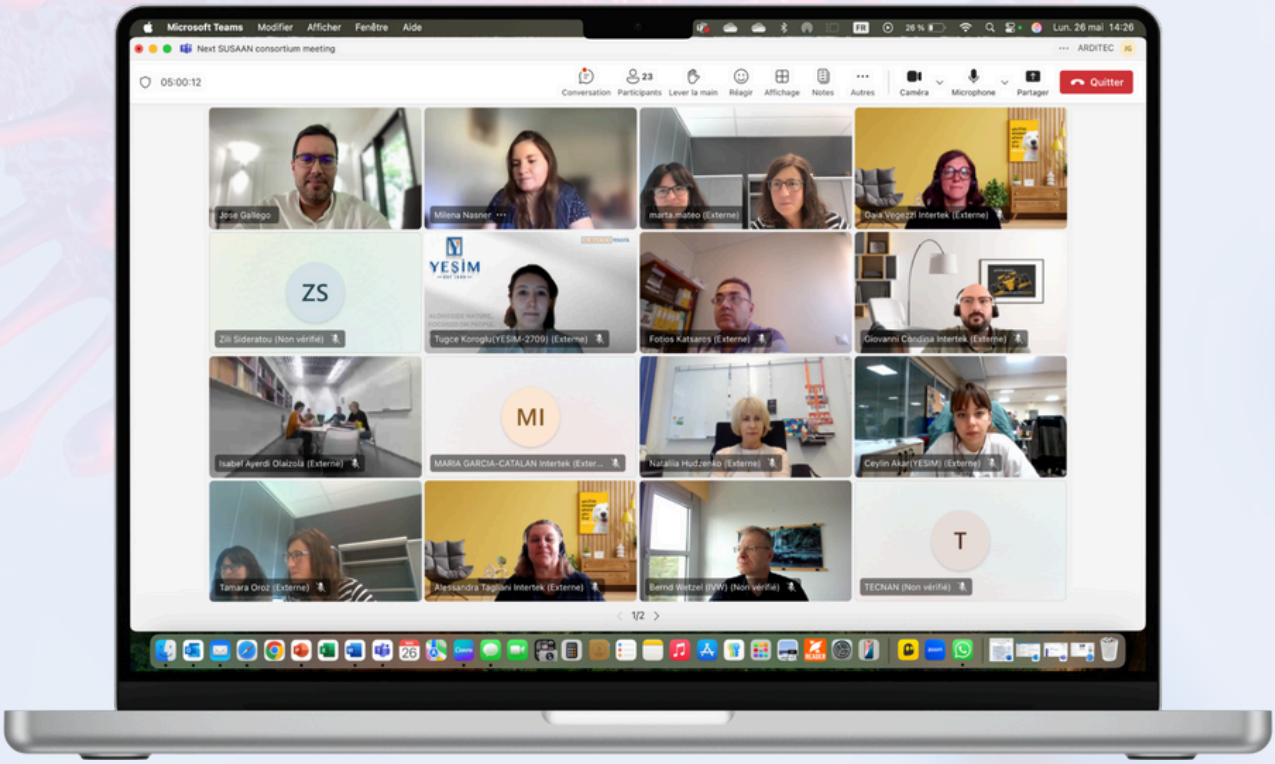
SUSAAN Progress Update (Month 30–36): Moving forward together.

From November 2024 to May 2025, SUSAAN made solid progress across key areas. Prototypes were tested for all three application types, metal, plastic, and textile, including cistern panels, switches, sockets, and fabrics for home and food industry use.



Virtual Meeting at M36, discussing progress and next actions

- WP3: Successfully completed by Month 30
- WP4: Applying and testing selected nanocoatings
- WP5: Assessing safety, regulations, and sustainability
- WP6: Sharing results and future use of outcomes
- WP7: Overall project coordination and management

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SUSAAN Progress:
Testing nanocoatings performance for three industrial applications

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At Month 36, the SUSAAN Project is making strong progress in the development of advanced nanocoatings. By synthesizing inorganic, biobased, and hybrid materials, the developments are enhancing surface performance across metallic, plastic, and textiles applications.

Watch the video available in our youtube channel to hear the summary from our coordination team and insights from our partners at Celabor, along with prototypes images tested by our industrial partners PANASONIC, YEŞIM GROUP, and ECZACIBAŞI.

🔗 **Video: SUSAAN Progress at M36**

Panasonic · Eczacıbaşı · YEŞİM EST 1956 · DEMOKRITOS National Centre for Scientific Research · Lurederra centro tecnológico · ceit Member of Basque Research & Technology Alliance · celabor · VirHealth · TECNAN Tecnología Navarra de Nanoproductos, S.L. · Leibniz Gemeinschaft · Leibniz-Institut für Verbundwerkstoffe · intertek Total Quality. Assured. · Research Center ITENE · ARDITEC

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SUSAAN Progress:
Enhancing the safety assessment of the functional antimicrobial coatings

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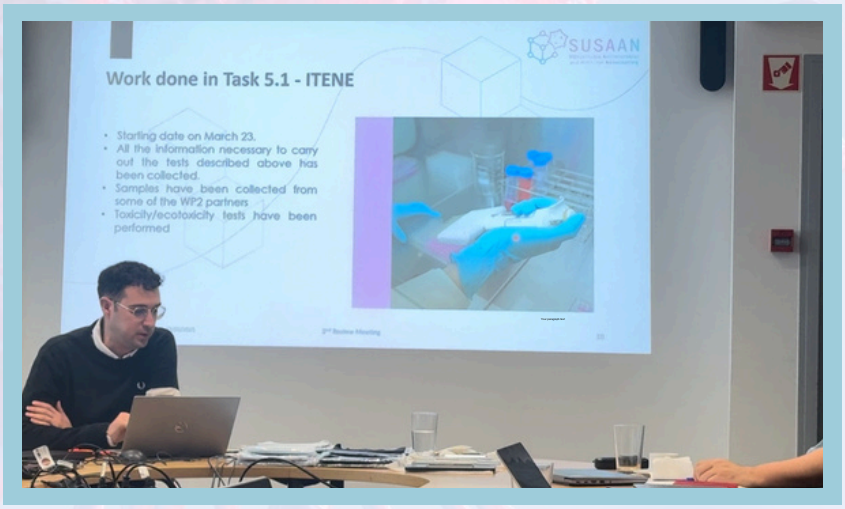
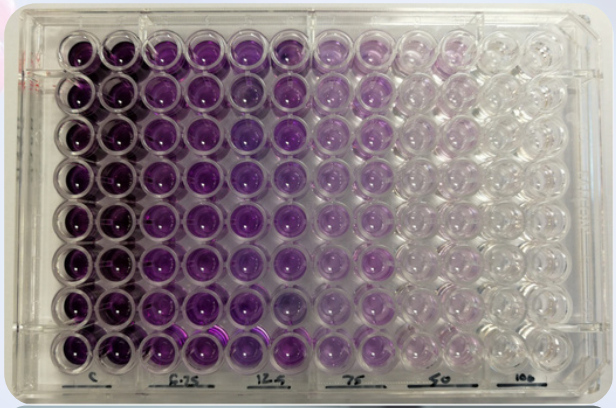
RESEARCH CENTER ITENE

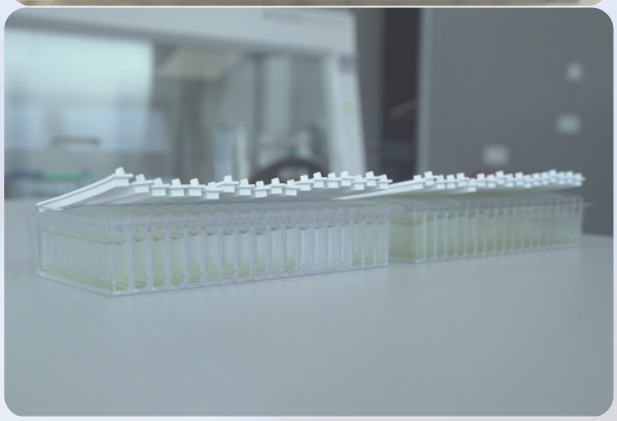
By developing a tailored extraction method based on internationally recognized standards, ITENE successfully simulated realistic release scenarios and quantified the release of metals, a key active ingredient in the formulations.



Continuing the work, ITENE is conducting comprehensive toxicity and ecotoxicity tests, including cytotoxicity, genotoxicity, and environmental impact assays that provide accurate dose-response evaluations.

This approach ensures a thorough understanding of the coatings' safety for both human health and the environment, marking an important milestone in the SUSAAN project.





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SUSAAN Progress: Pioneering nanomaterial innovation within BPR Regulatory Framework

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intertek
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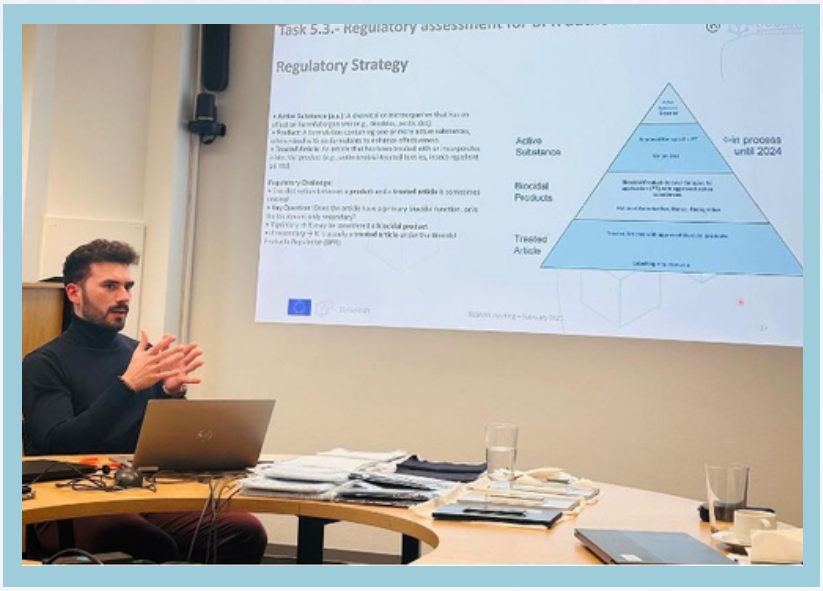
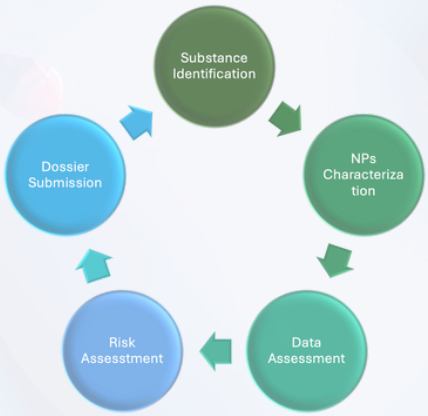
As part of their contribution to the SUSAAN project, Intertek is leading a regulatory assessment to evaluate how emerging nanomaterial technologies align with the current Biocidal Products Regulation (BPR).

At this stage, the regulatory approach focuses on considering only the core particle as the active substance, as it is primarily responsible for the antimicrobial effect. Intertek is currently evaluating the influence of surface treatments and coatings on (eco)toxicity, efficacy, release behavior, and other technical properties of the final advanced nanomaterials (ANMs).





Ongoing regulatory work is helping to bridge the gap by ensuring that emerging nanomaterial technologies are evaluated in line with the latest scientific insights. This effort focuses on clarifying how current frameworks particularly the Biocidal Products Regulation (BPR) apply to these innovative materials.

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SUSAAN Progress:
Advancing in the environmental and socio-economic assessment of nanocoatings.

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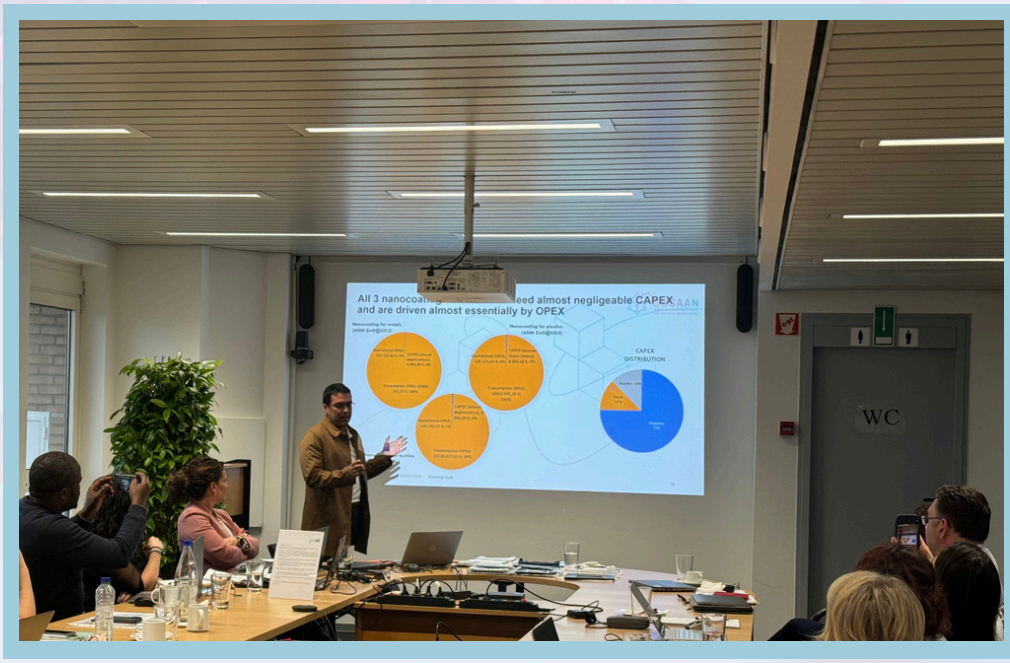
ARDITEC

Over the past 36 months, ARDITEC conducted a comprehensive sustainability assessment of nanocoatings for textiles, plastics, and metallics using SimaPro. Environmental Life Cycle Assessment (LCA) guided key design decisions from raw material selection to formulation by optimizing solvents, precursors, and processes to reduce energy use and emissions. SUSAAN focused on upstream improvements to lower environmental burdens.



In parallel, Life Cycle Costing (LCC) evaluated the economic viability by analyzing cost-efficiency and conducting sensitivity analysis compared to existing products on the market. Social Life Cycle Assessment (S-LCA) examined social impacts such as labor rights and health, among others. Together, these assessments provide a comprehensive framework for developing nanocoating technologies that are not only innovative but also environmentally, economically, and socially responsible.

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SUSAAN Dissemination:
2 Papers published and more on the way

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🔗 **Read the full paper published in Nanomaterials (MDPI) on 28 May 2025.**

Lurederra centro tecnológico · Celabor

Open Access | Editor's Choice | Article

https://doi.org/10.3390/nano15110809

Sustainable Antibacterial Chitin Nanofiber/ZnO Nanohybrid Materials: Ex Situ and In Situ Synthesis, Characterization and Evaluation

by Caroline Piffet [1,*], Jean-Michel Thomassin [1], Emilie Stierlin [1], Job Tchoumtchoua [1], Claudio Fernández [2], Marta Mateo [2], Leyre Hernández [2], Kyriaki Marina Lyra [3], Aggeliki Papavasiliou [3], Elias Sakellis [3,4], Fotios K. Katsaros [3], Zili Sideratou [3] and Dimitris Tsiourvas [3,*]

In this study, SUSAAN partners developed and compared ex-situ and in-situ synthesis strategies to create chitin nanofiber/ZnO nanohybrids, aiming to produce sustainable materials with effective antibacterial properties. The work included detailed characterization and performance evaluations.

🔗 **Read the full paper published in Scientific Reports on 03 May 2025.**

ceit MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

The role of unidirectional surface roughness on the regularity of LIPSS generated on stainless steel using femtosecond lasers

https://doi.org/10.1038/s41598-025-00185-1

Diego Gallego [1,2], Isabel Ayerdi [3,4], Aldara Pan [1,2], Santiago M Olaizola [1,2], Ainara Rodriguez [1,2]

In this study, SUSAAN partners investigated how surface roughness and its orientation influence the regularity of Laser-Induced Periodic Surface Structures (LIPSS). Results showed that both the magnitude and direction of roughness significantly affected LIPSS coherence and alignment.

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SUSAAN Dissemination: Participaing in key events and International engagements

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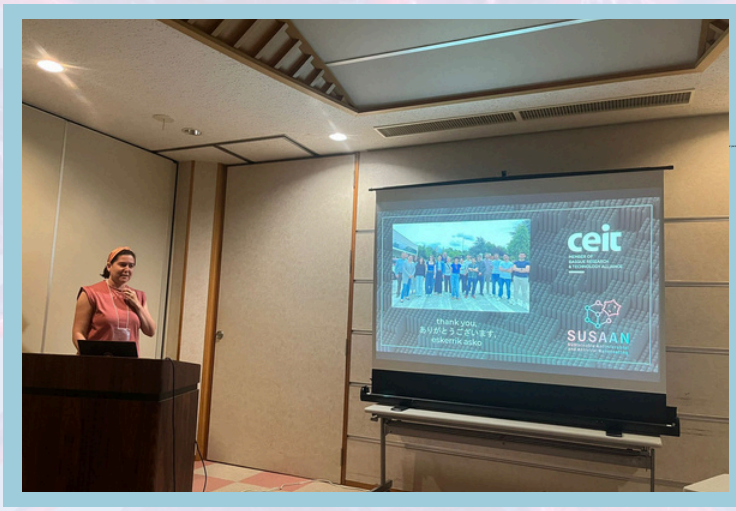
To date, SUSAAN has actively presented results at more than 40 high-profile events, engaging diverse audiences and driving impactful discussions. Over the next three pages, we highlight recent events that exemplify key milestones and showcase the project's significant progress.



CEIT took part in the 9th International Congress on Laser Advanced Materials Processing (LAMP 2025) in Japan. Our partner, PhD. Ainara Rodriguez, presented the work titled "Engineering Thin Films: LIPSS-Based Approaches for Submicron Structuring" within the framework of the SUSAAN-EU Project.

Our partners from CEIT also joined the event OPTOEL 2025 – the Spanish National Conference on Optoelectronics, held on July 2–4, 2025 in Catalonia, showcasing SUSAAN results and ongoing research in photonics and laser processing.

The presentation, titled "Machine Learning Approach to Find the Optimal Window for LIPSS Formation in Femtosecond Laser Processing" is a key element of a PhD thesis, the research merges ultrafast laser processing with artificial intelligence.

Aitor Larrañaga from CEIT participated in *OPTOEL Joven*, organized by the PhotoniCAT-UPC Student Chapter, which provided a vibrant space for young researchers to connect, exchange ideas, and build collaborations in an inspiring setting.

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SUSAAN Dissemination: Participaing in key events and International engagements

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PhD. Zili Sideratou from National Centre of Scientific Research "Demokritos" presented the advances on the system of novel antimicrobial materials achieved within SUSAAN-EU Project in the Inaugural International Colloquium at chios island. By presenting their findings to an international audience of experts, they offered valuable insights into the advance future technology and healthcare.

YEŞIM GROUP (ALMAXTEX) participated in the 19th Textile ETP Annual Conference, which took place from May 12 to 14, 2025, place at AITEX facilities, in Alcoy, Spain. This conference was organised in collaboration with Textile ETP and AITEX and this year focussed in ecodesign of clothing and consumer goods, as well as the sustainability of technical and smart textiles. During the event, they distributed factsheets about the SUSANN project and engaged with the audience to exchange insights and raise awareness about the project's goals and activities.

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Participaing in key events and International engagements

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ARDITEC participated in the XI International Conference on Life Cycle Assessment in America CILCA 2025, which was scheduled from April 7 to 11, 2025, in Mexico City. We had the opportunity to showcase the SUSAAN-EU Project. This conference joined colleagues from academia, industry, and governmental entities gathered in Mexico to exchange research on life cycle assessment and the circular economy.

The presentation focused on applying the Life Cycle Assessment (LCA) methodology, specifically from cradle to usage, and on the challenges of integrating this approach at the design stage of innovative nanocoating production.

This session at CILCA sparked conversations about the sustainability of active nanocoatings and the importance of LCA in guiding innovation aligned with EU directives and goals.

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