SUSAAN
SUStainable Antimicrobial and Antiviral Nanocoating

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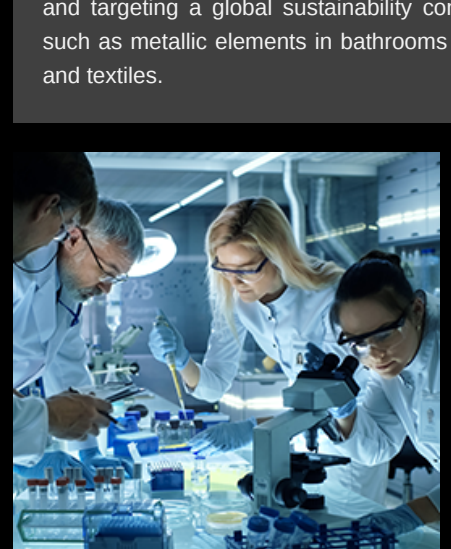
SUSAAN PROJECT

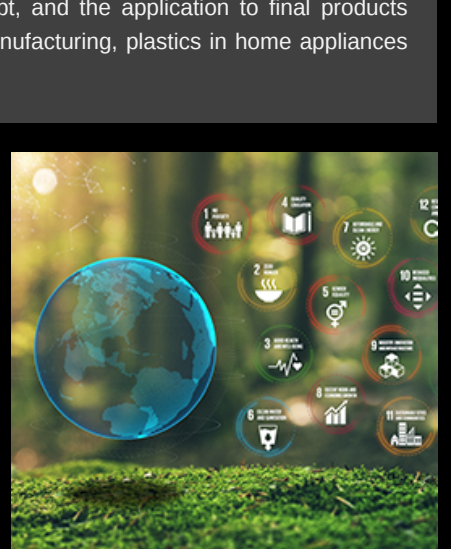
SUSAAN project has received funding from Horizon Europe Programme for Research and Innovation under the Grant Agreement **N° 101057988.**

The project aims to develop sustainable antiviral and antimicrobial coatings based on active nanomaterials, such as bio-based active materials and inorganic nanoparticles. It includes the development of fast active-response and durable surfaces, taking into consideration their ease of use, low toxicity, and health issues, and targeting a global sustainability concept, and the application to final products such as metallic elements in bathrooms manufacturing, plastics in home appliances and textiles.



Scientific Impact

New sustainable antimicrobial and antiviral nanocoatings with enhanced functionalities (durability, efficiency, low toxicity). Validated nanomaterial in three market sectors and replicable in more than 25 additional applications defined.

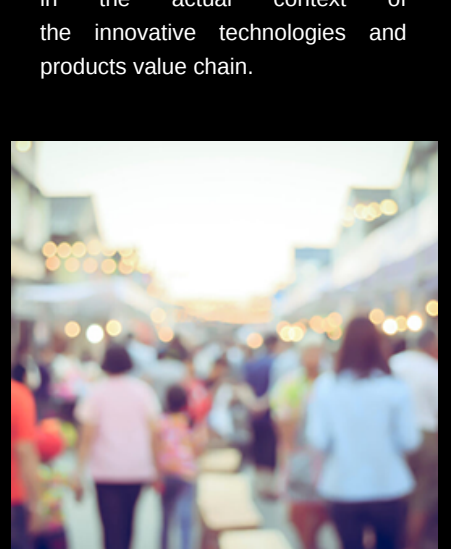


Environmental Impact

Sustainability integrated analysis in the products life cycle will be performed to highlight synergies and conflicts linked to the ambitions and objectives of Sustainable Development Goals (UN-SDG), in the actual context of the innovative technologies and products value chain.

Economic Impact

The new AV/AM nanocoatings will give a "market argument" and a competitive difference in the context of growing demand but also increasing offer due to the current situation regarding COVID-19 pandemic.



Social Impact

SUSAAN technology and new products development may give rise to new market opportunities in the future, new jobs, new knowledge, and impact on the scientific area. Employment impacts on specific regions, sectors and workers.

6th MONTHS CONSORTIUM MEETING

SUSAAN 6th Month Meeting brought together the consortium, to present their progress. The meeting took place on the November 3rd & 4th, 2022, and was hosted by the coordinator partner, LUREDERRA in Navarra, Spain. Our partners discussed the tasks, progress and next actions according to the project timeline.

SUSAAN PROJECT TECHNOLOGIES

NSCR DEMOKRITOS

NATIONAL CENTER FOR SCIENTIFIC RESEARCH

- A novel assisted impregnation (A.I.) for the inclusion of semiconductor nanoparticles, into mesoporous hosts.
- Functionalization in order to impart additional AM/AV properties and lower toxicity, to improve the compatibility of NPs with the selected matrices, and to enhance the stability of NPs avoiding agglomeration during the lifetime of the product.

LUREDERRA

FOUNDATION FOR TECHNICAL AND SOCIAL DEVELOPMENT

- Flame Spray Pyrolysis (FSP), a scalable technology for the synthesis of inorganic NPs used for the active nano-materials development.
- Functionalization of these nanomaterials in order to modify its surface for improving its performance and for being included in ready to use coatings.

ITENE

RESEARCH CENTER PACKAGING, TRANSPORT AND LOGISTICS

- Toxicity analysis of nanomaterials using computational methods (in silico), through in vitro tests, performed following the protocols set out by the OECD and using the guidelines and recommendations available for nanomaterials and microplastics.

CELABOR

BIOMASS VALORIZATION SCIENTIFIC & TECHNICAL CENTER

- Different technologies link to the production of functionalized nanofibers (High shear defibrillation, extrusion, chemical reactor, supercritical CO2 reactor) and the technologies for the production of coatings (bar coating, roll to roll, spray coating, dip coating).
- Regarding the extraction of natural antiviral and antimicrobial components, pressurized hot liquid extraction and especially sub-critical water extraction coupled with adsorption resin technologies will be applied.

PANASONIC

PANASONIC TURKEY

- Panasonic Electric is working on developing antibacterial products in Turkey. Within the scope of these studies, silver ions and antistatic additives are made into masterbatches and mixed with PC and PC-ABS raw materials. PC, PC-ABS materials mixed with additives are processed in injection machines. Visual appearance is another important criteria for switch and socket products, the traffic objects will be tested in SUSAAN project.

INTERTEK

INTERTEK ITALIA SPA

- EU Biocide Product Regulation (BPR) application, Toxicological and Eco-toxicological risk assessment to ensure product safety for both humans and the environment.

TECNAN

NAVARREAN NANOPRODUCTS TECHNOLOGY, S.L.

- A scalable production approach as Flame Spray Pyrolysis (FSP). Employing this technology, larger batches of inorganic nanoparticles will be obtained through a one-step and reproducible process. Remaining their particle size uniform and in the nanometric range and ensuring their properties of size, shape, and composition and, therefore, their antiviral and antimicrobial properties.

YESIM

ALMAXTEX TEKSTIL SANAYI VE TICARET ANONIM SIRKETI

- Yeşim Textile will provide expertise and equipment for textil finishing treatments. Application process of selected formulations will be treated by padding/pad-dry-cure method which is the most common and fastest method for large-scale production.

PARTNERS
Q & A INTERVIEW

LUREDERRA

FOUNDATION FOR TECHNICAL AND SOCIAL DEVELOPMENT

Could you explain in brief your role in SUSAAN Project?	How do you envision the future of Antiviral/Antimicrobial Nanocoatings applied to industrial products?
LUREDERRA is in charge of the coordination of SUSAAN Project. Also, LUR will work in the development and testing of a variety of ANMs and coating to be applied on different substrates (metal, plastic and textile) for end users of the Project (YESIM, PANASONIC and ECZASIBASI).	As it is known, nowadays, a free-pathogens environment has an important impact after Covid-19 pandemia. It is important to have end-users interested in this field who can include AV and AM nanocoating in their products to improve the substrates quality, that could also be helpful to commercialize these AM/AV nanocoatings to the market.

Fotios Katsaros
National Center for Scientific Research
NCSRD / DEMOKRITOS

NSCRD

NATIONAL CENTER FOR SCIENTIFIC RESEARCH "DEMOKRITOS"

Could you explain in brief your role in SUSAAN Project?

NCSRD team is going to work on the synthesis of shape and size -tunable inorganic nanoparticles (NPs) that can exhibit antimicrobial properties. In addition, the team will immobilize the developed NPs into various mesoporous supports aiming to control their toxicity NPs.

NCSRD will support the synthesis of the coatings, increasing the compatibility of the developed nanomaterials in the selected matrices. Apart from the characterization of the developed nanomaterials, the team will also evaluate the antibacterial performance of the new nanomaterials using gram+ and gram- bacteria as well as their cytotoxicity. Finally, the team will participate to the dissemination and exploitation activities of the project.

How do you envision the future of Antiviral/Antimicrobial Nanocoatings applied to industrial products?

The paint and coating industry is among the world's most competitive sector driven by the need to meet both regulatory policies and consumer expectations. Thus, several ever-evolving technologies are present. Among them, nanocoatings play a significant role to offer sustainable, durable and efficient solutions for a range of applications including transportation (automotive, marine, aviation and train), health care sector, textiles, customer products, building products and in general for protection of high touch surfaces against pathogens.

ITENE

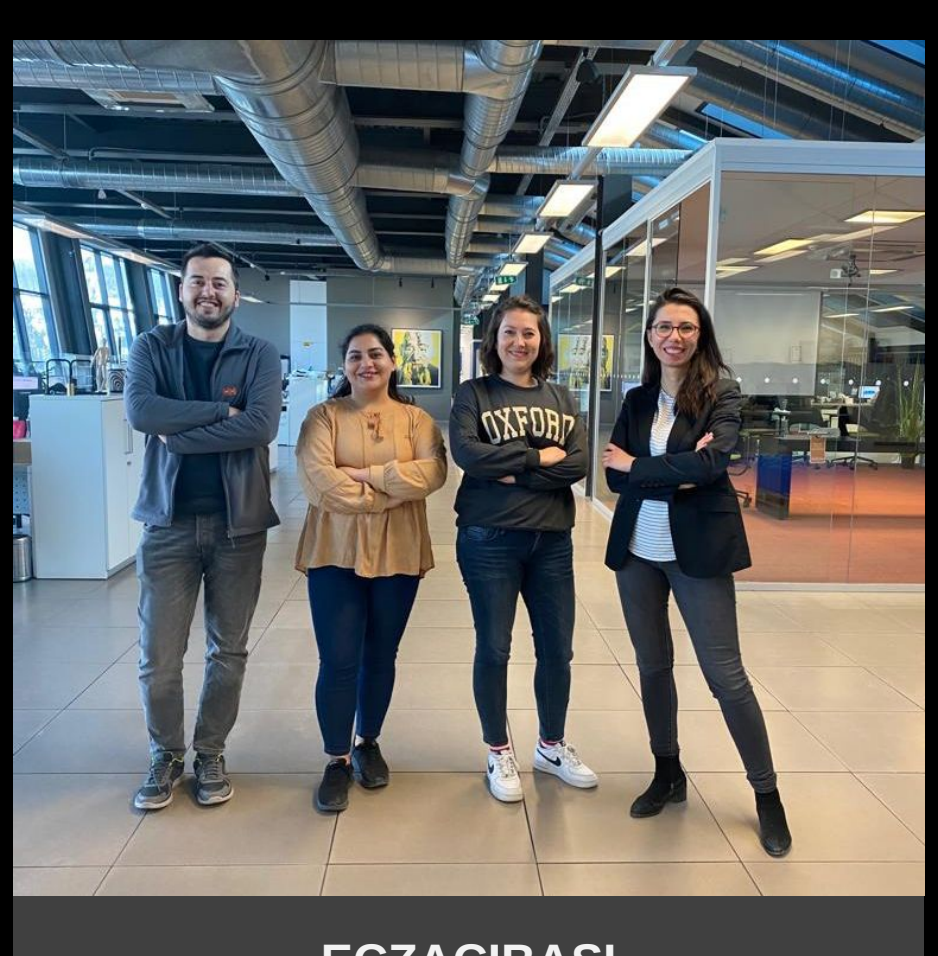
INSTITUTO TECNOLOGICO DEL EMBALAJE,TRANSPORTE Y LOGISTICA

Could you explain in brief your role in SUSAAN Project?	How do you envision the future of Antiviral/Antimicrobial Nanocoatings applied to industrial products?
ITENE will lead the complete definition of the final coating properties in terms of performance against the selected bacteria and viruses, robustness, durability, toxicity, ecotoxicity and price. In addition, the research centre will be involved in defining the method to be used for the selection of active nanomaterials (ANMs), formulations and final products to be applied. It will also lead toxicology experiments for the new active substance and coatings, as well as in vitro ecotoxicology studies. And it will participate in the evaluation of the environmental, social and economic impact of the technologies and surfaces developed, as well as in the dissemination and management of the project.	The use of nanomaterials with antimicrobial and antiviral activity might represent a revolution in terms of safety in industrial processes. The production of all kinds of edible products, such as meat or fruit, is susceptible to being contaminated by different types of microorganisms, some of them pathogenic. This contamination is able to cause significant losses in this industry, for example, due the withdrawal of products contaminated with pathogenic organisms from the market to comply with health and hygiene regulations.

CELABOR

BIOMASS VALORIZATION SCIENTIFIC & TECHNICAL CENTER

Could you explain in brief your role in SUSAAN Project?	How do you envision the future of Antiviral/Antimicrobial Nanocoatings applied to industrial products?
The development of biobased nanofibers for the production of hybrid oxide nanoparticles/nanofibers and their introduction in coatings for plastics and textile. Green extraction of bioactive components with antiviral and antimicrobial activities such as anthraquinones from rhubarb, isothiocyanates from horseradish and chitin/chitosan from mushroom.	The potential is wide as long as the project achieves its goal to ensure the stability of the coating and the preservation of the antimicrobial properties over long period of time.



ECZACIBASI

YAPI GERECLERI SANAYI VE TICARET AS

Could you explain in brief your role in SUSAAN Project?	How do you envision the future of Antiviral/Antimicrobial Nanocoatings applied to industrial products?
Eczacibasi will assess the results in terms of quality testing for AM/AV coated surfaces including bathrooms and other living spaces, including indoor and outdoor pools, gardens, and building exteriors.	With the Covid-19 pandemic, the risks of contamination in common areas have come to the fore, and products and services are needed to minimize the contact of toilet and bathroom users with each other. AV/AM nanocoating is one of the applicable solutions to increase the general hygiene status of public bathroom and toilet areas and VitrA products. Therefore, with these types of coatings, the hygiene barrier in public areas will be strengthened and the risk of contamination will be reduced. Thus, it will be beneficial for public health.

INTERTEK

INTERTEK ITALIA SPA

Could you explain in brief your role in SUSAAN Project?	How do you envision the future of Antiviral/Antimicrobial Nanocoatings applied to industrial products?
Intertek is an expert partner in regulatory compliance under the BPR and in substances registration, including nano-substances. We will support the project by assessing the regulatory status of the substances involved, performing the risk assessment for human and environment for selected products and by identifying the proper authorization pathways and related requirements according to the Biocidal Products Regulation (BPR - Regulation (EU) 528/2012), in order to make them available on the European market.	From a regulatory consultancy company perspective, our participation in this project will allow us to follow closely how innovative products based on nanomaterials are developed at research level and scaled to industrial level, with a special attention to sustainability. This experience will let us help Companies to better understand and guide their processes, from early stage to the final product, to define regulatory requirements and obligations, in order to raise awareness on sustainability approach and to make them access the EU market.

YESIM

ALMAXTEX TEKSTIL SANAYI VE TICARET ANONIM SIRKETI

Could you explain in brief your role in SUSAAN Project?	How do you envision the future of Antiviral/Antimicrobial Nanocoatings applied to industrial products?
As an end user partner, our main role in SUSAAN Project is application of coatings for textiles, prototyping and demonstration, then testing and validation of coated final products. Also, we participate in the definition of substrates needs and coating requirements, and we have a role in economical validation and exploitation of project outcomes.	Nanotechnology-based solutions are successful at inhibiting different pathogens, including viruses. Many different sectors can use the idea of long-term protective antiviral/antimicrobial nanocoatings on surfaces. They are used in a wide range of industries, including apparel, the food industry, hotels, restaurants and cafes, all forms of transportation, hospitals, all kind of public places. By 2027, the market for anti-viral coatings is estimated to reach $1.3 billion, expanding at a CAGR of 13.3% from 2020 to 2027. It seems like the application of Antiviral/Antimicrobial Nanocoatings will be increased to combat viruses and microbials.

TECNAN

TECNOLOGIA NAVARRA DE NANOPRODUCTOS SL

Could you explain in brief your role in SUSAAN Project?	How do you envision the future of Antiviral/Antimicrobial Nanocoatings applied to industrial products?
TECNAN will participate as the partner involved in the technical activities addressed to produce, at industrial level, antiviral and antimicrobial active materials. But also, in their incorporation into final developed liquid formulation to produce desired antiviral and antimicrobial coatings. To do so, within this project, TECNAN will support activities related with the definition of requirements and development, characterization and optimization of active materials at lab-scale. TECNAN will lead the up-scale production of most promising selected active materials and coatings; through the evaluation of key parameters employed in each production route.	After the global situation due to Covid-19 pandemic, the need to carry out the optimization of active nano-coatings that allow protection to different substrates against pathogens that can threaten health has been highlighted. Achieving a cleaner environment and delaying transmission of viruses and microbes. For all these reasons, it is needed to continue working on the study and evaluation of antiviral and antimicrobial properties, with the aim to demonstrate their effectiveness to potential end-users and to facilitate, not only their entry into the market, but also contributing to improve public health.

DISSEMINATION
EVENTS 2022-2023

NSCR DEMOKRITOS

National Centre of Scientific Research "Demokritos"

- 1st Mediterranean Conference on porous materials - MEDPore 23 presenting some of the result son the synthesis of porous materials (2023)
- EuroNanoForum 2023 presenting novel nanomaterials
- International Congress and Expo on Materials Science and Nanoscience, June 28-30, 2023 Paris, France.
- 2nd Global Summit on Nanotechnology and Materials Science -2023 September 13 - 15, 2023, Rome, Italy
- 13th Advanced Materials World Congress, 09-12 November 2023, Orlando (MI), USA

INTERTEK

INTERTEK ITALIA SPA

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- **Turkchem Eurasia 2022** and gave a speech about the KKDIK (Turkish REACH) regulation, focusing on the deadline for companies to register their substances by 31 dec 2023. In this event, Intertek also sponsored its participation to SUSAAN project.
- **In-cosmetics Global** – Barcellona Spain in March 2023, where all areas of the cosmetics industry connect to inspire, share insights, and spark potential collaborations. As many of SUSAAN Project partners are based in Spain, this will be a good occasion to further disseminate the project.
- **OMC Med Energy Conference 2023** in Ravenna, Italy (May 2023).

LUREDERRA

FOUNDATION FOR TECHNICAL AND SOCIAL DEVELOPMENT

- **Encuentro de Personas Gestoras y Promotoras de Proyectos Europeos** and **NEXUS, where Navarra meets Europe, 2022**. In both of them LUR has described the consortium and the objectives that englobe SUSAAN Project. Also, the distribution of SUSAAN brochures at bilateral meetings has been carried out.

ITENE

INSTITUTO TECNOLOGICO DEL EMBALAJE, TRANSPORTE Y LOGISTICA

- **Nano-week" 2023**, organized by ***NanoCommons*** in collaboration with **the EU NanoSafety Cluster projects**, in which there are a series of conferences and events focused on nanosafety and sustainability, among others.
- **EuroNanoForum 2023** that will take place in Lund, Sweden, from on 11 - 13 June 2023.
- **ITENE's attendance at the NanoSafe 2023 congress** is also contemplated. In the 8th edition of the congress, health and safety problems derived from nanomaterials will be addressed in order to make responsible use of them and will take place in Grenoble from 5 to 9 June 2023.

YESIM

ALMAXTEX TEKSTIL SANAYI VE TICARET ANONIM SIRKETI

- **10th International Fibers And Polymers Research Symposium** in 2022, while introducing their company at the beginning of the paper presentation, they talked about the SUSAAN Project.
- YESIM plans to prepare different training activities for sharing experiences and raising awareness regarding the development, production, application and testing of antimicrobial/antiviral treatments on textiles as the SUSAAN project progresses.

Merry Christmas
And
Happy New Year

For more information about SUSAAN Project
VISIT OUR WEBSITE & SOCIAL MEDIA

susaan-project.com

SUSAAN CONSORTIUM

Germany
Belgium
France
Italy
Spain
Greece
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SUSAAN - SUStainable Antimicrobial and Antiviral Nanocoating

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