

Innovative web-based tool to promote safe use of nanomaterials in textile finishing

Nanomaterials add new and/or improve existing textile properties. But what about the risks of nanomaterials to human health and the environment? By exploring four functionalities: biocidal, fire-retardant, dirt-repellent properties and protection against UV-light, and by setting up pilot cases, EcoTexNano will help the industry to gain and share knowledge in the risk assessment and safe use of these new materials.

Therefore, EcoTexNano will design an innovative tool to improve risk assessment and promote the safe use of nanomaterials in the textile finishing industry.



Although nanomaterials are not intrinsically hazardous, it is necessary to take into account specific considerations in their risk assessment.

EcoTexNano will

1. identify and reduce environmental, health and safety impacts by carrying out a comprehensive Life Cycle Assessment and Risk Assessment of the selected nanomaterials.
2. run two pilot-scale trials to provide evidence of best practice in the application of nanobased techniques compared to conventional finishing chemicals.
3. increase knowledge on nanomaterials for further development of human health and environmental EU policy, such as REACH, BREF for textile sector, regulations of biocidal products and CLP regulation.
4. improve the competitiveness of the EU textile sector by obtaining higher value products, to counteract the import of low cost textiles.
5. increase consumer's awareness on the HSE impacts of the textile sector using nanomaterials.

The final project results will be assembled in a user-friendly, WEB-BASED TOOL to support future design and implementation of textile finishing processes for nanomaterials. The EcoTexNano tool will include environmental, health and safety indicators for the applications techniques of nanomaterials.

Please fill in our online questionnaire about the use of nanomaterials within your company

<https://es.surveymonkey.com/s/J2DHWHN>

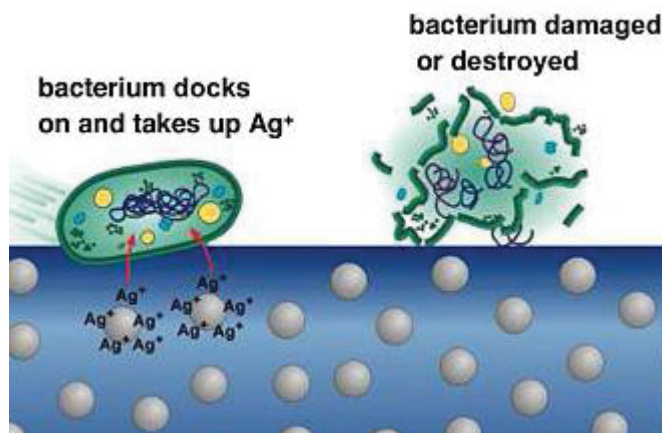
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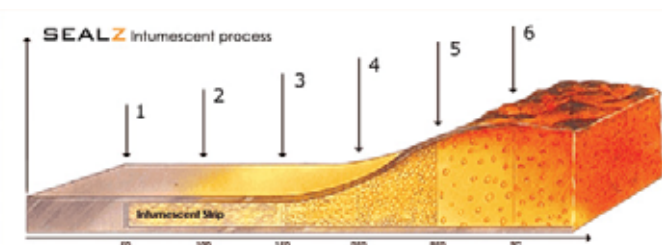
Textile properties and nanomaterial choice

EcoTexNano will explore four textile functionalities and select the most representative nanomaterials that are being used in textile finishing processes in order to establish the scope of the implementation actions of the EcoTexNano project.

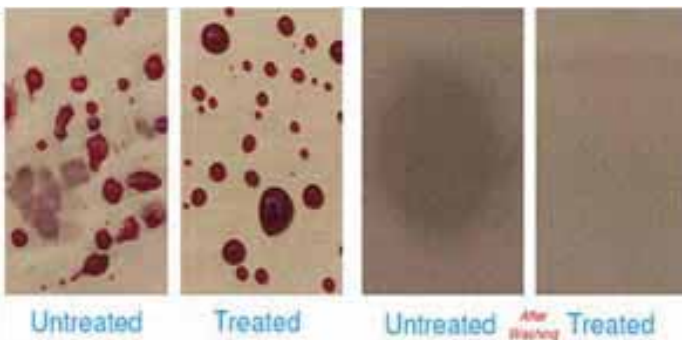
1. **ANTIMICROBIAL:** The most common method is the use of biocides (yarns, particles and finishing) containing silver. There are other types of products such as quaternary amines, copper, zinc or chitosan acting in different ways such as attacking the cell membranes of bacteria and degrading them. Antimicrobial property of silver is well known and is one of the best metals with antimicrobial activity against gram negative and gram positive. Some antimicrobial products based on this compound are usually applied in medical textiles, home textiles (towels, bedding curtains...), clothing (fabric military uniforms, sportswear, underwear...) or textile construction.



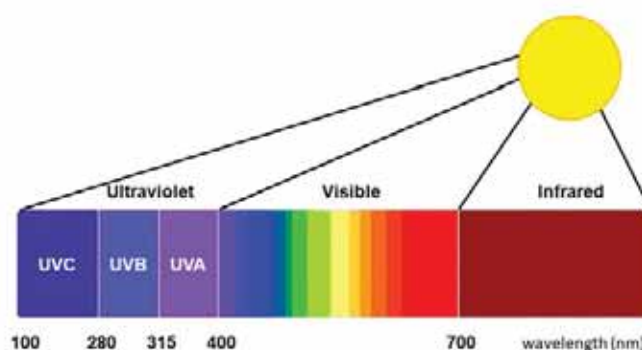
2. **FLAME RETARDANT PROPERTIES:** Flame retardant products can be classified in organophosphorus, organohalogen and mineral types. There are several mechanisms to create a flame retardant activity. Some materials break down at high temperatures due to an endothermic process, others have an intumescent reaction and create a thermal insulation barrier on the fabric surface, a third category works as diluents of combustible gas and the last one reacts chemically by generating radicals on the surface with much lower potential to propagate combustion.



3. **SOIL-RELEASE:** Soil-release is one of the properties of easy-care finishing and is commonly known as a finishing with a self-cleaning effect, although in this case the mechanism is not photocatalysis. Soil-release is a finishing which can remove dust, and/or oil easily. Normally, a fabric is soiled either by mechanical adhesion, electrostatic forces, or by the redeposition of soil during washing. Therefore, a single mechanism to remove dirt is not enough. A soil-release finishing behaves differently depending whether it is in contact with air or with water. In this sense, perfluorinated chains have the unusual property of being hydro/oleophobic in contact with air, and hydro/oleophilic in water (washing process).



4. **UV PROTECTION:** The ultraviolet protection factor (UPF) depends on the construction, composition and swelling capacity of the fibres, on the colour, and on the presence of optical brighteners and ultraviolet absorbers in the finishing product. UV protection of a fibre can be improved by incorporating of TiO₂ in its structure and/or by providing sufficient weight to the fabric. In summer however, light weight fabrics are preferred, and fabrics finished with UV absorbers and/or stabilizers offer good performance.



EcoTexNano webtool

The EcoTexNano tool will be designed to:

- provide a user-friendly tool to the textile industry to enhance knowledge on the risk assessment of nanomaterials and to promote the safe and green use along their life cycle.
- compare nanotextiles and conventional textile finishing products and quantify the achieved environmental and risks improvement.
- serve as a basis for the further development of a network platform to share data with stakeholders including scientific committees, EU policy makers and international researchers, filling the knowledge gaps about nanomaterials.

The EcoTexNano tool structure:

1. **NANOMATERIAL SELECTION:** this part will allow users to select the appropriate nanomaterial in function of the desired property to be provided to the textile product.
2. **ENVIRONMENTAL ASSESSMENT:** Textile companies will be able to determine the environmental impacts of its finishing textile.
3. **RISK ASSESSMENT:** users will be able to assess the health and safety potential risks associated with the application of nanomaterials in finishing processes of textiles.
4. **SHARING KNOWLEDGE SPACE:** the aim of this part is to improve the knowledge of textile finishing sector about the use of nanomaterials.

In addition, an online tutorial will be available in order to support textile companies to conduct the environmental and risk assessment.



nanomaterial selection

environmental assessment

risk assessment

sharing
knowledge
space

More information on the webtool: [http:// www.life-ecotexnano.eu](http://www.life-ecotexnano.eu)

EcoTexNano partners



Piacenza is a manufacturer of fine woolen fabrics, leader in the top segment of noble fibre fabrics for luxury market, and pure cashmere knitwear. It is the supplier of fabrics to all world-leading fashion brand manufacturers. The production strategy is based on "quality of excellence" obtained by strict control of production.

The competitive strategy of the company is focused on maximum differentiation of the product, in terms of raw material choice, style, and color.

Piacenza will function as one of the two pilot plants that will be set out in the project to provide evidence of best practice in the application of nanobased techniques compared to the conventional finishing chemicals. With this project Piacenza hopes to apply new functionalities to its garments and fabrics.



Vincolor/Crevin is a family company that is dedicated to the production of upholstery fabrics.

The company itself is completely vertical; from product development to weaving and finishing. By its objective to remain prominent, Crevin is continuously trying to innovate and to improve its products. By doing so, it is always pursuing high quality standards and minimal environmental impact.

The finishing department of Crevin, Vincolor, will contribute to the EcoTexNano project. During the project it will function as the second pilot plant. By participating in the project Crevin will continue to innovate its product with a minimal environmental impact.



LEITAT is a private, non-profit Technological Centre specialized in production technologies, surface treatment, biotechnology, environment and renewable energy.

LEITAT runs R&D projects on material sciences, sustainable technological development and environmental impact analysis. In addition, the centre is an expert in the field of nanomaterials, nanotoxicology, fate and bioaccumulation, REACH compliance and Life Cycle Assessment (LCA) of nanomaterials.

LEITAT is the project leader of EcoTexNano. Its vast experience will be of great value to the project.



ITENE is a Research Institute constituted in 1994 as a private non-profit Research center integrated with businesses, entities and institutions related to Packaging, Transport and Logistics. ITENE's mission consists of improving business competitiveness through the promotion of research, development, innovation and advanced technological services.

The R&D Divisions in ITENE involved in the EcoTexNano project are: Safety & Security, Sustainability and ICT and have a vast experience in the areas related to the tasks assigned within EcoTexNano.



CENTEXBEL is the scientific and technical research centre of the Belgian Textile industry and offers a complete range of standardised testing. Centexbel is a notified body for protective clothing, and offers technological advice and training to companies on sustainability, environmental subjects, and the implementation of environmental management systems.

Centexbel runs R&D projects on polymer formulation and extrusion processes; innovative finishing, coating and laminating formulations and technology; biomedical interactions of textiles; smart textiles and sustainable textile production processes

The EcoTexNano project fits perfectly in Centexbel's scope of assisting the textile industry in its transition to sustainability.

