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TextileMission

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Press release

TextileMission Conference in Berlin

Solutions for the environmental impact of textile microplastics should cover the entire life cycle of garments

From the production of textiles to their use and disposal - in the effort to sustainably reduce the output of textile microplastics it's important to identify and exploit potential savings and optimisation at all stages of the product life cycle. This was the key finding of the conference "Textile Microplastics - Solutions by Industry and Research" held on November 7, 2019 in Berlin. The event was organised by the partners of the joint project TextileMission and sponsored by the German Federal Ministry of Education and Research (BMBF). The partners presented first results of their research activities and discussed promising solutions together with around 90 participants.

"Studies have shown that 20 to 35 percent of the microplastics found in the oceans worldwide originate from garments made of synthetic fibres. The fibre fragments can cause inflammations and entanglements in the digestive tract of marine organisms. They influence natural behaviour, reduce fertility and can lead to the death of marine animals", said **Caroline Kraas,** project manager microplastics at **WWF Germany**, one of the project partners. After explaining the extent of the problem she gave advices on how to find a solution: "From a sustainability perspective, it is important to extent the research and action framework as far as possible. It is not just a question of particle release caused by the household washing of synthetic textiles. There are already considerable emissions at the textile production stage. Another important source of microparticles is the abrasion that occurs during wearing, and finally fibres are also released during the transport and when textiles end up in landfills. Avoidance must start at the very beginning and go on throughout the cycle."

Strongest microplastic release during the first three washes

What are the causes of microplastic emissions from textiles? What influence does the washing behaviour of consumers have? What textile technology approaches can be used to develop low-emission textiles? The project partners **Dr. Jens Meyer** and **Malin Obermann**, scientific co-workers of the Research Institute for Textiles and Clothing at **Hochschule Niederrhein - University of Applied Sciences**, provided answers to these questions. Up to now, fleece products have been the focus of their investigations - a focus that needs to be expanded, as Jens Meyer explained: "Fleece products were previously regarded as particularly microplastic-emitting due to the deliberate destruction of fibres during the shearing and roughening process in production. To a large extent, this is true. However, in our washing and drying tests, conventional filament goods such as pullovers and T-shirts made of polyester sometimes show a similarly high particle output".

A further test result catches the eye: during the first three washing cycles of a new garment by far the most microparticles are released. "This indicates that in the textiles there are still loose fibre fragments originating from production that are only discharged during household washing," Jens Meyer said.

A solution that all TextileMission partners consider worth testing could be a processing step (e.g. pre-washing or pre-drying) directly connected to the production process. Pre-drying would have several advantages: The resulting fibre fragments are generally easier to filter from air than from water. In addition, the haptics and volume of the new garments, which are important for sales, would be less affected than in the case of laundry.

Advice for consumers: Always pack the washing machine as full as possible

Should it prove practicable, this approach would take effect at the beginning of the product life cycle. Consumers, on the other hand, wonder what contribution they can make during the use phase. "One recommendation is to always fill the washing machine as much as possible. Textiles being washed at a low load are exposed to higher mechanical stress and therefore release more microplastic," explained Jens Meyer. However, the textile researchers are sceptical about the use of a washing bag on the market that promises to filter out most of the textile microplastic. "Although the protection of the textile by the surrounding wash bag has certain positive effects, we were unable to prove the announced filter performance in our tests," Meyer said. In addition, the bag reduces the washing performance.

Product development: machine parameters and alternative joining techniques as levers

Hochschule Niederrhein is not only researching into the causes of microplastic loss, but also into the development of sports and outdoor textiles, which have a lower microplastic emission by design. Malin Obermann explained two approaches at different stages of the textile production chain. "Already during the knitting process in the production phase there is a high generation of microplastic load. Initial tests with our institute's own large-scale circular knitting machine have shown that even changing two machine parameters can lead to a significant reduction in particle emissions," Obermann said.

Later, when the raw material is joined to fleece jackets and pullovers by the manufacturers, there are also promising levers. "Conventional seams increase the emission potential. Alternative joining techniques such as ultrasonic welding, which we have already tested, can lead to a reduction in this output", Obermann added. It remains to be proven, however, whether garments produced in this way also have the same performance properties as standard products on the market. In the further course of the project, the textile researchers, together with the participating industrial partners such as VAUDE, will also test biodegradable fibre materials and work on the implementation of the solution approaches in the textile supply chain.

Biodegradability of fibre materials in sewage treatment plants: viscose performs well

The extent to which materials declared as biodegradable are actually degraded in a sewage treatment plant within the framework of TextileMission is a research focus of **TU Dresden**. **Prof. Dr. Stefan Stolte**, **head of the Institute for Water Chemistry**, explained first results obtained by using lab-scale waste water treatment plants and the OxyTop test system: "Within our test period of 58 days, pure polyester was, as expected, almost not degraded at all, while cellulose fibres such as viscose were almost completely degraded. It was found that dyestuffs, which in this case accounted for about 0.2 - 0.4 weight percent of the viscose fiber, had no negative effect on the biodegradability of the material." A possible toxicity of the usually not degradable dye, however, remains unaffected by this finding. Stefan Stolte also warned against a prematurely optimistic generalization of the results: "These statements on biodegradability refer to the system waste water treatment plant - the degradation behavior for example in the deep sea runs under completely different conditions". Water temperature and pressure are just two examples.

Further lectures were given by the following renowned speakers:

- Prof. Dr. Gunnar Seide (Aachen Maastricht Institute for Biobased Materials) on the biodegradability of plastics,
- Prof. Dr. Hans-Josef Endres (Leibniz Universität Hannover) on end-of-life options and sustainability aspects of bio-based fibre raw materials,
- Jérome Pero (FESI Federation of the European Sporting Goods Industry) on European policy aspects of textile recycling,
- Carsten Eichert (Rittec Umweltsysteme) on technical aspects of textile recycling and environmental services,
- Nathan Obermaier (UBA - Federal Environment Agency) on regulatory aspects of microplastics.

The presentations of all speakers can be found here:
http://textilemission.bsi-sport.de/fachkonferenz-2019/

Caption: Approximately 90 participants from politics, science and industry attended the Textile-Mission conference in Berlin. Photo: Esteve Franquesa.

Are you interested in further pictures and graphics? Feel free to contact us!

Background:
The aim of the TextileMission joint project is to reduce the environmental impact of microplastic particles that are released by textiles from synthetic fibres such as polyester. TextileMission runs over a period of three years and is funded by the German Federal Ministry of Education and Research (BMBF) with around 1.7 million euros as part of the funding line "Plastics in the environment - sources, sinks, solutions". As project partners, the following nine organisations from the sectors research, sporting goods, household appliance, detergent and environmental protection contribute their respective know-how to the project: As partners: Association of the German Sporting Goods Industry (BSI), Hochschule Niederrhein - University of Applied Sciences, TU Dresden - Institute for Water Chemistry, VAUDE Sport GmbH & Co. KG and WWF Germany. Associated partners: adidas AG, Henkel AG & Co. KGaA, Miele & Cie. KG and Polartec LLC.

Further information can be found here: http://textilemission.bsi-sport.de/

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