

# How much microplastic is there in your laundry basket?

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A new filter developed by SINTEF will provide new and important knowledge of the microplastics originating from our laundry. From the left: Stephan Kubowicz of SINTEF and Camilla Coward, founder and CEO of Clean Oslo. Seated in front of Hanne is Elisabeth Høiesen, Sustainability Manager at Fjong. Credit: Siri Elise Dybdal

Every time you wash clothes, you are releasing microplastics into the sea, but we know little about the amount and distribution of such material from different types of textile. Research scientists are now working on measuring and capturing microplastics in our laundry.

Globally, microplastics from laundry represent the largest primary source of such pollution, together with particles from car tires. A study carried out by IUCN (the International Union for Conservation of Nature) indicates that in high-income countries with good waste management systems, primary microplastics represent a more serious problem than discarded plastic articles.

## **Rental garments as a research lab**

In Fjong's showroom at Frogner in Oslo, fine dresses in all the colors of the rainbow are on display. The company's business is lending and renting used dresses and everyday garments both from its own showroom and via its website. The objective is to reduce our overconsumption and provide a good alternative to buying new clothes.

However, the frequent washing and dry cleaning of clothes is a challenge when it comes to minimizing the environmental impact of the company as regards chemical consumption, water consumption and emissions of microplastics. The rental company has now become a "research lab" in a new joint-venture project involving SINTEF [research scientists](#) and industry participants, with the aim of making the laundry process more sustainable.

Among other things, Fjong will test a filter system developed by SINTEF in its washing process. The system passes wastewater from the washing machine through a series of special filters that capture plastic fibers. This can provide important knowledge regarding the amounts produced, and how the various material types contribute to microfiber in the wastewater.

The initiative taker and manager of the project is the innovative company Clean Oslo, whose aim is to find a method that prevents discharges of microfiber in wastewater from laundrettes and industrial

laundries.

## **Lack of knowledge**

"The current practice of washing textiles is not sustainable when it comes to chemical consumption, water consumption, or microfiber in waste water. We know that synthetic textiles make a significant contribution to the spread of microplastics. A fleece jacket can release as many as one million fibers in a single wash. Many of the plastic particles that loosen from microfibers are not captured by waste treatment plants because they are too small. Instead, much of this material ends up in the sea as microplastic pollution," says Camilla Coward, founder and CEO of Clean Oslo. One of the benefits of the SINTEF filters is that they are not discarded when the washing machine gets old, but can be re-used.

However, we still lack knowledge of the amounts that are rinsed out and of the spread of such fibres from different textiles.

"Perhaps chemical-rich natural fibers can be equally harmful? We want to find methods for the sustainable textile laundering of the future," Coward emphasizes.

"There is a need to think differently in the washing and maintenance phase, just as there is in the consumer phase. We need to ask more questions about our need for white tablecloths and shirts. In a way it's a case of clean clothes or a clean planet," she says, and goes on to say that the project has received support from the urban environment department (Bymiljøetaten) in Oslo, Innovation Norway, the Norwegian Retailers' Environment Fund (Handelens Miljøfond) and the Ferd System.

## **From research to the daily wash**

Stephan Kubowicz, a research scientist at SINTEF, has been involved in the development of the washing machine filter. He explains that the filter was originally developed for use in the Microplastic project, which studied microplastic in textiles, but was then used in the laboratory with test textiles.

"This is a specially developed version for use in real life situations. To begin with, we are filtering in three phases, using coarse, medium and fine filters—that is 500, 100 and 20 microns. The finest captures microplastics. Anything captured by the filters helps us understand what is being discharged, and how the various materials differ. The filters can be connected to several machines. As we gain experience, we will adapt the process and make changes. Maybe we need only one or two filters. We will also find out if the handling is good enough, how often the filters need to be emptied, and so on."

According to the SINTEF scientist, existing washing machines have only one filter for coarse fiber, and there has been little awareness of the fact that washing also discharges a lot of microfiber.

"However, we are seeing that a lot of fiber is left behind when we use a tumble-drier. The filter itself is nothing magical," Kubowicz explains:

"They consist of a very fine metal grating. We have produced a prototype for high-volume laundering. The transition from a scientific project and a filter that can be used in everyday applications is not difficult. The aim is to develop this into something that can be used in laundrettes," he says.

## **Washing creates piles of waste**

Filtration takes place only when the water comes out of a machine. This is a conscious choice, according to Coward:

In densely populated areas we believe the solution is to wash collectively and filter the water outside the washing machine. A bit like a laundrette from 1950, but updated to 2030. Today, only a small plastic device has to be installed, whereas in those days everybody would have had to buy a new washing machine. That is not the solution. We also need to use fewer chemicals. According to WWF, in the United States alone, 7 million bottles of laundry detergent are sold every day and an ordinary family of five washes 500 loads of laundry every year. This results in 700 million plastic containers on American landfills every year.

One of the benefits of the SINTEF filters is they are not discarded when the [washing machine](#) gets old, but can still be used. Coward points out that a lot of people cannot be bothered to clean the filter, or flush the lint in the toilet.

"And that defeats the object. So the aim is not to get private users to adopt this—we must quite simply entertain bigger and more interesting ambitions," she believes.

## **Thinking new and big**

Coward says that the collaboration with Fjong was a "natural partnership," since the idea behind the business is to reduce the environmental impact of textiles. Both Fjong and Clean Oslo see themselves as "disruptors"—getting us to stop and think differently.

"We see ourselves as "disruptors." We want people to think differently when it comes to fashion and clothes. The entire textile industry is insanely polluting. We want to help people think differently," says Hanne Elisabeth Høiesen, Sustainability Manager at Fjong.

"Somebody has to start showing the world that recycling clothes is a viable business."

She tells us that the company is now two and a half years old and has a growing range of items:

"There is great demand for evening clothes, but we also see an increasing trend in renting everyday garments. We consider this to be a positive thing in that recycling is becoming increasingly normalized! At Fjong you can both rent garments and rent out your own. The way this functions is that the income is shared equally between the owner of the clothes and Fjong."

However, a recent noticeable trend is that people often like the same garments:

"Clothes don't have unlimited lifetime, but if we wash them carefully and repair or adjust garments that are worn or damaged, we are contributing to maximizing their lifetime—so that several people can enjoy the same garments! We see that many of the same garments are being rented out. We Norwegians think alike. Which garments become more worn also has a lot to do with their production and the quality of materials and needlework. Poor material and quality result in a shorter life cycle," she says.

## **Who is responsible?**

Part of the philosophy of Fjong involves careful laundering methods:

"When it comes to washing, we have mainly tested cold, deionized water. This attracts negatively charged particles, drawing the dirt out of the material. Clean Oslo is the only laundry operator in Norway offering this method of washing clothes, completely free from detergents. We have been using this method for years. For us, filtering out microfiber is the next step," says Høiesen, adding that until now, no method has been available for doing this.

"Imagine the enormous amounts of textiles that are used, for example, in hospitals, hotels and so on, which may contain 50 percent artificial fibers that are not filtered out. Who is responsible—the laundries, the manufacturers? We need a new approach to this. In the future we envision collective laundries, and that this approach will also become a way of life. The homes of the future must also have communal facilities in which clothes are washed together and where people rent clothes from each other and share clothes," says Høiesen.

Provided by Norwegian University of Science and Technology

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