BACKGROUND ON MICROFIBERS

Microfibers are anthropogenic fibers < 5mm in length that can be composed of synthetic (e.g. nylon or polyester) or natural materials (e.g. cotton). Synthetic microfibers are one type of microplastic pollution. Microfibers are generated through the normal wear and tear of fabrics and textiles. Laundering is a significant source of microfibers to the environment.

Previous studies have found a single load of laundry can release thousands of microfibers into washing machine effluent. They are carried from washing effluent to the wastewater treatment plant, where some of them are released directly into aquatic ecosystems.

Although one significant known route for microfibers to enter the environment is through the discharge of wash water from residential and commercial laundering, other microfiber sources may also include dryer exhaust, household dust, textile manufacturing and others, however their relative contributions to microfiber pollution is unknown.

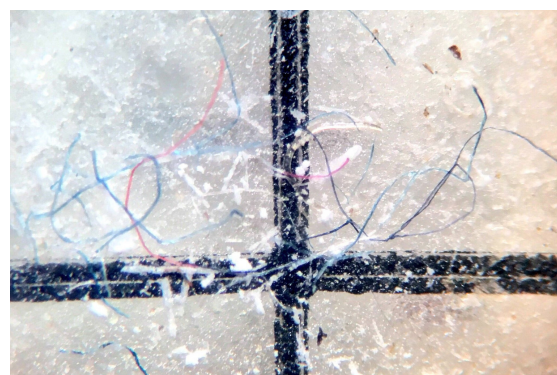*Microfibers are the most common type of microplastic in WWTP effluent.*

FILTERS ADDED TO WASHING MACHINES MITIGATE MICROFIBER POLLUTION

Our research demonstrates that filters added to washing machines significantly reduce microfibers that are shed from clothing in washing effluent. This means that filters added to machines can reduce the number of microfibers that enter wastewater treatment plants.

MICROFIBERS IN THE ENVIRONMENT

- Microfibers are the most prevalent type of microplastics in the environment and have been found in surface water, soil, biota and atmospheric samples.
- This widespread contamination includes commercial fish, honey, salt and drinking water.
- Chemicals found in clothing can be added during manufacturing (e.g. dyes, flame retardants), some of which can be toxic.
- Fibers can sorb harmful chemical compounds and release them to the environment.
- Some studies have demonstrated that microfibers can be harmful to animals upon ingestion.

*Microfibers can enter the food web when ingested by wildlife*

WASHING MACHINE FILTERS MITIGATE MICROFIBER POLLUTION

In a recent set of laundering experiments, we found the Lint-LUV-R filter captured an average of 87% of fibers by count and 80% by weight from entering waste water streams (McIlwraith et al. 2019). Further, we found the Filtrol160 washing machine filter can capture and prevent 89% of fibers by weight.

CAPTURE EFFICIENCY OF FILTROL160

89% REDUCTION IN MICROFIBERS
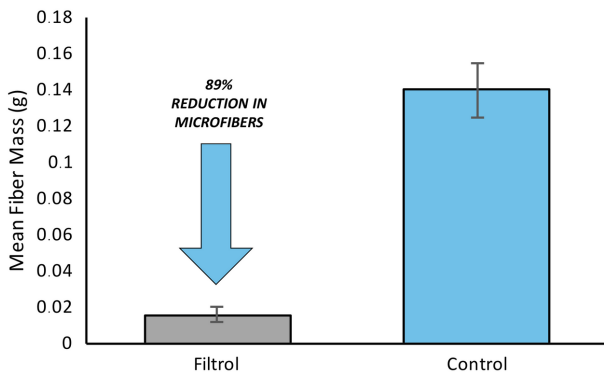
These findings indicate that washing machine filters offer a low-cost solution for mitigating microfiber pollution.

CURRENT PROGRESS

- Connecticut Passed HB 5360 to establish a working group to address microfiber pollution.
- California has tabled Assembly Bill 2379 and New York has introduced Bill A10599, both of which will target clothing containing more than 50% polyester and require manufacturers to place a microfiber pollution warning label on clothing.
- The Microfiber Leadership Summit led by the Ocean Conservancy and UCSB's Bren School, was held to share knowledge about the state of microfiber science and potential solutions.

POLICY RECOMMENDATIONS

- Legislation requiring internal washing machine filters that capture microfibers in wash water. This could include a microfiber emission cap, similar to other chemical contaminant mitigation strategies, or a minimum pore size set at a level that is most effective for catching microfibers.
- Providing tax credit to consumers that buy after-market filters for their washing machines.
- Legislation requiring laundry filters to be required by industrial textile washing facilities, commercial laundry services, shared laundry facilities, and self-service laundry facilities.
- Provide funding for further research on other sources of microfibers (e.g. dryers) to the environment.

AUTHORS

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IN CONCLUSION

Whereas, microfibers are the most ubiquitous form of microplastic pollution in the environment and

Whereas, there is scientific evidence suggesting microfibers act as vectors for indoor pollutants to potentially enter the outdoor environment, and

Whereas, to date, the largest documented source of environmental microfibers is washing machines, and

Whereas, our findings indicate washing machine filters mitigate the majority of fibers lost during washing, therefore,

Scientific evidence supports policy or management options that reduce microfiber emissions to the environment from laundering.

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