Microfibers, a Macroproblem: Optimizing Washing Machine Filters To Reduce Microfiber Emissions

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Microplastics are a major source of pollution in our oceans and waterways. One source of microplastics is microfibers released from washing synthetic clothing. Wastewater treatment plants are able to collect 98-99% of the microfibers, but still release a significant amount of microfibers per day. Commercial microfiber filters are being developed that filter washwater effluent prior to discharge to the sewer to minimize the release of these microfibers. This research aims to optimize the filter size(s) that would capture the most microfibers from washwater effluent. A high-loft fleece blanket, a microfleece sheet, and sports clothing were each washed three times, filtering the washwater through a series of filters: a coarse screen (1350 microns), 400-, 200-, 100-, 55-, and 25-micron filters. Based on the mass of microfibers, for sports clothes, the most was collected on the 55-micron filter; for the high-loft fleece, the 400-micron filter; and for the microfleece, equally between the 400- and 55-micron filters. This research suggests that the optimal design for consumer washing machine effluent filtration would be two filters in series, 400- followed by 55-micron, to maximize microfiber capture and to minimize flow obstruction.

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