# Factors Affecting the Discharge of Micro-Plastic Fibers from Household Laundry

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Every day millions of loads of laundry are done in in the United States alone. Many, if not most, include synthetic fibers. During washing, micro-plastic fibers are released from the fabric, and discharged into the wastewater. These fibers have been detected in fresh water throughout the world and all of the oceans. These micro-plastic fibers are an emerging environmental contaminant that can adversely affect wildlife and are highly bio-accumulated in aquatic food-chains. Additionally, like other plastics, micro-fibers are not readily biodegraded and persist in the environment for a long time. In this research, I explored the effect of the way we wash clothes on the amount of micro-plastic fibers that are shed by common clothing materials containing man-made fibers. I collected discharge samples from wash and rinse cycles of a washing machine. I collected samples from a control wash using no detergent and then repeated five times. Next, I repeated the experiment five times using four different types of detergent. Large amounts of micro-plastic fibers were released during all wash cycles. However, the numbers decreased during the later rinse cycles. The use of laundry detergent increased the number of micro-plastic fibers released into the wash-water. Deep cleaning detergents produced over ten times more fibers than the no-detergent control. The gentlest detergent only released two time more fibers than the control. Therefore, it would be possible to affect the number of fibers released into the wastewater simply by selection of detergent. The ultimate goal of my research is to develop an optimized detergent that minimizes the number of micro-plastic fibers generated by washing and still effectively clean clothes.

**Awards Won:**
Fourth Award of $500