

Microfiber Contamination Research Abstract

Prepared by Oscar R. Mayer and Bri Matthews

Much of our modern society relies on the use of plastic materials. However, the consequences of society's continued use of plastic materials are only recently being explored. Microplastics, extremely small pieces of plastic debris, are being identified in throughout each of the oceans and the majority of lake and rivers in human-developed areas, contaminating the environment. These plastics directly impact the oceanic environment, becoming ingested by microorganisms including plankton. However, the consequences of microplastic contamination are not strictly limited to the oceanic environment. Microplastics are emerging in human food products, such as table salt and fish products. Microplastics are even present in the drinking water supply of many countries, including the United Kingdom, France, Germany, and the United States. The full extent of the consequences these microplastics present to public health is yet to be determined, however, it is possible to trace the microplastic contamination back to its source.

The most commonly noted source of microplastic contamination are facial cleansers with microbead scrubs. These microbeads are advertised as "exfoliators" and do not dissolve after use. As a result of public outcry against microbead contamination, the United Kingdom has completely banned microbeads products from store shelves. While regulations have been implemented to prevent microbead from entering public water supplies, microbeads don't even account for half of the global microplastic contamination.

A much larger and less discussed threat comes from synthetic microfibers. Some studies suggest that 85% of the human-made material polluting oceans and shorelines are microfibers. Despite the larger threat to the environment and public health, regulatory action has yet to take place, likely a result of knowledge gaps regarding the actual sources of microfibers and their potential consequences. As such, our research project seeks to contextualize the issue by studying the release of microfibers into the water system.

The main source of microfibers is our clothing, specifically apparel composed of synthetic fabrics. As we wash synthetic fabrics, small strands of plastic are released from the material, introducing these fibers directly into to the water system. Due to the incredibly small size of these fibers, wastewater treatment plants are unable to remove microfibers from the released water, sending into our lakes, rivers, and oceans.

Our research team has set out to determine the number of microfibers released from washing synthetic clothing. By collecting samples directly from washing machine affluent, we are able to analyze and quantify how many microfibers are released under certain conditions. We have obtained samples that directly compare the release of microfibers from an old piece of synthetic fabric to a completely new piece of synthetic fabric. We have compared the number of fibers released from loosely-knit synthetic fleeces to tightly-knit synthetic athletic apparel. We are continuously collecting samples from washing machines and are constantly improving our methods of analysis. Our team also plans to further diversify our research by testing advertised microfiber collection devices to see if they significantly decrease microfiber pollution. Synthetic microfibers pose a great risk to the environment and public health. We seek to ignite the spark that will lead to further conversation, discussion, and change that will guide us to a more sustainable and conscious future.