Quantifying Microplastics in the Mississippi River: A Source of Pollution in Gulf Coast Seafood

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Microplastics consist of small plastic particles in commercial products as well as plastics that degrade in the environment. Microplastic pollution is of growing concern because microplastics are entering the food chain. My project focuses on quantifying the concentration and type of microplastic pollution in the Mississippi River and estimating the amount of microplastics entering the Gulf of Mexico from the river. My procedure was as follows: First, I collected samples from the river using a fine net. Next, I sieved each sample and dried them overnight. To break down natural organic matter, I added a Fe(II) solution and hydrogen peroxide. To separate the plastic particles, I added salt for a density separation. I transferred floating materials in the beakers to a glass jar. To count the microplastics, I used a microscope and tested several of them using a hot needle. I also analyzed some microplastics using infrared spectroscopy and fluorescence microscopy. My results were as follows: I observed 28 colored fibers and 29 irregular shaped colored particles. To test if these particles were anthropogenic, I removed a few and they melted with a hot needle. One particle's infrared spectrum showed characteristics of polyethylene. In my project, I successfully detected and identified microplastics in the Mississippi River. Based on the time my net was deployed and USGS estimates of the river flow rate and overall discharge, I estimate that 198 million plastic particles >125 µm are entering the Gulf of Mexico every day.

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