Microplastics in the Terrestrial Food Chain via Earthworms (Lumbricus terrestris)

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Microplastics are small plastic particles that are generally less than 5 mm in diameter and can come from cosmetics, clothing, weathered and degraded plastic, and more. There has been growing concern regarding the effects of microplastics in the environment and the potential threat they pose to people. The purpose of my project was to find out if microplastics can enter the terrestrial food chain through low-level organisms, such as worms, determine the sizes and types of microplastics that are more readily ingested, and look at the growth and mortality rate of worms exposed to microplastics. I hypothesized that the worms would ingest the microplastics, especially the particles of the smallest sizes, and that exposure to microplastics would result in a decreased growth rate and an increased death rate. To test mortality rate, I put 15 worms in containers with different microplastics, and to test growth rate, I put individual worms in small containers with varied concentrations of polyethylene microplastics. After about a month, I digested the worms with hydrogen peroxide and nitric acid and examined them under a fluorescence microscope and an optical microscope for plastics. I found that the worms ingested microplastics in small amounts. Growth rates were stunted, and the worms exposed to plastics, particularly polyethylene, had a much greater death rate than the blanks. In conclusion, I found that microplastics are able to enter the terrestrial food chain through worms and thus may pose a potential threat to larger organisms through biomagnification.

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