Microspheres: Micro or Mega Problem?

Hetland, Madison

Microbeads are added to personal care products such as body scrubs to aid in the exfoliation of skin and to toothpastes as an abrasive. They do not break down readily in the environment thereby posing a possible hazard to organisms after they are washed down the drain. The problem was to assess the environmental impact of polyethylene microspheres on aquatic (Lumbricularis variegatus) and terrestrial invertebrates (Tenebrio molitor). Polyethylene microspheres were mixed with the food/substrate (dry infant rice cereal) of the T. molitor at a ratio of 1:2 (beads:cereal) and kept in 60 mL polypropylene containers. Growth in mass (g) was monitored. Glass microspheres were used as a negative control for impacts specific to polyethylene. Controls (no beads) were also monitored for the same parameters. Polyethylene or glass microbeads were added to the water of L. variegatus at a ratio of 1:25 (beads: water). There was also a control with no beads. Survival and behavior were monitored. The microspheres did impact the invertebrate behavior and growth. The L. variegatus exhibited increased activity frequently “curling” and clumping when in contact with the polyethylene microspheres but not the glass microspheres with worms more dispersed and not as active. In a terrestrial environment, an independent two-tailed T-test revealed that T. molitor showed a significantly higher growth rate, as change in mass (g), in the presence of the polyethylene microbeads (M=.009, SD=.003, N=9) than glass, t(8)=.003, a=.05, (M=.004, SD=.002, N=9) or the control worms, t(8)=.012, a=.05, (M=.004, SD=.002, N=9).

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