Environmentally Safe Solution to Styrofoam Waste

Rodriguez, Alexander
Rust, Haley

Commonly available beetle larvae could be the key to diminishing five types of polystyrene waste in our environment: purple compact Styrofoam, expanded white Styrofoam, packing peanuts, bean bag beads, and extruded polystyrene. Lab cultures of the mealworm T. molitor and the “superworm” Zophobas morio were able to digest all of these plastics, with the mealworm digesting the most. However, when a commercially available version of T. molitor was fed packing peanuts and extruded polystyrene, results were not as robust which were hypothesized to be due to a lower winter humidity. Replicating this trial at a higher humidity produced equivalent results. The larva, not the humidity, seemed to be the difference since we were also able to replicate the first trial at a high humidity using the lab culture with good results, just as before. It’s possible that T. molitor gut microbiota are responsible for this discrepancy. If mealworms were used to eliminate Styrofoam waste, would there be toxicity of polystyrene propagating up the food chain? When T. molitor that had eaten the Styrofoam were fed to centipedes no toxic results were detected. Carbon dioxide levels produced during ingestion of the Styrofoam were significantly less than when mealworms were ingesting their culture food source. Thus it may be possible to employ the right type of mealworm to significantly reduce the effects of Styrofoam upon the environment without harming either the food chain or producing abundant greenhouse gases in the process.

Awards Won: