Mealworms and Polystyrene Foam: If Mealworms Are Fed Only Polystyrene Foam, Does Their Frass Contain Styrene and Benzene?

Stone, Andrew (School: Washington High School)

Mealworms are capable of eating and digesting polystyrene foam. The purpose of this project was to test the hypothesis that styrene and benzene would not be found in the frass of mealworms that eat exclusively polystyrene foam. Mealworms were sorted into six groups of three hundred and placed into containers. Polystyrene foam was added to three containers, and oats were added to three containers. After forty-eight hours, the frass was disposed. The containers were placed in a dark area and left for three months. After the 3 months, the frass was collected. In a lab, 2.35 grams of frass was added to a beaker. Fifty ml of reverse osmosis water was swirled in and sat for 5 minutes. Fifty ml of dichloromethane was swirled in. The immiscible solvents were left to steep for 5 minutes. The solvents were filtered and then inverted in a separatory funnel. 20ml of the mix was released into 3 beakers and filtered to ensure no particles remained. The mix was analyzed in an IR spectrometer. The results support the hypothesis. There was no evidence of styrene or benzene in the frass. Further testing will ensure that the frass of polystyrene-fed mealworms is safe for the environment while being plant beneficial. This could lead to large-scale centers that “recycle” the foam using mealworms while selling the frass as fertilizer and older worms as feeders. A once discarded item could be taken out of the landfills and be used to better the environment rather than destroy it.

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