Analyzing the Effects of House Dust on Growth, Development, and Fat Content in the T. molitor

Hetland, Hannah
Hetland, Madison

Our project analyzed the effect of house and school dust on the total lipid content of the blackworm, Tenebrio molitor. A study published in Environmental Science & Technology has found that chemicals found in house dust can bind to the PPAR gamma receptor, a protein that can regulate fat metabolism. We hypothesized that exposure to dust in the T. molitor food/bedding environment source would contribute to a significant increase in their lipid content. Samples consisting of four test groups with individual larva placed in a separate environments containing mixtures of dust/rice cereal (% w/w) with mass, mortality, and developmental milestones (e.g. pupae and beetle stages) were recorded every week for 8 weeks. Dust was obtained from two different sources: household and a school vacuum cleaner. Groups included a control (0% dust), 3% house dust/cereal, 5% school dust/cereal; and 10% school dust/cereal. After seven weeks, the larvae were euthanized by freezing, heated to a constant dry weight at 90oC, and analyzed for total lipid content using phospho-vanillin colorimetric reagent. Results proved that both the 5% and 10% school dust caused a statistically significant increase in proportion of fat of the T. molitor compared to the control. Further testing aimed at lipid composition, its relationship to the PPAR Gamma-1 protein which stimulates body fat in humans, as well as composition of the dust particles is warranted.

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