Investigating the Efficacy of the Gut Biome of Tenebrio molitor and Zophobas morio in the Biodegradation of Polystyrene

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As the human population grows, more and more waste is created, most of which is non-recyclable and non-biodegradable. Styrofoam, a derivative form of the plastic polystyrene, is one such example. It cannot be recycled into other products, takes upwards of 500 years to biodegrade, and is prone to forming microplastics, posing a damage to organisms everywhere. Making the switch to a more sustainable material is important, but so is eliminating the Styrofoam already present in a sustainable and safe manner. Recently, it was discovered that mealworms (Tenebrio molitor) are capable of metabolizing and mineralizing Styrofoam, and that their gut bacteria play an important role in this process. This project focused first on establishing a rate of Styrofoam consumption for both Tenebrio molitor and Zophobas morio, another species of darkling beetle that, at the start of this research project, had not been studied extensively. The rate of Styrofoam consumption of both species' gut bacteria is now being studied, something that has never been established in Z. morio. Furthermore, the effects that different variables, such as temperature and LB broth concentration, have on this bacterial consumption rate is under investigation, in an attempt to open the door to potential methods of degrading Styrofoam on an industrial level.

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