Tenebrio Molitor as a Bioreactor for Synthetic Polymers Biodegradation

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Synthetic polymers, like Polystyrene (PS), are a severe environmental problem. Recently published studies prove that the larvae of Tenebrio molitor (mealworms) are capable of biodegrading PS through existing gut microorganisms. In this study, we attempted to determine the best conditions to optimize the biodegradation rate of polystyrene by larvae of Tenebrio molitor. Three larval strains, from different places, were investigated and we verified that they have different efficiency in PS biotransformation. We tried to enrich the mealworm gut microbiota with pre-existent biofilm from decomposing PS found in nature, but that procedure had no impact in PS biodegradation efficiency. It was hypothesized that different sizes of PS waste influence its biodegradation rate; however, the results did not confirm our hypothesis. Factors that might affect mealworm efficiency as a bioreactor in decomposing polystyrene are still being investigated.