Biodegradation of Polystyrene by Tenebrio molitor for Produce Compost Amendment

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By the year 2050, it is estimated that cumulative plastic production will reach 34 billion tons (Bt), and at pace with the current consumption rate, around 12 Bt of per week (PW) will find their destination either in landfills or marine areas. (Golam Kibria, Md. et al, 2023). Therefore, various techniques such as mechanical and chemical recycling, combined with sustainable alternatives, are being used to solve this problem. One of the newest and intriguing possibility is the use of insects in biodegradation of plastics, which can be named entomoremediation (Bulak, et al., 2021). This research explores the potential of Tenebrio molitor as larvae and adult form to biodegrade polystyrene waste and transform it into a valuable resource for organic matter at compost. The hypothesis to be tested is the following: If Tenebrio molitor as larva and adult used polystyrene as primary food source, then they are sustainable alternative to biodegrade plastic waste. . To test the hypothesis twenty two grams (22g) of larvae and two grams (2 g) of plastic (polystyrene) was placed in a container. Data was collected to evaluate Tenebrio molitor's potential to degrade plastic. Over a six-week experimental period, 22 grams of Tenebrio molitor fully biodegraded 2 grams of polystyrene. This represents a reduction of 100% in polystyrene mass. Therefore, Tenebrio molitor is an alternative to develop as a plastic decomposer and organic matter producer.

Awards Won: