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Plastic Degradation Activity of Bacillus Sp. Isolated from the Gut of Plastic-Fed Yellow Mealworm

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Abstract : The increasing number of plastic production and its importance to humanity in daily life made it a headache to the planet earth. The persistence of plastic wastes in the environment formed a serious problem. They are prominent with their capability to resist microbial degradation for decades. Thus, it was crucial to find ways to eliminate the plastics without depending on conventional recycling methods, which causes the formation of more hazardous compounds and doubles the problem. In this paper, mealworms were fed with a mixture of plastic wastes such as plastic bags, Styrofoam, PE foam, and plastic tarpaulins film as the sole food source for a month. Frass was collected at the end of the test and examined using FTIR analysis. Also, the gut bacteria were isolated and identified using 16S rRNA. The results show the mineralization of plastic in the frass of plastic-fed worms when compared to control. The 16S rRNA and the BLAST analysis showed that the obtained isolate belongs to the genus Bacillus Sp especially Bacillus subtilis. Phylogenetic analysis showed their relatedness to the other Bacillus species in the NCBI database.

Keywords : mealworm, waste management, plastic-degrading bacteria, gut microbiome, Bacillus sp
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