Utilizing an Experimental Compost To Accelerate the Degradation Process of Low Crystallinity PET Plastics and Employing Molecular Docking To Analyze Targeted Binding Pockets

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Plastic waste is an ongoing environmental pollution and contamination hazard across the world. Our experimental compost has been shown to accelerate the degradation process of low-crystallinity PET plastics. It is made by mixing multiple organic waste materials, along with compost accelerants, such as lime and montmorillonite. The degrading potential of bacteria in the compost mixtures were evaluated through several plastic decomposition field tests. Microorganisms in the compost, such as Bacillus Subtilis, Bacillus Pumilis, and Azotobacter were identified by growing cultures on agar plates. Additionally, molecular docking was employed to analyze the targeted binding pockets that facilitate the breakdown of PET plastics. The results showed that chemically enhanced compost containing both lime and montmorillonite significantly accelerated the biological and chemical degradation processes within low crystallinity PET plastics, as evidenced by the reduced weight. Furthermore, the molecular docking analysis identified potential binding pockets on the PET polymer, providing insights into the underlying degradation mechanisms. Final research testing provides a promising approach to addressing the environmental issues associated with PET plastic waste.