

Isolation and Molecular Identification of Polyethylene Degrading Bacteria From Soil and Degradation Detection by FTIR Analysis

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Abstract : Today, the increase in plastic waste accumulation is an inescapable consequence of environmental pollution; the disposal of these wastes has caused a significant problem. Variable methods have been utilized; however, biodegradation is the most environmentally friendly and low-cost method. Accordingly, the present study aimed to isolate the bacteria capable of biodegradation of plastics. In doing so, we applied the liquid carbon-free basal medium (LCFBM) prepared with deionized water for the isolation of bacterial species obtained from soil samples taken from the Izmir Menemen region. Isolates forming biofilms on plastic were selected and named (PLB3, PLF1, PLB1B) and subjected to a degradation test. FTIR analysis, 16s rDNA amplification, sequencing, identification of isolates were performed. Finally, at the end of the process, a mass loss of 16.6% in PLB3 isolate and 25% in PLF1 isolate was observed, while no mass loss was detected in PLB1B isolate. Only PLF1 and PLB1B created transparent zones on plastic texture. Considering the FTIR result, PLB3 changed plastic structure by 13.6% and PLF1 by 17%, while PLB1B did not change the plastic texture. According to the 16s rDNA sequence analysis, FLP1, PLB1B, and PLB3 isolates were identified as *Streptomyces albogriseolus*, *Enterobacter cloacae*, and *Klebsiella pneumoniae*, respectively.

Keywords : polyethylene, biodegradation, bacteria, 16s rDNA, FTIR

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