BIODEGRADATION OF POLYETHYLENE TEREPHTHALATE (PET OR PETE) AND HIGH DENSITY POLYETHYLENE (HDPE) USING MICROBES ISOLATED FROM WASTE DUMPING SITES IN CHITTAGONG, BANGLADESH

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by

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Biodegradation of Polyethylene Terephthalate (PET or PETE) and High Density Polyethylene (HDPE) Using Microbes Isolated from Waste Dumping Sites in Chittagong, Bangladesh

Abstract

Synthetic polymers like polyethylene terephthalate (PET) and high density polyethylene (HDPE) are hazardous pollutants for the environment. The aim of this study is to investigate the ability of microbes in soil and water samples from three different waste dumping sites in Chittagong to degrade PET and HDPE pellets. The sites are: sewage drain next to the Asian University for Women (AUW) campus, the landfill of Chittagong City Corporation (CCC) in Anandabazar, and the ship breaking yard in Sitakunda. Nineteen selected microbes from these samples were cultured on nutrient agar at 37ºC and their ability to biodegrade the two synthetic organic compounds mentioned above were tested by placing the weighed pellets on the cultured agar plates. These plates were observed periodically for about a month and final weights of the pellets were recorded. Similarly, the experiment was also carried out in nutrient broth with sixteen microbes. Results from the agar method showed mean percent weight loss of 8.32±0.52 in PET pellets by L3AW1 sample and 7.10±2.83 in HDPE pellets by L3AW3 sample. In the broth method, percent weight loss was observed 11.77 in PET by L3AW3 and 5.26 in HDPE by S4SB1 sample. Further studies are recommended for identification and characterization of the microbial strains.

Keywords: Polymer; PET; HDPE; Hazardous pollutant; Environment; Biodegradation; Weight loss.