

Isolation of Microorganisms with the Potential of Degrading Polythene

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Polythene is an ethylene polymer used to make bags, food containers, and textiles. Polythene can take 12 - 32 years to break down, producing toxic chemicals in the soil. When burned, this polymer releases toxic fumes and pollutes the air. This study aimed to isolate a microorganism that can degrade polythene. Degraded polythene that was buried under the soil was collected. A microbial suspension was prepared by soaking them in sterile saline. A tenfold dilution series in sterile saline was prepared using this suspension. From the suspensions, 10^{-4} and 10^{-5} , were inoculated on Sabouraud agar, Mac Conkey agar, and Blood agar using the spread plate method. The plates were incubated at 27 °C and 37 °C for 24 h. Eighteen Organisms responsible for morphologically different colonies were isolated and microbial suspensions were prepared using each organism in sterile brain heart infusion broth. New polythene pieces were cut, sterilized, and selected based on weight. A polythene piece was introduced to each bottle of suspension and the bottles were incubated at 27 °C and 37 °C with a control (pure broth and polythene piece). After 3 months, the final weight of the polythene pieces was measured after washing the remaining piece with soap and water to remove contaminants. Finally, the percentages of degraded amounts of polythene were calculated. To identify the organisms, Gram staining and oxidase test was performed. The weight reduction at 27 °C by two-Gram positive bacilli was 0.0925% and 0.3828%, and at 37 °C, 2.2658% and 0.6409%. The Gram-negative bacilli which showed the highest weight reduction, 3.0114% at 27 °C and 4.1632% at 37 °C was identified as *Pseudomonas aeruginosa*. Therefore, *Pseudomonas aeruginosa* has the ability to degrade polythene.

Keywords: Polythene, Degradation, *Pseudomonas aeruginosa*