

IDENTIFICATION OF MIXED MICROBIAL CONSORTIA ISOLATED FROM POLYETHYLENE FILMS SURFACE

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Polyethylene, a highly recalcitrant and inert synthetic material and thereby very difficult to degrade in the environment has become a major source of environmental pollution. The traditional methods for plastic waste disposal are recycling, incineration, and landfilling, the oldest and most common method of plastic waste disposal. The natural degradation of low-density polyethylene (LDPE, PE-LD) depends on polymer properties, its high molecular weight, hydrophobic nature and lack of functional groups, recognized by microbial enzymes makes it adverse towards degradation. However, several studies have reported the polyethylene degrading microorganisms isolated from waste disposal sites. Various species of bacteria and fungi or microbial communities, isolated from soil, are able to modify and consume the plastic polymers as a source of energy.

The purpose of present study was to characterized microbial consortia isolated from the surface of LDPE films extracted from the soil contaminated with polyethylene.

LDPE films were placed in the soil that was collected from the landfill, located near the village of Slobozia-Duşca, the Criuleni district, the Republic of Moldova. The soil was treated under aerobic and anaerobic conditions within six months.

Fungal and bacterial strains were isolated from LDPE surface, through enrichment techniques. Enrichment cultures were prepared by adding 10 mL water sample to 90 mL mineral salt medium (MSM). At the initial stage of creating consortia in the culture media was added LDPE in the form of granules, in an amount of 1 g. As a growth inducer in the media was added glucose, in a concentration of 0.1 mL. Samples from the enrichment culture were serially diluted and plated onto MSM agar, nutrient agar, Czapek medium. Bacterial isolates were then allowed to grow by incubating the plates at 28°C for five days. Growing colonies were selected and streaked successively onto the same media for purification. The isolates were examined for their Gram reaction, endospore formation, and cultural characteristics, such as colour, colony form, margin, surface, and elevation.

The data obtained show that after 100 days of cultivation the microorganisms in the consortia retain their viability, the titer being from 7.00×10^6 CFU/mL, up to 32.00×10^6 CFU/mL. The consortia obtained are composed predominantly of fungal strains, and micromycetes are mostly represented by the genus *Trichoderma*. The bacteria were determined only in 2 consortia, out of the 6 obtained, and were represented by species from the genera *Bacillus*, *Pseudomonas*, *Streptomyces*.

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