

Screening and Enrichment of Polymer Degrading Microbes and their Application in Environmental Engineering

**Anu Anmol¹, Anusha Chaudhary¹, Deepali Vaid¹, Deepika Rana¹, Lakshmi Rana¹,
Monika Yadav¹, Siddharth Srivastava¹, Sujata Kumari¹, Akansha Agarwal², Nishant Jain²,
Ravinder Singh², Siddharth Sirohi², Divya Babjaj¹,
Nalla Vijaya Kumar¹⁺, Yogender Pal Khasa³⁺**

¹*Department of Microbiology, ²Department of Polymer Science, Bhaskaracharya College of Applied Sciences, Sector-2, Dwarka, New Delhi-110075*

³*Department of Microbiology, University of Delhi (South Campus), New Delhi-110067
+ Corresponding Author*

ABSTRACT

Plastics are one of the most important synthetic polymers, which besides having vast number of applications, also becomes as environmental threat since they are not easily biodegradable. Current technologies are not efficiently addressing this problem. With the objective of answering this problem in a sustainable manner, we have devised a microbiological approach for digesting complex polymeric substances. We have identified a population of microbes which are involved in efficient degradation of diverse varieties of synthetic polymers such as Polyethylene, Polyurethane, PVC, PCL, Nylon, PBS and several other routinely used polymers. We have identified and enriched various bacteria and fungi such as Bacillus, Flavobacter, Streptococcus, Pseudomonas, Actinomycetes, Trichoderma, Rhizopus and other closely related microorganisms. A laboratory based soil burial technique and an agar based clear zone technique is employed to assess the digestibility of plastics. Preliminary observations suggest that such a system of microbial compilation is very useful in addressing this problem in a sustainable manner. A number of enzymes which are secreted by these microbes could be helping them to digest these plastics. Identification and cloning of genes involved in the production of these enzymes would be crucial. Further research is in progress to check and optimize the efficiency of this microbial population to function under different environmental conditions.