

Isolation of a *Pseudomonas aeruginosa* strain from soil that can degrade polyurethane diol

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Polyurethane diol (PUR-diol), a synthetic polymer, is widely used as a modifier for water-soluble resins and emulsions in wood appliances and auto coatings. Non-biodegradability of polyurethanes (PUR) and PUR-based materials poses a threat to environment that has led scientists to isolate microbes capable of degrading PUR. However, the bio-degradation of PUR-diol has not yet been reported. In this study, we report isolation of a soil bacterium that can survive using PUR-diol as sole carbon source. PUR-diol degradation by the organism was confirmed by thin layer chromatographic analysis of the conditioned medium obtained after the growth wherein a significant reduction of PUR-diol was observed compared to non-inoculated medium. To quantify the PUR-diol degradation, a sensitive assay based on High Performance Thin Layer Chromatography has been developed that showed 32% degradation of PUR-diol by the organism in 10 days. Degradation kinetics showed the maximal depletion of PUR-diol during logarithmic growth of the organism indicating a direct relation between the growth and PUR-diol degradation. Mutagenic study and GC-MS analysis revealed that esterase activity is involved in this degradation event. The ribotyping and metabolic fingerprinting analysis showed that this organism is a strain of *Pseudomonas aeruginosa* (*P. aeruginosa*). It has also been observed that this strain is able to degrade Impranal DLNTM, a variety of commercially available PUR. Therefore this study identifies a new bacterium from soil that has the potential to reduce PUR-related waste burden and adds a new facet to diverse functional activities of *P. aeruginosa*.

Biography

I, Koushik Mukherjee, completed my M.Sc in Biophysics from the University of Kalyani, West Bengal and qualified CSIR-UGC NET (LS). I am pursuing my Ph.D at the department of Microbiology, University of Calcutta on bioremediation of plastic by isolated microorganisms. I am trying to find out the mechanisms behind the degradation for last 5 years. During this tenure, I have published two original research articles in internationally reputed journals on this topic of bioremediation. I have also presented several posters, oral talk in different national and international seminars and conferences.

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