Bacterial contamination in kerosene storage tanks: Intraspecific biodiversity and bioremediation potential of isolates

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Kerosene is a jet engines fuel with mainly a paraffinic composition. Microbial contamination of storage tanks, as well as pipes, poses serious economic problems due to biofilm formation and clogging of valves. The aim of this work was to investigate the biodiversity of such aerobic bacterial contaminants in kerosene storage tanks, biofilm formation capacities and alkanes degradation potential of those contaminants. Using enrichment cultures on alkanes as sole carbon sources, 10 bacterial strains were isolated. They were taxonomically identified through conventional microbiological tests, including BIOLOG identification system, and also by molecular methods (ARDRA – Amplified Ribosomal DNA Restriction Analysis) as belonging to *Pseudomonas fluorescens*. To assess the intraspecific biodiversity of the isolates, rep-PCR fingerprinting method with BOX-A1R, REP1R/REP2, (GTG) 5’ primers was applied. Results indicated six independent clusters of strains, reflecting a high intraspecific diversity. All 10 isolates were able to grow on at least one n-alkane as sole carbon source (C10, C12, C16) and had the ability to form biofilm. alkB gene (coding for alkane hydroxylase as main enzyme for metabolic oxidation of alkanes) was detected by PCR in all isolates, thus proving the genetic basis for microbial degradation of alkanes. Though microbial contamination of fuel storage tanks poses major downsides, such bacterial strains able to grow at high hydrocarbon concentrations and use them as sole carbon source can become powerful candidates in oil bioremediation processes that rely on microbial metabolic abilities to degrade various oil compounds.

Biography

I Chiciudean (30 years old) is PhD student and Research Assistant at the Genetics Department, Faculty of Biology, University of Bucharest. Her PhD project is “Molecular studies on genes involved in microbial biodegradation of petroleum hydrocarbons” (work in progress) and her main research interests focus on genetic characterization of bacterial strains able to degrade different petroleum hydrocarbons and xenobiotic compounds. She is coauthor in three scientific papers published in national and international journals.

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