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Biodegradation of Endosulfan by *Agrobacterium tumefaciens PT-3*

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Abstract

Endosulfan, classified as an organochlorine pesticide, is rated by the U.S. EPA as a category-I pesticide with extremely high acute toxicity. The aim of this study was to isolate an endosulfan degrading microbial strain(s) from historically contaminated soil for field scale applications. Through repetitive enrichment culturing technique in growth medium containing endosulfan as the sole source of carbon and energy, three different bacterial strains (PT-1, PT-2 and PT-3) were isolated. The isolates were evaluated for their capacity to degrade endosulfan (100 mg L^{-1}) under aerobic conditions. Analysis of residual endosulfan in the spent medium revealed that the bacterial isolate, PT-1 biodegraded >99% of both α and β isomers of endosulfan after 180 h of incubation without detectable accumulation of metabolites in the spent medium. Bacterial isolate, PT-2 also degraded >99% of α-endosulfan following 100 h of incubation. However, this bacterial strain was not able to degrade β-endosulfan. Among the three isolates, maximum biodegradation ability was exhibited by the bacterial isolate PT-3 which degraded >99% of α and β endosulfan after 90 h of incubation. PT-3 was identified as *Agrobacterium tumefaciens* on the basis of 16S r-DNA sequencing analysis. Results from these investigations suggest that the bacterial isolate, *Agrobacterium tumefaciens* has the potential as a biocatalyst for endosulfan bioremediation.

Biography

Sumathi Suresh is a full time professor at the Centre for Environmental Science and Engineering, Indian Institute of Technology Bombay (IITB), Powai, Mumbai 400076, India. She holds a Ph.D. degree in the field of biochemistry (enzymology) from Indian Institute of Science, Bangalore, India. She has published 50 international papers, 3 book chapters and holds national and international patents. She is the editorial board member of several reputed international journals. Her research interests include chemical and biological remediation of environmental pollutants, biomonitoring of contaminants and pathogens in water and application of molecular biological tools for studying microbial diversity in biological reactors.