

PL-1

Microbially-Mediated Degradation of Pesticides in the Environment

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Soils receiving infrequent or no prior application displayed very low rates of atrazine mineralization, and a fraction of water-soluble atrazine in soils was sequestered due to sorption and became increasingly unavailable with time for biodegradation. Data suggest that native microbial populations in soils with different histories of atrazine application vary phenotypically and genotypically in their ability to mineralize atrazine. MPN enumeration of atrazine-degrading microorganisms has generally demonstrated a positive association between the recoverable numbers of atrazine-degraders and history of atrazine application. Subsequent studies have sought to define a relationship between the number of atrazine-degrading microorganisms in soils and the frequency of genes representing a dechlorination, N-dealkylation, and ring cleavage. Hybridization signals in dot blots of DNA extracted from soils and from MPN samples were most frequent with the chlorohydrolase gene probe. The signals signifying ring-cleavage were rare although the parallel studies showed fast and extensive mineralization of atrazine. Because there may be multiple pathways the gene probes used in this study did not adequately represent the genotypic diversity of atrazine degradation in soil microbial populations.