ESTABLISHMENT AND CHARACTERIZATION OF ATRAZINE DEGRADING CULTURES FROM NIGERIAN AGRICULTURAL SOIL USING TRADITIONAL AND BIO-SEP BEAD ENRICHMENT TECHNIQUES

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Abstract

Traditional and *in situ* enrichment using porous Bio-Sep beads fortified with atrazine were used to obtain mixed consortia of atrazine-degrading bacteria. Cultures derived from both enrichment techniques showed rapid degradation of atrazine and the composition of consortia varied depending on enrichment type and atrazine concentration present in both the selective media and in atrazine fortified Bio-Sep beads as determined using denaturing gradient gel electrophoresis (DGGE). The DGGE analysis also revealed the presence of many bands corresponding to various bacteria both cultured and uncultured. All enrichment cultures possessed *trzND* genes. The *atzBC* genes were detected in all bead enrichments while only *atzC* was present in one soil enrichment. The atrazine chlorohydrolase gene (*atzA*) and cyanuric acid amidohydrolase genes (a*tzD*) were not detected in any of the enrichment cultures. In soil samples, *trzN* and *trzD* were the only known atrazine catabolic genes detected. Parallel degradation studies with atrazine potential metabolites showed extensive loss of these compounds from the culture media. The results indicate that *in situ* enrichment with Bio-Sep beads might be a viable method to cultivate atrazine-degrading bacteria not currently represented in existing culture collections. The triazine chlorohydrolase encoded by *trzN* commonly found in most Gram-positive atrazine-degrading bacteria, was more prevalent than *atzA*. Thus, the detection of known atrazine-catabolic genes in soil or bacteria from tropical African contaminated systems is an indication of the likely global distribution of these important *s*-triazine genes.

Keywords: Atrazine, Bio-Sep beads, Biodegradation, Enrichment, Genes, Soil

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