

Evaluation of aerobic biodegradation of ethylene dibromide in contaminated soil by indigenous bacteria and bioaugmentation

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Ethylene dibromide (1,2-dibromoethane or EDB) is a highly toxic halogenated organic compound that was primarily used as an antiknock gasoline additive and as a soil fumigant. Recent studies showed that the presence of EDB in aquifers has become a major concern. The objective of this study was to evaluate the aerobic biodegradation of EDB by indigenous bacteria and bioaugmentation of a pure culture to support biodegradation. Aerobic microcosms were established using approximately 15 g of soil from an EDB contaminated site and 40 mL of synthetic groundwater as groundwater from the site was unavailable. The initial concentration of EDB was approximately 2.5 mg/L. Autoclaved and water controls were also prepared to determine abiotic losses. After 90 days of incubation, no significant losses were observed in live bottles when compared to controls. A culture capable of growth on EDB (*Mycobacterium* strain GP1) was then evaluated for its ability to stimulate biodegradation of EDB. Strain GP1 was added to microcosms at a concentration of 5 % v/v. Degradation of EDB started within one day while complete consumption was observed within approximately three days after bioaugmentation. There was no significant degradation of EDB in microcosms that did not receive the culture. These results suggest that the soil samples did not contain organisms that can degrade EDB. Bioaugmentation can be an effective strategy to remediate sites where degradation of EDB does not occur.