

Hydrocarbons, Chlorinated/*metabolism

Solvents/*metabolism

Bacteria, Aerobic/metabolism; Bacteria, Anaerobic/metabolism; Biodegradation; Models, Biological; Pilot Projects; Research Support, U.S. Gov't, Non-P.H.S.;

Trichloroethylene/metabolism

Abstract

Chlorinated solvents and their natural transformation products are the most frequently observed groundwater contaminants in the United States. In situ bioremediation using anaerobic or aerobic co-metabolic processes is a promising means of cleaning up contaminated aquifers. Studies show that under natural conditions trichloroethylene can be anaerobically degraded to dichloroethylene, vinyl chloride, and ethylene. Pilot scale field studies of in situ aerobic co-metabolic transformations have shown that indigenous microbes grown on phenol are more effective at degrading trichloroethylene and cis-1,2-dichloroethylene than microbes grown on methane. Modeling studies support field observations and indicate that the removal of trichloroethylene and cis-dichloroethylene results from the biostimulation of an indigenous microbial population. Field tests and modeling studies indicate that, at high TCE concentration, degradation becomes stoichiometrically limited.