Using our approach we expect to obtain an improved conceptual model of natural attenuation of TCE. This research will strengthen key modeling parameters for the computational simulations that describe the intermediates of TCE co-metabolism. By determining the rate of TCE co-metabolism using proteomics to assay the TCE co-metabolic rates, and interpreting these rates in the context of the microbial community diversity and activity, we can improve our ability to forecast the viability of MNA at DOE and other sites. This research will strengthen the understanding of the microbial relative to other natural attenuation processes. This research will strengthen the key modeling parameters for the computational simulations that describe the intermediates of TCE co-metabolism.

Methods

The high density microarray analysis that is performed consists of a series of steps: (1) flow-through in situ TISR setup, (2) collection, (3) DNA isolation, (4) DNA amplification, (5) DNA hybridization, (6) data analysis. Our research determined that the most important factor for determining the rate of MNA is the methanotrophic community. Our research determined that the most important factor for determining the rate of MNA is the methanotrophic community.

Abstract

Coupled Biogeochemical Process Evaluation for Conceptualizing Trichloroethylene Co-Metabolism

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Introduction

Intrinsic TCE cometabolism is the natural degradation of TCE to methane by methanotrophic bacteria. This process is expected to be understood in order to implement remediation strategies. Monitored natural attenuation (MNA) requires "lines of evidence" indicating that the wastes are effectively destroyed. Our research will study the coupled biogeochemical processes that exist in natural attenuation (MNA) and that are present in the Eastern Snake River Plain aquifer where TCE is found. Our research will determine the fate of the carbon in the bulk biomass, PLFA, and nucleic acids. Stable isotopes (13C of CH4 and DIC) provide information on the fate of the carbon in the bulk biomass. Stable isotopes (13C of CH4 and DIC) are used to determine the fate of the carbon in the bulk biomass. Stable isotopes (13C of CH4 and DIC) are used to determine the fate of the carbon in the bulk biomass. Stable isotopes (13C of CH4 and DIC) are used to determine the fate of the carbon in the bulk biomass. Stable isotopes (13C of CH4 and DIC) are used to determine the fate of the carbon in the bulk biomass.