Enhanced solubility of TCE and other contaminants due to the presence of biological material

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For Presentation at the

American Chemical Society,
BIOT Environmental Biotechnology
New Orleans, LA
March, 2003

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Preferred Format: Presentation and/or SCIMIX poster

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**This work was supported by the Environmental Management Science Program of the Office of Science, U.S. Department of Energy under Contract DE-AC05-00OR22725 with UT-Battelle, LLC.

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Abstract:

Biological material is shown to increase the total solubility and decrease air/liquid partitioning constants of several sparingly soluble important environmental contaminants (TCE, benzene, and toluene). Careful closed vessel equilibrium experiments were used to determine these measurements with varying amounts of biological material. In dense aqueous biomass systems, the solubility limits increased approximately 3x for benzene, 5X for toluene, and over 100X for TCE. We also report the effects of various cellular fractions (e.g., membranes, cytosol) as well as the effect of model biological materials (e.g., triglycerides, protein, carbohydrates). These results should be applicable to predictions of contaminant mass transport in systems where significant biological material in present.