

THE POTENTIAL FOR PHYTOREMEDIATION OF MTBE

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ABSTRACT

This paper examines the potential for phytoremediation of MTBE, a gasoline additive that has become a prevalent and persistent groundwater pollutant, due to its non-sorbing and non-reactive nature in water. A novel experimental design has been developed to measure plant uptake and transpiration of MTBE from hydroponic systems, separating these processes from passive volatilization of the chemical. Plant uptake experiments have indicated 30% reduction in MTBE mass in water over a one-week period by small poplar saplings, at both high (1600-ppb) and low (300-ppb) MTBE concentrations. Active plant uptake of MTBE was approximately double that achieved by passive volatilization through a balsam wood control. MTBE was detected in biomass at the 100-ppb level, confirming passage of MTBE through the plant. A mass balance indicated that MTBE was untransformed during transport through the small poplar saplings to air. The high degree of MTBE removal achieved by small plants over a short period of time indicates great potential for successful phytoremediation of subsurface MTBE plumes using poplar trees. The fraction of MTBE removed from the hydroponic systems correlated well with the volume of water transpired by the plants; the correlation enabled computation of the MTBE transpiration stream concentration factor of approximately 1, an important parameter for the design of engineered MTBE phytoremediation systems.

Key words: *phytoremediation, MTBE, groundwater, transpiration stream concentration factor*

The full text of this paper is available in Rubin, E. and A. Ramaswami. "The Potential for Phytoremediation of MTBE." *Water Research*. Feb 2001, vol. 35, issue 5, pp. 1348 -1353.