

## Test of aerobic TCE degradation by willows (*Salix viminalis*) and willows inoculated with TCE-cometabolizing strains of *Burkholderia cepacia* - DTU Orbit (09/11/2017)

### Test of aerobic TCE degradation by willows (*Salix viminalis*) and willows inoculated with TCE-cometabolizing strains of *Burkholderia cepacia*

Trichloroethylene (TCE) is a widespread soil and groundwater pollutant and clean-up is often problematic and expensive. Phytoremediation may be a cost-effective solution at some sites. This study investigates TCE degradation by willows (*S. viminalis*) and willows inoculated with three strains of *B. cepacia* (301C, PR1-31 and VM1330-pTOM), using chloride formation as an indicator of dehalogenation. Willows were grown in non-sterile, hydroponic conditions for 3 weeks in chloride-free nutrient solution spiked with TCE. TCE was added weekly due to rapid loss by volatilization. Chloride and TCE in solution were measured every 2-3 days and chloride and metabolite concentrations in plants were measured at test termination. Based on transpiration, no tree toxicity of TCE exposure was observed. However, trees grown in chloride-free solution showed severely inhibited transpiration. No or very little chloride was formed during the test, and levels of chloride in TCE-exposed trees were not elevated. Chloride concentrations in chloride containing TCE-free nutrient solution doubled within 23 days, indicating active exclusion of chloride by root cell membranes. Only traces of TCE-metabolites were detected in plant tissue. We conclude that TCE is not, or to a limited extent (less than 3%), aerobically degraded by the willow trees. The three strains of *B. cepacia* did not enhance TCE mineralization. Future successful application of rhizo- and phytodegradation of TCE requires measures to be taken to improve the degradation rates.

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