

## HRC TECHNICAL BULLETIN # 2.4.1

Hydrogen Release Compound **HRC**<sup>®</sup>**Test Tube Microcosm Studies**

In the initial stages of development, the use of HRC for remediation of trichloroethylene (TCE) was studied in tightly capped 200ml test tubes to simulate reaction conditions in an anaerobic aquifer. The basis of these experiments was to measure the release of lactic acid from HRC as a function of bacterial concentrations and HRC concentrations and the concomitant reductive dechlorination of TCE.

In the experiments, 10 grams of sterilized sand was added to each test tube followed by a solution of TCE with a concentration of up to 140 mg/L. Various quantities of bacteria capable of reductively dechlorinating TCE were then added from a recirculating fluid media bioreactor at dilutions of 1:10 and 1:100. Finally, 0.5 or 1.5 grams of HRC was added to each test tube. Also included was a sample containing a 1:1000 bacterial dilution with 0.5 grams HRC and a control containing a 1:1000 bacterial dilution and no HRC. Each day, 6 ml samples were taken and analyzed for TCE (using gas chromatography) and lactic acid (using HPLC with a conductivity detector on an anion column).

Results indicated that lactic acid release increased with time, bacterial concentration, and HRC concentration. TCE was remediated in all experiments under all conditions. Results from one representative experiment are presented in Figure 1, which shows that reduction in TCE follows an increase in lactic acid release. It is important to note that most of the initial drop in TCE (within the first hour of the experiment) was due to adsorption of TCE on the sand. This TCE eventually desorbed from the sand and was remediated as the dissolved phase TCE was remediated during the progression of the experiment.

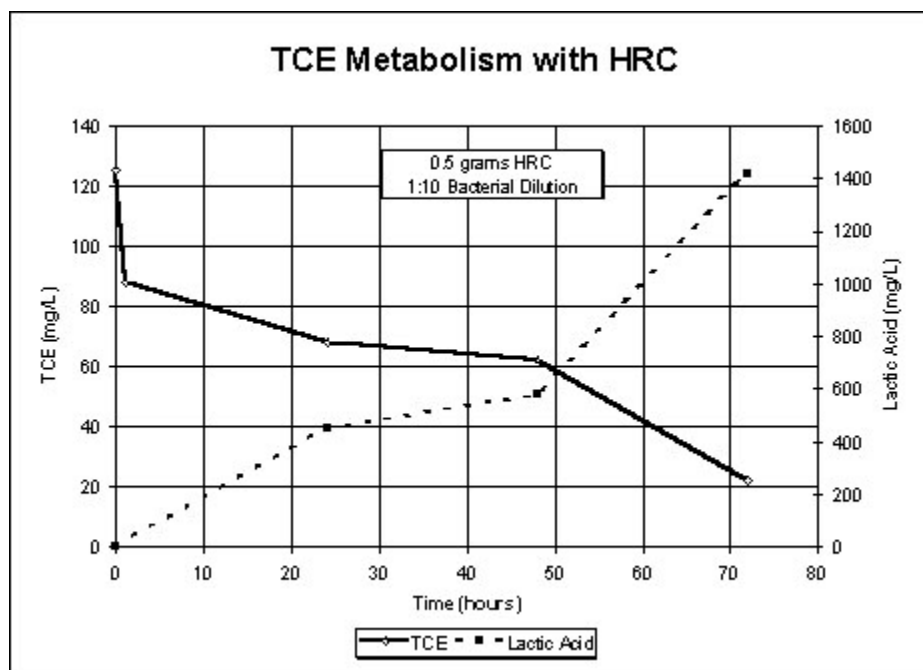


Figure 1

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