

Kongrit Loungmuang 2007: Anaerobic Bioremediation of Trichloroethylene Using Volatile Fatty Acids as Electron Donors. Master of Engineering (Environmental Engineering), Major Field: Environmental Engineering, Department of Environmental Engineering. Thesis Advisor: Assistant Professor Cheema Chomsurin, Ph.D.
113 pages.

The objective of this research was to investigate anaerobic bioremediation of trichloroethylene in groundwater. Trichloroethylene is carcinogenic and it is difficult to remove from nature. In this study, soil was sampled from a landfill's leachate pond and was used as a rich source of natural microorganisms. Fermentation of the soil with shredded peanut shell produced volatile fatty acids (VFAs) which were used as electron donors in TCE dechlorination process. The peanut shell size was reduced to the range of approximately 0.5 to 2.36 mm.

The first part of the experiment studied VFA production from subsurface fermentation of peanut shell. It was found that the average pH was 7.06 (± 0.61) and ammonium ion was between 0.67 – 4.63 mg/l. In the second part, bioremediation of 63.33 mg/L TCE contaminated groundwater, was studied, It was found that TCE concentration reduced to 33.60 mg/L (46.74% reduction efficiency). Average VFAs in the system was 0.47 (± 0.21) mMCH₃COOH and the average ammonium ion was 14.43 (± 1.25) mg/l and pH was 6.83 (± 0.22).

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