

Ye Hlaing Win 2012: Ex-Situ Anaerobic Bioremediation for Soil Contaminated with Total Petroleum Hydrocarbons. Master of Engineering (Environmental Engineering), Major Field: Environmental Engineering, Department of Environmental Engineering. Thesis Advisor: Mr. Suchat Leungprasert, Ph.D. 96 pages.

The soil contaminated with total petroleum hydrocarbons (TPHs) is generally found in several industrial areas. TPHs contamination leads to environmental concerns due to its hazardous characteristics and the cancer risk of its component. As a result, TPHs should be removed from the contaminated soil. To determine the feasibility of the biodegradation of TPHs under anaerobic condition, the contaminated soils with TPHs were added to 2-L lab-scale reactors in which the temperature was controlled by using a water bath incubator. During anaerobic bioremediation, TPHs could transform to be CH_4 and CO_2 . To prove this strategy, the contaminated soil temperature was varied from 30°C to 40°C and to 50°C every 15 days. The percentage of CO_2 and CH_4 production was about 34.8% and 2.94% for non-sterilization and 19.2%, and 0% for sterilization, respectively. After 45 days operation, TPHs were reduced by 49.49% for no sterilization soil samples and 6.62% for sterilization soil samples. To determine the effects of temperature on anaerobic bioremediation, the 1.2 kg of contaminated soil was added to the reactor with temperature control under 30°C , 40°C , and 50°C for sterilization, non-sterilization, and nutrients ratio of C/N/P of 100:2:0.2. The result showed that for non-sterilized soil samples the maximum production of CH_4 was 12.9%, 14%, and 13.9% under 30°C , 40°C , and 50°C for non-sterilization, respectively. The CO_2 production was also found in all temperature operation. It was found that as temperature increased, the CO_2 production was increased. Also, the reduction of TPHs in 30°C , 40°C , and 50°C was 36.74 %, 35.38%, and 28.21% for non-sterilization, respectively.

Student's signature

Thesis Advisor's signature