

Kittisak Jeenakom 2014: Enhancing Bioremediation Efficiency of Motor Oil-Contaminated Soil by Biosolid Amendment and Surfactants. Master of Science (Environmental Technology and Management), Major Field: Environmental Technology and Management, Department of Environmental Technology and Management. Thesis Advisor: Mrs. Piyapawn Somsamak, Ph.D. 187 pages.

This research aims to study the remediation efficiency of motor-oil contaminated soil by addition of biosolids, detergent or combinations of both. It was found that the remediation efficiency is related to concentrations of detergent applied. At the end of the experiment, the treatment with 8% detergent, which was the highest concentration tested, exhibited the greatest motor oil removal of 51%, analysed as total petroleum hydrocarbon (TPH). The treatment with distilled water added or treatment with no amendment showed moderate TPH removal of 20%. The addition of biosolids 10 - 30% increased soil organic carbon, nutrients as well as microbes resulting superior TPH removal efficiency than that of control treatments. Treatment with 10% biosolid amendment demonstrated best remediation efficiency with total 690 ± 41.51 mg/kg TPH removal. However, with higher ratios of biosolids the efficiency was deteriorated. The combination of 10% biosolids and 8% detergent yielded TPH removal of 925 ± 82 mg/kg or 93% of initial TPH concentrations. The analysis of soil dehydrogenase activity (DHA) revealed activity of 600.21 ± 85.05 $\mu\text{g TPF/g}$ on day 20. In treatments with only 10% biosolids and 10% biosolids with distilled, DHA of 203.93 ± 61.74 $\mu\text{g TPF/g}$ and 229.60 ± 79.01 $\mu\text{g TPF/g}$ were detected respectively. The first two sets of experiment demonstrated that contaminated soil containing biodegradable hydrocarbons with limiting bioavailability. On the other hand, there were portion of hydrocarbon which were readily bioavailable but lack of appropriate microbial population. These two limiting factors, once identified, were removed effectively by the addition of biosolids in combination with detergent.

Student's signature

Thesis Advisor's sign