

Thesis Title	The Study of Oleophilic Fertilizers in the Bioremediation of Contaminated Crude Oil in Seawater
Thesis Credits	12
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Degree of Study	Master of Science
Department	Environmental Technology
Academic Year	2001

Abstract

The study of oleophilic fertilizer aimed to supply essential nutrient nitrogen (N) and phosphorus (P) in order to stimulate hydrocarbon-degrading bacteria (RBC 109) in bioremediation of crude oil contaminated in seawater. The experiments were divided into 2 parts: firstly, study on the composition of the oleophilic fertilizers which are urea, lecithin, 2-Butoxy-1-Ethanol, water and oleic acid as formula 1, stearic acid was used in stead of oleic acid as formula 2. The solubility of nitrogen and phosphorus from both fertilizers formulas in seawater, suitability of microbial growth and degradation of contaminated hydrocarbon were designed to choose a proper effective fertilizer. The second study focused on the effective ratio of the fertilizer to hydrocarbon degradation, which are 0.5, 1.0, 2.0 and 4.0 (v/v) of crude oil.

Bacteria RBC 109 can grow in seawater with range of salinity 0-30 ppt. and in 1.0 % (v/v) contaminated crude oil. The result of the studied fertilizer shown that the suitable component of the first formula are 217 g/l oleic acid, 232 g/l 2-Butoxy-1-Ethanol, 65 g/l urea and 382 g/l lecithin and the second formula comprise of 55 g/l stearic acid, 523 ml/l 2-Butoxy-1-Ethanol, 65 g/l urea and 382 g/l lecithin. The essential nutrient concentration in both formulas of the oleophilic fertilizer are 32.5 g/l nitrogen and 3.25 g/l phosphorus. It was found that the first formula (oleic acid) shows higher immobilization efficiency in the crude oil than the second formula (stearic acid) in term of nitrogen and phosphorus dissolved to seawater. However the solubility of these nutrients did not effect on microbial growth rate. Nevertheless the second formula of fertilizer affect to higher degradation rate of hydrocarbon than the first formula (the degradation rate of hydrocarbon of the first formula is 10.8% at 120 hours of experiment and the degradation rate of hydrocarbon of

the second formula is 29.1% at 120 hours of experiment). It was found that the suitable supplies ratio of the oleophilic fertilizer per crude oil is 1:1 (v/v).

Keywords : Oleophilic fertilizers / crude oil degradation / nitrogen / phosphorus / hydrocarbon-degrading bacteria / bioremediation