

ABSTRACT

Soil pollution caused by various oil products is major environmental problem that negatively affect the quality of soil quality and pollution of ground water resources. Now a days, the area dirty soil by oil was growing rapidly. Oil spills are wide spread and have raised serious concern about petroleum pollution, especially in agriculture. The study aims to investigate optimization of different chemical treatments on laboratory scale for removal of Total Petroleum Hydrocarbons (TPH) from oil contaminated soil. Six types of the treatment reagent involving Hydrogen peroxide (H_2O_2), Hydrogen peroxide with Potassium dihydrogen phosphate ($H_2O_2+KH_2PO_4$), Hydrogen peroxide with Ferrous sulphate ($H_2O_2+FeSO_4$), Common detergent (Surf Excel), Polysorbate-80 (Tween-80) and Sodium Dodecyl Sulphate (SDS) were used to evaluate the percentage removal of TPH from spiked (contaminated) soil samples. Response Surface Methodology (RSM) was used to observe the parameter (time, amount of treating reagent and stir rate) optimization at which maximum removal of TPH occurred from contaminated soil. Experiments were run according to the RSM model and the determination of TPH was carried out by gravimetric analysis following US-EPA standard method. It was found that 67.85 %, 75.76 %, 93.51 %, 70.19 %, 89.54 % and 56.97 % removal of TPH was observed on optimized conditions of time at 5.23, 4.70, 4.54, 4.28, 4.50 and 3.67 hours, amount of treatment reagent at 12.39, 14.33, 13.32, 13.13, 13.40 and 14.06 ml and stir rate at 98.30, 86.29, 108.30, 94.82, 100.25 and 88.71 rpm by above mentioned treatment reagents respectively. Parameter conditions for optimization were estimated by analyzing TPH percent removal data by variance analysis (ANOVA). Statistical analysis has shown that maximum percent removal efficiency was obtained by Fenton based treatment reagent ($H_2O_2+FeSO_4$) with result 93.51% on optimized condition of time at 4.54 hours, amount of reagent at 13.32 ml and stir rate at 108.30 rpm. 