

Solvent Extraction Of Total Petroleum Hydrocarbons From Contaminated Soils In Qatar

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Abstract

The increase of soil and water contamination, caused by oil leakages during transportation and storage of petroleum components, present serious threat to human health and the environment.

Total petroleum hydrocarbons (TPH) is a commonly used gross parameter for quantifying environmental contamination that is originated by various petroleum hydrocarbons.

The characterization of the petroleum contaminated soils will enable the selection of the most appropriate methods for bioremediation and rehabilitation of these soils.

Qatar's economic boom, based on the hydrocarbon industry, is putting a strain on other scarce resources. Due to the increase of industrial activities; several environmental issues arose in the recent years, putting at risk the natural and cultural resources of Qatar.

Soil in Qatar is in general shallow sandy calcareous, overlying rocky bedrock. The available nutrition is poor with salty soil; they are adapted and tolerate different physical and chemical factors.

In areas with long history of oil spills, it's important to conduct large-scale study in which oil weathering in the sediments is evaluated in terms of toxicity to the environment.

Rehabilitation of lands should be further developed to preserve agricultural soils, and to prevent the spread of harmful molecules and their infiltration into the groundwater and in the food chain.

Solvent extraction is a promising technology for degrading polluted soil. Consequently, several solvents have been researched; namely methanol, hexane, dichloromethane and acetone. The solvent mixture [hexane: dichloromethane (50:50)] efficiently extracts the polycyclic aromatic hydrocarbons (PAHs) compounds.

The solvent extraction methods are useful to identify the composition of soil contamination which would assist in the treatment and remediation.

Accelerated solvent extraction has been applied to extract a wide range of petroleum hydrocarbons, including aliphatic, polycyclic aromatic hydrocarbons (PAHs), phenols, and polychlorinated biphenyls (PCBs), while gas chromatography-mass spectrometry (GC-MS) is used to quantify the hydrocarbon compound in environmental samples.

In this study, Total petroleum hydrocarbons were extracted and quantified in several samples collected from aged contaminated sites. The analytical results, indicated that the quantitative determination of the PAHs was dependent strongly on the sample preparation, and solvents.

The data collected in this baseline study should be further validated and incorporated with other studies that would guide the future remediation strategies.