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Turbidimetric Determination of Hydrocarbon Contamination in Passaic River Sediments and Refinery Polluted Soils

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ABSTRACT

A rapid method is described for the determination of petroleum hydrocarbons in soil samples. The method is based on the extraction of hydrocarbons by a solvent and the treatment of the solution with an aqueous solution of a surfactant to release the hydrocarbons to the water phase in the form of a stable emulsion. The emulsion is then utilized to measure the hydrocarbon content by turbidimetry. The effects of various operating parameters including the surfactant solution composition and time of extraction and time of mixing with the releasing solution are investigated. The stability of the emulsion was improved in acid environment containing and electrolyte. The turbidity values (T) were related with hydrocarbon concentration in the extract (C) by the following equation. Turbidity = 2.75 C + 205.7. With R^2 = 0.9929. The soil hydrocarbon content (SHC) measured in μg/g can then be calculated using the formula: SHC = [Extract Vol. (mL) x C]/Sample Wt (g). The results correlated well with the results of total hydrocarbons in soils determined by standard methods. The method was applied for the estimation of hydrocarbons in Passaic river sediments taken from various locations and depths. For field work the method was used to supply data on the hydrocarbon contamination of soil samples taken within an oil refinery and a monitoring well drilled within heavy hydrocarbon waste dumping location.

KEYWORDS

Hydrocarbon Contamination, Turbidimetry, Refinery Soils, Passaic River Sediments

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