

Geochemical Fingerprinting of Oil impacted soil and water samples in some selected areas within the Niger Delta

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This study was aimed at tracing sources of oil spills and the distribution of organic pollutants; Aliphatic Hydrocarbons (AH) and Polycyclic Aromatic Hydrocarbons (PAH) in selected communities in the Niger Delta using geochemical techniques. A total of sixteen samples made up of ten (10) crude oil-impacted soil samples taken at a depth of 30cm, two (2) water samples; each from boreholes and burrow pits and two (2) surface water samples; one from a river and rain harvest as control, were obtained. Organic pollutants were identified and quantified using an Agilent 7890B Gas Chromatograph Flame Ionization Detector (GC-FID). The values of AH and PAH in the water samples ranged from 0.13mg/l to 5.78mg/l and 0.09 mg/l to 1.109 mg/l respectively while that for the soil samples ranged from 22.52mg/kg to 929.44mg/kg and 10.544 mg/kg to 16.879 mg/kg respectively. The PAH concentration in the soil samples were 10.54–16.89 times higher than the threshold of 1mg/kg proposed by the Department of Petroleum Resources and are classified as heavily polluted. The predominance of 3-ring (36%) and 4-ring (21%) PAH across the samples are indicative of recent deposition. The abundance of n-alkanes showed that the effect of degradation has been minimal. PAH diagnostic ratios suggests petrogenic sources, with minor contribution from combustion for the pollutants. Diagnostic ratios of AH revealed the Niger Delta crude oil as the source of hydrocarbon contamination.