

ABSTRACT

The effects of crude petroleum on a single soil, Cromarty Series (Entic Pelluderts), was investigated.

Due to petroleum pollution there were some readily distinguished effects. These included a blackening of the soil, the presence of a characteristic soil odour and introduction of water repellent properties.

Bulk density was reduced while there was aggregation of the smaller sized particles and the formation of stable aggregates. Total void space could not be determined as water did not penetrate the cores.

The induced water-repellent nature of the soil appeared to interfere with chemical analytical methods which did not involve the use of strong acids or bases. Some of these were pH determination, cation exchange capacity and available phosphorus(Truog). The efficacy of these tests are based on the soil coming in close contact with the respective medium and the water-repellent nature of the polluted soil appears to reduce this requirement. Results showed an elevated pH, reduced cation exchange capacity and a peculiar increase in available phosphorus.

Analyses using strong bases and acids or high temperatures were not affected. There was an approximate seven fold increase in oxidisable carbon together with a fractional increase in nitrogen.

Yields of humic and fulvic acids increased significantly, in absolute terms, but appeared as a reduction when considered as a fraction of the total organic carbon. Functional group analysis showed that the organic matter from the polluted soils had molecules with higher relative molecular masses or less functional groups per molecule.

Sodium hydroxide did not remove all the petroleum (organic matter) from the soil; carbon tetrachloride was found to be a better extractant for petroleum compounds when used in a soxhlet extractor.