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Method Summary

Determination of Phenols in Soils by HPLC

Scope

This method is suitable for the determination of phenol, cresols, xylenols, 2-isopropylphenol and 2,3,5 –trimethylphenol in solids (mg/kg).
A monohydric phenols result is the total of the phenol, cresols and xylenols results obtained.
A total phenols result is the total of all of the five groups that we analyse.

The detection limit for soils is 0.15mg/kg for total phenols. The maximum level is 7.5mg/kg, without dilution.

Principle

Preparation
Samples should be taken in 1 litre plastic tubs and stored at 1-8°C until ready for extraction. 8–12g of 'as received' soil is shaken for 30 minutes in 60:40 methanol: deionised water.
All samples are organised into batches, then filtered through 0.45μm filters into vials and racked up before being transferred to the instrument autosampler.

Analysis
An aliquot of the extracted sample is injected onto a liquid chromatography column, where it is separated by reverse phase HPLC. The separated compounds are carried past an electrochemical detector with the flow of eluent through the system. The detector senses a change in conductivity as each of the compounds passes it. This change in conductivity is recorded and when plotted over time gives a peak for each compound. Each compound peak is integrated to find the area beneath it and a result is obtained by comparison to a set of standards of known concentration.

Groups of compounds, such as the 3 cresol isomers or the 6 xylenol isomers partially co-elute and are therefore only available as group results and not as individual isomers.

Interferences

Hydrocarbons in soil samples may interfere with the chromatography due to the leaching properties of the methanol/deionised water extractant. Samples with high background conductivity may also interfere with the detector. If there is severe interference shown in the chromatogram, the samples should be analysed by alternative methods such as Phenols by GCMS.