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The Effect of Supercritical Fluid on the Extraction Efficiency of Heavy Metal from Soil

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Abstract : Clay soils have particular properties that affect the assessment and remediation of contaminated sites. In clay soils, electro-kinetic transport of heavy metals has been carried out. The transport of these metals is predicated on maintaining a low pH throughout the cell, which, in turn, keeps the metals in the pore water phase where they are accessible to electro-kinetic transport. Supercritical fluid extraction and acid digestion were used for the analysis of heavy metals concentrations after the completion of electro-kinetic experimentation. Supercritical fluid (carbon dioxide) extraction is a new technique used to extract the heavy metal (lead, nickel, calcium and potassium) from clayey soil. The comparison between supercritical extraction and acid digestion of different metals was carried out. Supercritical fluid extraction, using ethylenediaminetetraacetic acid (EDTA) as a modifier, proved to be efficient and a safer technique than acid digestion technique in extracting metals from clayey soil. Mixing time of soil with EDTA before extracting heavy metals from clayey soil was investigated. The optimum and most practical shaking time for the extraction of lead, nickel, calcium and potassium was two hours.

Keywords : clay soil, heavy metals, supercritical fluid extraction, acid digestion
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