

EVALUATION OF POLYCYCLIC AROMATIC HYDROCARBONS IN SOILS USING SUPERCRITICAL FLUID EXTRACTION

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The soil contamination with petroleum is one of the major concern of industries operating in the field and also of environmental agencies. The petroleum consists mainly of alkanes and aromatic hydrocarbons. Polycyclic aromatic hydrocarbons (PAHs) are mainly produced via fossil fuel deposit and incomplete combustion. Due to their persistence to natural degradation and potential damaging to human health and ecosystem, PAHs have been classified as priority pollutants by the US Environmental Protection Agency. In the remediation of contaminated soil with PAHs by advanced chemical oxidation, a very important step is the extraction of the degraded contaminants. The use of an inappropriate extraction method can cause gross errors in the quantification of contaminant. Considered a clean technique, the supercritical fluid extraction (SFE) has been used as an alternative method providing high efficiency in reduced time. The aim of this work was to evaluate the extraction of PAHs from contaminated soil by supercritical CO₂. Traditional extraction methods (Soxhlet and ultrasound) using organic solvents were also used to compare the methodologies. The PAHs utilized in this work were phenanthrene and anthracene. The results showed that the efficiency of the supercritical extraction of phenanthrene and anthracene was more than 90% in a less time than 2 hours, while for Soxhlet and ultrasound the efficiencies were 98% and 92%, in more than 2 hours and 30 min respectively. The results demonstrated that SFE process exhibited good reproducibility of extraction and that this technology can be an alternative method of treatment of contaminated soil with PAH.

Keywords: PAH, supercritical fluid extraction, soil treatment.

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