

Biomonitoring potentials of polycyclic aromatic hydrocarbons (PAHs) by higher plants from an oil exploration site, Nigeria

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Abstract

Higher plants sampled from a moderately polluted exploration site were analyzed with gas chromatography–mass spectrometry to determine the occurrence and sources of polycyclic aromatic hydrocarbons (PAHs). The concentrations of the sum of 28 target PAHs (designated as $\Sigma 28\text{PAH}$) in the leaves of higher plant samples ranged from 365 to 2870 $\mu\text{g}/\text{kg}$ with an average of 1430 $\mu\text{g}/\text{kg}$. The majority of the target compounds were detected except 9,10-diphenyl anthracene and dibenzo(a,h)anthracene, which were below the detection limits in most plant samples. In addition, the concentrations of the 2- and 3-ring PAHs, especially naphthalene and its alkylated derivatives, were generally higher than the 4-, 5- and 6-ring PAHs. Based on the results obtained in the present study, higher plants, especially non-woody annual and perennial plants could serve as good phytoremediators for a PAHs polluted sites.

Research highlights

► PAHs concentrations ranged from 365 to 2870 $\mu\text{g}/\text{kg}$ ► Concentrations of 2–3 ring PAHs higher than 4–6 ring PAHs ► Main source of PAHs was pyrolytic ► Non-woody annuals and perennials plants could serve as good phytoremediators.

Keywords: Phytoremediators; Higher plants; Polycyclic aromatic hydrocarbons; Non-woody annuals and perennial
