

Quantification, sources, and associated risks of 16-priority polycyclic aromatic hydrocarbons from selected land-use impacted soils

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Abstract. This study determined the spatial compositional occurrence, sources, and the associated risks of sixteen priority PAHs in soil depths from the selected land-use environments. Samples were collected from nine generator land-use sites in the top (0-15 cm) and sub (15-30 cm) soil depths. Sample extraction was by ultrasonication with dichloromethane/*n*-hexane and clean-up in silica gel/alumina packed column. The level of PAHs was determined using a gas chromatography-mass spectrometer (GC-MS). The concentrations of PAHs isomers and the $\Sigma 16$ PAHs ranged from ND to 16876 $\mu\text{g}\cdot\text{kg}^{-1}$, and from 346 to 44052 $\mu\text{g}\cdot\text{kg}^{-1}$ respectively. The $\Sigma 16$ PAHs occurrence showed concentration load in the order of subsoil > topsoil. The Σ PAHs concentrations exceeded the DPR-EGAPSIN target and intervention value in 91% and 11% of the samples respectively. The total cancer risk ranged from low to moderate risk-based levels. The PAHs sources were attributed to low and high petroleum combustion emissions and stationary sources around the diesel combustion electricity generator in the land-use sites. This study revealed that the land-use activities associated with diesel combustion have contributed a significant amount of $\Sigma 16$ PAHs to the pollution load in the land-use sites with potential for ecological and human exposure risks.

Keywords: PAHs, soil pollution, exposure risks, anthropogenic, electricity, generator, diesel combustion, Niger Delta.

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