# ASSESSMENT OF POLYCYCLIC AROMATIC PYDROCARBON LEVELS IN SOILS OF THE TEMA HEAVY INDUSTRIAL AREA

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## ABSTRACT

Polycyclic aromatic hydrocarbons (PAHs) are hydrophobic organic pollutants that are ubiquitously distributed in the environment from petrogenic, pyrogenic and biogenic sources as a result of combustion. The aim of this study is to assess the concentrations of PAHs in soils at the Tema heavy industrial area. Surface-soil (0-10 cm) samples from fifteen representative sites at the Tema Oil Refinery and its environs as well as other installations in the Tema heavy industrial area were randomly sampled and analysed for 16 USEPA priority and four (4) other polycyclic aromatic hydrocarbon concentrations. The analytical methods employed in the study involved:

1. Soxhlet extraction of surface soil with dichloromethane.
2. Two-step clean up on an alumina-silica column.
3. Gas chromatographic analysis with flame ionization detection.

The total mean concentration of the 20 PAHs ranged from 21.25 to 200.66 µg/kg dry weight soil. Compared to observed values of industrialized locations around the world, the overall levels of PAHs in soils sampled from the study area were low. Pyrene, benzo (g, h, i) perylene, benzo(e)pyrene, benzo(a)anthracene and anthracene were consistently the most prevalent individual PAHs. Benzo(a) anthracene was the dominant carcinogen with chrysene being the least dominant carcinogen excerpt for the food processing companies (Cocoa Processing and Nestle Ghana Ltd). Pyrene was the dominant non-carcinogen with concentrations which varied among individual non-carcinogenic PAHs from other sites. The values of PAH isomer ratios [anthracene/ (anthracene + phenanthrene)] indicate that combustion processes were the major sources of PAHs. The 4-ring member PAHs was the dominant group across the sites with the 2-ring member PAHs being the least dominant.

Polycyclic aromatic hydrocarbon concentrations in the soils within the area under study were remarkably lower than what have been observed in the soils of industrial sites from elsewhere. The results show that the industrial area used in this study was not notably affected by PAH contamination because the levels in the soil samples are quite similar to those found in unpolluted sites.

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