

ASSESSMENT OF SOME HEAVY METALS AND POLYCYCLIC AROMATIC HYDROCARBONS IN SOOT FROM THE EXHAUST OF STANDBY GENERATORS

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ABSTRACT

Instabilities in electric power supply create the need for alternative power sources. Generators have become the major alternative for backup power supply. Exhaust emissions (gases and particles) from these generators contain various pollutants which negatively influence the ecosystem. The focus of this work was to evaluate the level of heavy metals and polycyclic aromatic hydrocarbons (PAHs) in soot from the exhaust of standby generators sampled from University of Ghana, Legon campus. Heavy metals (Cd, Cr, Cu, Fe, Pb and Mn) and PAHs were determined from twenty (20) generators using Atomic Absorption Spectrophotometer and Gas Chromatograph – Mass Spectrometer (GC-MS) respectively. Iron gave the highest mean concentration of 9.20 mg/kg while Lead showed the lowest mean concentration of 0.11 mg/kg. With the exception of Chromium, the concentrations obtained for the other heavy metals were far above the World Health Organization maximum acceptable limits for air and water reception and therefore represent a possible health hazard. Using GC - MS, 15 out of 17 PAHs were identified based on their retention times. They were quantified using their peak areas. Benzo (g,h,i)perylene recorded the highest mean concentration of 384.0 ng/g. Four significant molecular diagnostic PAH ratios were used to determine the major source of PAH contamination in the soot.

KEYWORDS: Heavy Metals, Polycyclic Aromatic Hydrocarbon, Soot, Standby Generator, University of Ghana, Legon Campus

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