

Determination of Polycyclic Aromatic Hydrocarbons in the Water, Soils and Surface Sediments of the Msunduzi River, KwaZulu-Natal, South Africa



Alexis Munyengabe

University of KwaZulu-Natal, South Africa

Polycyclic aromatic hydrocarbons (PAHs) are organic pollutants which are known carcinogens. Their presence in the environment has been linked to cancer, neurological and reproductive illnesses to name but a few. Hence it is important to monitor the levels of these PAHs in order to identify areas of high pollution and possible toxic exposure to aquatic and human life. Water samples were extracted using a liquid-liquid extraction technique into dichloromethane and dehydrated with sodium sulphate anhydrous. The soils and surface sediments were extracted with a mixture of dichloromethane and n-hexane (1:1 v/v) using the soxhlet extraction technique. The crude extracts were purified by silica gel packed column chromatography. The concentrations of PAHs in the extracts were analysed by GC-MS. The instrument was calibrated using internal standardization (deuterated PAH) and PAH standards. Percentage recoveries of 7 PAHs in the spiked and equilibrated samples varied from 79.16 ± 0.01 to 101.28 ± 0.02 and 80.30 ± 0.02 to 105.56 ± 0.01 for solid and water samples, respectively. The grand average in the summed concentrations of concentrations of the 7 PAHs in the water for all seasons decreased in the order: $\Sigma[7\text{-PAH}]$ spring > $\Sigma[7\text{-PAH}]$ summer > $\Sigma[7\text{-PAH}]$ autumn > $\Sigma[7\text{-PAH}]$ winter while in the surface sediments was in the order: $\Sigma[7\text{-PAH}]$ spring > $\Sigma[7\text{-PAH}]$ autumn > $\Sigma[7\text{-PAH}]$ summer > $\Sigma[7\text{-PAH}]$ winter and in the soils was in the order: $\Sigma[7\text{-PAH}]$ spring > $\Sigma[7\text{-PAH}]$ autumn > $\Sigma[7\text{-PAH}]$ winter > $\Sigma[7\text{-PAH}]$ summer. The concentration of PAHs was found to be comparatively higher in the soils and surface sediments than in the water samples.



Biography

Munyengabe A. has completed his MSc at the age of 30 years from the University of KwaZulu-Natal, South Africa. He is currently a PhD student at the University of Johannesburg, South Africa. He has 1 publication and 1 technical report on green chemistry in South Africa.