ABSTRACT

The exponential growth in the rate of industrialization is a serious precursor for contamination and deterioration of the environment. Water pollution, for instance, is expected to reach disturbing levels in the years to come. Polycyclic aromatic hydrocarbons (PAHs) in water systems are persistent contaminants not only in aquatic systems but also in soil, air and plant materials and are well-known initiators for cancer and gene mutation. Numerous human-dependent activities such as agriculture and suspected wood treatment works in Elburgon may lead to an increased PAH contamination of water in River Elburgon, especially when the internationally set limits are exceeded. The sediment samples were collected in May 2019 during the wet season and treated for analysis of PAHs using a gas chromatograph hyphenated to a mass selective detector. A total of 25 PAHs were quantified in this study out of which pyrene was the most abundant, contributing $$\approx \,17\%$$of the total concentrations of PAHs identified. The total concentration of the PAHs analyzed in this study was found to be $$\mathop \sum \nolimits_{25} {\text{PAH}} = 73.19 \pm 3.67\;\upmu{\text{g}}\;{\text{g}}^{ - 1}$$dry weight (dw) with pyrene contributing a total concentration $$\mathop \sum \nolimits_{\text{pyrene}} = 12.44 \pm 0.54\;\upmu{\text{g}}\;{\text{g}}^{ - 1 }$$ dw. On the other hand, benzo[a]pyrene (BaP)—a well-known carcinogen—was significantly high $$\mathop \sum \nolimits_{\text{BaP}} = 10.67 \pm 0.43\;\upmu{\text{g}}\;{\text{g}}^{ - 1 }$$. Other major PAHs detected included acenaphthene and 5,6-dihydrobenzo[de]anthracene, $$14.57\%$$and $$\approx \,11\%$$, respectively. The low concentration PAHs included 1-ethenylnaphthalene and 1,4,5-trimethylnaphthalene each at $$0.08\%$$. The presence of benzo[a]pyrene in significant amounts is of serious concern on the public health of the residents of Elburgon and its environs. Considering the high levels of PAHs in the sediments of River Elburgon, it is important to note with concern that the water in the river under study is not only be unsuitable for drinking but also unsuitable for other domestic purposes such as irrigation and laundry.