

Spatial and Seasonal Distribution of Persistent Organic Pollutant (Polychlorinated Biphenyl) Along the Course of Buffalo River, Eastern Cape Province, South Africa

Authors : Abdulrazaq Yahaya, Omobola Okoh, Anthony Okoh

Abstract : Polychlorinated biphenyls (PCBs) are generated from short emission or leakage from capacitors and electrical transformers, industrial chemicals wastewater discharge and careless disposal of wastes. They are toxic, semi-volatile compounds which can persist in the environment, hence classified as persistent organic pollutants. Their presence in the environmental matrices has become a global concern. In this study, we assessed the concentrations and distribution patterns of 19 polychlorinated biphenyls congeners (PCB 1, 5, 18, 31, 44, 52, 66, 87, 101, 110, 138, 141, 151, 153, 170, 180, 183, 187, and 206) at six sampling points in water along the course of Buffalo River, Eastern Cape, South Africa. Solvent extraction followed by sulphuric acid, potassium permanganate and silica gel cleanup were used in this study. The analysis was done with gas chromatography electron capture detector (GC-ECD). The results of the analysis of all the 19 PCBs congeners ranged from not detectable to 0.52 ppb and 2.5 ppb during summer and autumn periods respectively. These values are generally higher than the World Health Organization (WHO) maximum permissible limit. Their presence in the waterbody suggests an increase in anthropogenic activities over the seasons. In view of their volatility, the compounds are transportable over long distances by air currents away from their point of origin putting the health of the communities at risk, thus suggesting the need for strict regulations on the use as well as safe disposal of this group of compounds in the communities.

Keywords : organic pollutants, polychlorinated biphenyls, pollution, solvent extraction

Conference Title : ICAC 2016 : International Conference on Analytical Chemistry

Conference Location : Cape Town, South Africa

Conference Dates : November 03-04, 2016