

Occurrence and Distribution of Per- and Polyfluoroalkyl Substances from Multi-Industry Sources to Water, Sediments and Plants along Nairobi River Basin, Kenya

Abstract

Per- and polyfluoroalkyl substances (PFAS) are ever-present pollutants in the environment. They are persistent and bio-accumulative with deleterious health effects on biota. This study assesses the levels of PFAS in environmental matrices along the Nairobi River, Kenya. An aggregate of 30 PFAS were determined in water, while 28 PFAS were detected in sediments and plants using solid phase extraction then liquid chromatography–mass spectrometric techniques. In water, higher levels of perfluoroundecanoic acids of up to 39.2 ng L⁻¹ were observed. Sediment and plant samples obtained in the midstream and downstream contained higher levels of perfluorooctanoic acid of up to 39.62 and 29.33 ng g⁻¹, respectively. Comparably, levels of long-chain PFAS were higher in water and sediments than in plants. Sediment/water log distribution of selected PFAS ranged between 2.5 (perfluoroundecanoic acid) and 4.9 (perfluorooctane sulfonate). The level of perfluorooctane sulfonate (1.83 ng L⁻¹) in water is above the acceptable level in surface water posing high human health and ecological risks. The observed PFAS concentrations and distribution were attributed mainly to multi-industries located along the river, among other sources. The knowledge of PFAS occurrence and distribution in Nairobi River, Kenya, provides important information to local regulatory agencies for PFAS pollution control.

Authors

[Flora Chirikona](#), [Natalia Quinete](#), [Jesleen Gonzalez](#), [Gershom Mutua](#), [Selly Kimosop](#), [Natalia Quinete](#)