

Are Kenyan Fresh Water Lakes Safe? First Evidence of Microplastic Pollution in L. Naivasha

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Microplastics (MPs) are emerging threat contaminants that have been shown to provide toxic pollutants, either from the environment or from their inherent toxic monomers and additives, a pathway into the aquatic food web. In the present study, the occurrence, abundance and composition of microplastic (MP) load in the surface water of Lake Naivasha was determined. Seven sampling locations were selected to ensure maximal coverage of hydrologic and other factors such as anthropogenic pressures that may influence plastic and MP input and distribution in the lake. Surface water physical chemical parameters were measured *in situ* whereas MP samples were collected using plankton net trawls and treated with H₂O₂ to decompose organic matter. The MP particles recovered were classified taking into account their physical and chemical properties which were done via visual observation and attenuated total reflectance - Fourier transform infrared spectroscopy respectively. The average MP concentration range in surface water was 183,333.5±16,666.5 and 633,333.5±66,666.5 particles/km². Fragments, fibers and films were identified and were majorly composed of polypropylene, polyethylene, and polyester. The lakes' dominant abundance of fibrous (81%) and colored (81%) MP is an indication that secondary MPs are the major source of the pollutants in the lake. Moreover, correlational analysis done exhibited a strong positive association between the MP quantities and turbidity, total nitrogen and total phosphorus in the lake. This assessment adds to the growing documentation of MPs presence in freshwater ecosystems, and provides a baseline for future monitoring and assessment in sediment and biota of Lake Naivasha and other Kenyan freshwater systems.

Keywords: Freshwater, Lake Naivasha, Microplastics, Surface-water