

Comparative Assessment of Microplastic Pollution in Surface Water and Sediment of the Gomati and Saryu Rivers, India

Authors : Amit K. Mishra, Jaswant Singh

Abstract : The menace of plastic, which significantly pollutes the aquatic environment, has emerged as a global problem. There is an emerging concern about microplastics (MPs) accumulation in aquatic ecosystems. It is familiar to everyone that the ultimate end for most of the plastic debris is the ocean. Rivers are the efficient carriers for transferring MPs from terrestrial to aquatic, further from upstream to downstream areas, and ultimately to oceans. The root cause study can provide an effective solution to a problem; hence, tracing of MPs in the riverine system can illustrate the long-term microplastic pollution. This study aimed to investigate the occurrence and distribution of microplastic contamination in surface water and sediment of the two major river systems of Uttar Pradesh, India. One is the Gomti River, Lucknow, a tributary of the Ganga, and the second is the Saryu River, the lower part of the Ghagra River, which flows through the city of Ayodhya. In this study, the distribution and abundance of MPs in surface water and sediments of two rivers were compared. Samples of water and sediment were collected from different (four from each river) sampling stations in the river catchment of two rivers. Plastic particles were classified according to type, shape, and color. In this study, 1523 (average abundance 254) and 143 (average abundance 26) microplastics were identified in all studied sites in the Gomati River and Saryu River, respectively. Observations on samples of water showed that the average MPs concentration was 392 (± 69.6) and 63 (± 18.9) particles per 50l of water, whereas the sediment sample showed that the average MPs concentration was 116 (± 42.9) and 46 (± 12.5) particles per 250gm of dry sediment in the Gomati River and Saryu River, respectively. The high concentration of microplastics in the Lucknow area can be attributed to human activities, population density, and the entry of various effluents into the river. Microplastics with fibrous shapes were dominated, followed by fragment shapes in all the samples. The present study is a pioneering effort to count MPs in the Gomati and Saryu River systems.

Keywords : freshwater, Gomati, microplastics, Saryu, sediment

Conference Title : ICMUPP 2023 : International Conference on Microplastics and Urban Plastic Pollution

Conference Location : Goa, India

Conference Dates : December 11-12, 2023