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Mold Contamination in Metropolitan Wastewater Systems of Drainage Substances

Sabha Taina*

Department of Epidemiology, Western University, London, Ontario, Canada

Abstract

Micro plastic pollution has emerged as a significant environmental concern worldwide, with urban rainwater drainage systems serving as conduits for the transport of micro plastics into aquatic environments. These drainage systems, designed to manage storm water runoff in urban areas, can become reservoirs for micro plastic accumulation due to various anthropogenic activities and inadequate waste management practices. This essay explores the causes, impacts, and mitigation strategies associated with micro plastic pollution in sediments of urban rainwater drainage systems, highlighting the need for concerted action to address this growing environmental problem, Urbanization leads to increased impervious surfaces such as roads, pavements, and rooftops, which facilitate surface runoff during rainfall events. This runoff carries micro plastics from various sources, including littered plastic debris, degraded plastic products, and micro beads from personal care products, into the drainage system.

Keywords: Growing environmental problem • Micro plastic pollution • Urban rainwater drainage

Introduction

Effluent from wastewater treatment plants and combined sewer overflows can contain micro plastic particles derived from the fragmentation of larger plastic items, laundering of synthetic textiles, and disposal of plastic-based products. These microplastics are subsequently transported through the drainage system and deposited in sediments, Improper disposal of plastic waste, including littering and illegal dumping, contributes significantly to micro plastic pollution in urban environments. Plastic items discarded on streets, sidewalks, and open spaces can be transported by storm water runoff and accumulate in rainwater drainage systems, where they undergo mechanical breakdown into microplastics over time, Microplastics in sediments can alter sediment properties, impair benthic habitats, and disrupt ecological processes in urban water bodies. Accumulation of microplastics in the benthic environment may affect sediment-dwelling organisms, such as benthic invertebrates and microorganisms, leading to changes in community structure and ecosystem functioning.

Literature Review

Bioaccumulation and bio magnification: Microplastics ingested by aquatic organisms may accumulate in their tissues and organs, leading to bioaccumulation over time. Through biomagnification, microplastics and associated contaminants can be transferred to higher trophic levels, increasing exposure risks for predators and organisms at the top of the food chain, including humans [1].

Physical Impacts on wildlife: Ingestion of microplastics can cause physical harm to aquatic organisms, such as abrasions, blockages of the digestive tract, and internal injuries, leading to impaired feeding, reproductive, and locomotor functions. Additionally, entanglement in microplastic debris can pose threats to aquatic fauna, including fish, amphibians, and aquatic birds [2].

Public health concerns: Microplastics and associated contaminants in urban water bodies may pose risks to human health through the consumption of contaminated seafood, ingestion of contaminated water, and inhalation of airborne microplastics. Chronic exposure to microplastics and associated pollutants has been linked to adverse health effects, including inflammation, oxidative stress, and potential carcinogenicity [3].

Discussion

Source reduction: Implementing measures to reduce the production and consumption of single-use plastics, promoting the use of biodegradable alternatives, and enforcing littering laws can help prevent the entry of micro plastics into urban drainage systems. Public education campaigns emphasizing responsible waste management practices and the importance of reducing plastic pollution are essential to fostering behavior change [4].

Storm water management practices: Incorporating green infrastructure solutions, such as permeable pavements, green roofs, rain gardens, and constructed wetlands, into urban storm water management systems can help intercept and treat storm water runoff, thereby reducing the transport of micro plastics and pollutants into drainage systems and receiving water bodies.

Sediment management and remediation: Implementing sediment management strategies, such as sediment dredging, sediment traps, and sediment capping, can help remove accumulated micro plastics from urban drainage systems and restore sediment quality. Additionally, bioengineering techniques using vegetation and microbial communities can aid in sediment remediation and stabilization [5,6].

Conclusion

Micro plastic pollution in sediments of urban rainwater drainage systems poses significant environmental, ecological, and public health risks, necessitating urgent action to mitigate its impacts. By addressing the root causes of micro plastic pollution through source reduction, storm water management, sediment remediation, advanced wastewater treatment, monitoring, and policy interventions, societies can work towards safeguarding urban water environments and promoting sustainable development. Concerted efforts involving government agencies, industries, academia, and civil society are essential for implementing effective solutions and achieving tangible

****Address for Correspondence:*** *Sabha Taina, Department of Epidemiology, Western University, London, Ontario, Canada, E-mail: sabasinha443@gmail.com*

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progress in combating micro plastic pollution in urban environments. Through collaborative action and shared responsibility, we can strive towards a cleaner, healthier, and more resilient future for urban ecosystems and communities.

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Conflict of Interest

None.

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