Microplastics Pollution in Aquatic Environments: A Comprehensive Review on Distribution, Concentration, Toxicity and Ecological Risks in Southeast Asia

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Abstract

Microplastics pollution is a growing environmental concern, particularly in aquatic ecosystems, where it poses significant threats to organisms and ecosystems. Originating from the widespread use of consumer products and inadequate waste management, microplastics are commonly found in aquatic environments, presenting various physical and chemical hazards to aquatic life. These risks include ingestion, which can lead to blockages in the digestive system, reduced nutrient intake and death. Additionally, microplastics absorb and transport toxic chemicals, contributing to bioaccumulation and biomagnification in the food chain. The impacts of microplastic exposure include oxidative stress, inflammation and potential reproductive issues in aquatic organisms.

Southeast Asia, known for its abundant aquatic resources, confronts particular challenges in managing pollution, and effective management strategies are needed. We can safeguard the health and sustainability of Southeast Asia's aquatic ecosystems by addressing these issues comprehensively. This review provides detailed insights into the dual physical and chemical effects of microplastics on aquatic organisms in Southeast Asia, underscoring the need for continued research and innovative solutions. © 2025 John Wiley & Sons Ltd.

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