The Contamination of Microplastics in Marine Environment: Occurrence, Distribution, Effects, and Health Impacts

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Abstract

Plastic waste is an emerging contaminant of catastrophic ecological consequence due to its voluminous production globally and recalcitrant nature in marine environments. There are multiple pathways for plastic waste entering beaches and worldwide oceans, such as rivers, atmospheric transport, and disposing wastes from human activities of aquaculture, navigation and fishery. Therefore, the marine environment is considered to be the ultimate convergence point of MPs. It is important to understand the size, abundance, and source of MPs in the marine environment, as this will affect the encounter probability and availability to aquatic biota. Specifically, the uptake of hazardous chemicals by MPs may affect the distribution and bioavailability of the chemicals. Moreover, MPs can directly or indirectly induce an alarmingly rapid deterioration of coral reefs via a multitude of pathways. In this research, we will provide an overview on the occurrence, distribution, effects, and health impacts of MPs in marine environment, including (i) reveal the abundance, morphological characteristics, composition, spatial distribution of the MPs in seawater, sediments, and corals, (ii) investigate the adsorption characteristics of persistent organic pollutants, heavy metal, and antibiotics on MPs, and (iii) evaluate the ecological impact of MPs on the coral reef ecosystems. This study will provide an insight

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into the research on the distribution of MPs in the marine environment, it is critical to also understand the concentration and origin of pollutants related to MPs, in order to assess the impact of MPs on the marine environment and develop well-informed prevention and management strategies.

Biography

Dr. Cheng-Di Dong is a Distinguished Professor at the Department of Marine Environmental Engineering, National Kaohsiung University of Science and Technology (NKUST), Taiwan. Dr. Dong obtained Ph.D. in Environmental Engineering from the University of Delaware, USA in 1993. Dr. Dong was Dean of the College of Hydrosphere of NKUST. Dr. Dong's research focuses on microplastics, waste-to-resources, biotechnology, nanotechnology, novel catalytic materials and biochar for environmental applications. Dr. Dong has published more than 380 research and review articles in leading international journals, 6 book chapters, and edited 6 special issues of scientific journals. His h-index ~39 and more than 7319 citation. He has won several scientific awards and grants from renowned academic bodies. Dr. Dong was in the "World's Top 2% Scientist-Stanford University Releases List (2021)" for Environmental Sciences. He is a Fellow of International Bioprocessing Association. Dr. Dong currently serves as Editor of Sustainable Environment Research, and he is Editorial Board Member of Bioresource Technology. He has also served as Guest Editor of Special Issues in Bioresource Technology, Environmental Pollution, Bioresource Technology Report, Catalysts, and Applied Sciences.

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