Microplastics Pollution: Integrated Approaches and Solutions

Bupe G Mwanza*

Graduate School of Business, University of Zambia

*Corresponding author: bupe.mwanza@gmail.com

Abstract

The National Oceanic and Atmospheric Administration (AOAA) defines microplastics as tiny plastic particles of less than 5 millimetres long. There exists a range of processes that contribute to formation of microplastics. For example, due to the breakdown of microplastics during the weathering process, microplastics are formed. Raw materials used in the production of plastics (resin pellets) also continue to contribute to the amount of existing microplastics. In 2014, it was estimated that, 51 trillion pieces of microplastics exist in the ocean (4Ocean Team, 2020). This amount exceeds the amount of stars in the Milky Way by 500 times. In comparison to macroplastics, microplastics are also carriers of persistent organic pollutants (POPs) and bacteria. Chemicals such dioxins and pesticides are found in micoplastics and these are hazardous to animal and human health. Other than the impact caused by microplastics in the aquatic communities, land ecosystems are also affected through the introduction plastic debris that affect organism behaviour, pollute food sources and contaminate ground water. To reduce the impact of microplastics on the environment, priority should be given through global multidisciplinary collaborative approaches. A literature review is conducted to establish the current best practices that can improve waste management of plastics for the purpose of enhancing environmental and health impacts caused by microplastics. Studies

 DOI: 10.21467/abstracts.119

ISBN: 978-81-947843-7-1 (eBook), 978-81-954993-1-1 (Paperback),

focusing microplastics pollution AND/OR strategies are reviewed. Through a critical analysis of the findings from these studies, the study recommends the following strategies and solutions for reducing mircoplastics pollution; utilization of biogradebale or bio-based plastics; enforcement of extended producer responsibility; advancement and improvement of waste collection systems; enforcement of recycling; plastic production and consumption regulation; improvement of recycled plastic supply-chains; design of reverse logistics systems, promotion of reusing plastics; and utilization of alternative transportation. The recommendations are applicable in all contexts but the implementation is what may differ. Therefore, this study is a drive towards achieving sustainable management of microplastics using collaborative approaches.

Keywords: Microplastics; Strategies, Solutions, Pollution, Waste Management

Biography

Bupe G Mwanza has a PhD in Engineering Management with academic and research experience in manufacturing systems, operations management, quality assurance in higher education and solid waste management. She is currently a senior lecturer at the University of Zambia in the Graduate School of Business. Bupe is currently serving as Review Editor on the Editorial Board of Waste Management (specialty section of Frontiers in Sustainability). International Peer review journal panels include; Journal of Cleaner Production; Total Quality Management; and Inderscience. International conference peer review panels include, Industrial Engineering and Operation Management; and Industrial Engineering and Engineering Management. She has presented in countries such as Zambia, Zimbabwe, South Africa, Ghana, Colombia, Singapore, Malaysia, Indonesia, Macao, Thailand and India. Bupe has won best paper

awards in Zambia, Zimbabwe, South Africa and Malaysia. Bupe was awarded Distinguished Woman in Industry and Academia Award at the 2020 Industrial Engineering and Operations Management (IEOM) Conference in Zimbabwe.

ISBN: 978-81-947843-7-1 (eBook)
978-81-954993-1-1 (Paperback)

Series: AIJR Abstracts
DOI: 10.21467/abstracts.119