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Life Cycle Assessment (LCA) of Microplastics in the Environment

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Abstract

Microplastic (MP) pollution is one of the most pressing environmental problems of the 21st century. In the EU, between 75.000 and 300.000 tons of MP are released into the environment every year. MP are ubiquitous, being found in seas, lakes, rivers and estuaries, air, sediments, landfills, and wastewater treatment plants because of improper human disposal of plastics and inadequate waste management. Life cycle assessment (LCA) is frequently promoted as a tool to assess environmental impact. LCA is regulated in accordance with ISO 14040 and implies a process that examines environmental aspects and potential environmental impacts on the product or service life cycle. While LCA is a valuable environmental tool, its application to MP has not been sufficiently developed and investigated. The purpose of this paper is to critically review the LCA modeling of MP. Several leading LCA software were analyzed. Based on the conducted research, it was concluded that there are very few databases used by LCA software, which can be connected to MP. In addition, it was concluded that for these types of analysis, it is best to observe the life cycle of plastic waste, focusing on the concept according to which waste is considered a resource.

Keywords: microplastics, environment, life cycle assessment, plastic waste