

Microplastics Research Trends in Korea

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Abstract

Plastics have been used in large quantities due to their convenience, but management in consideration of environmental impacts is insufficient. With an increasing use of plastic, considerable plastic waste is generated, threatening the environment and public health. In particular, changes in living patterns in urban areas have significantly impacted the rate at which plastic waste increases every year. Thus, governments in many developed countries have implemented numerous policies to reduce plastic waste generation. Two classifications of microplastics are currently recognized. Primary microplastics include any plastic fragments or particles that are already 5.0 mm in size or less before entering the environment. These include microfibers from clothing, microbeads, and plastic pellets. Secondary microplastics arise from the degradation of larger plastic products through natural weathering processes after entering the environment. Such sources of secondary microplastics include water and soda bottles, fishing nets, plastic bags, microwave containers, tea bags and tire wear. Both types are recognized to persist in the environment at high levels, particularly in aquatic and marine ecosystems, where they cause water pollution. 35% of all ocean microplastics come from textiles/clothing, primarily due to the erosion of polyester, acrylic, or nylon-based clothing, often during the washing process. However, microplastics also accumulate in the air and terrestrial ecosystems. Microplastics can absorb unwanted and undesirable chemicals including heavy metals, polychlorinated



biphenyls, and pesticides. Human consumption of microplastics can result in an increased exposure to these chemicals and might lead to poisonous effects. In laboratory tests, microplastics have been shown to cause damage to human cells, including both allergic reactions and cell death. But so far there have been no epidemiologic studies documenting, in a large group of people, a connection between exposure to microplastics and impacts on health.

In particular, in April 2018, there was a problem with the collection of plastic waste in Korea, which resulted in many changes in plastic-related policies and research fields. The Ministry of Environment is promoting research on integrated life cycle of microplastics generation, behavior, risk assessment and management. First, the generation status and material flow of waste plastics generated as waste are analyzed, and the source of their generation is investigated by identifying the route through which they are exposed to the environment. In addition, the Korean government is preparing the analytical method for microplastics and is conducting research on the behavior and risk by investigation the contamination status. In this presentation, I would like to introduce the research projects and contents being promoted in the environmental field.

Biography

Dr. Sun Kyoung Shin is currently a director at the National Institute of Environmental Research. Dr. Shin received her PhD in chemical engineering at New Mexico State University. Following her PhD, she served as a senior researcher at the Ministry of Environment. She has expertise in hazardous waste management and environmental pollutant analysis, with a particular focus on waste recycling and waste to energy.