

Characterization and Analysis of Microplastics and Nanoplastics in Water

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Abstract

The global increase in plastic waste has received world-wide attention recently, especially during the COVID-19 pandemic. Lots of consumer products that are used daily contain plastic components and living without plastics is somewhat unimaginable. There should, therefore, be methods to mitigate plastic waste or to recycle used plastics. However, challenges persist in the detection and analysis of plastic particles in the environmental media, especially in drinking water, due to the presence of nanoscale plastic particles. Such challenges include, but are not limited to, a lack of standardization of sampling, inconsistent pretreatment standards, and a lack of standardization of analytical methods of microplastics and nanoplastics. Such issues may be overcome through accurate validation of analysis data and by producing standards for identifying and quantifying microplastics and nanoplastics. Few studies have been carried out for the identification and quantification of microplastics and nanoplastics in drinking water, including tap water and bottled water. A systematic approach, ranging from sample preparation, purification, and analysis to QA/QC, is suggested for accurate analysis of microplastics and nanoplastics in water. Furthermore, consistent protocol from international standardization is recommended in all steps involved in the characterization and



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

analysis of plastic particles, including sampling, pretreatment, and characterization and analysis. In this presentation, characterization and analysis methods for microplastics and nanoplastics from different types of water are presented, along with the gaps in research identified through the characterization and analysis of microplastics and nanoplastics in water.

Keywords: Microplastics, Nanoplastics, Raman Micro Spectroscopy, Fourier Transform Infrared Spectroscopy, Drinking Water

Biography

Dr. Ingyu Lee received his Ph.D. in environmental engineering at the University of Seoul, under the supervision of Prof. Hyunook Kim. Following his Ph.D. degree, he served as a research associate at Argonne National Laboratory. He has three years of research experience since his Ph.D., in wastewater treatment technologies, water quality control systems, and waste treatment, with a particular focus on anaerobic digestion.