



Prevalence and implications of microplastics in potable water system: An update

Vikas Menon^{a,b}, Swati Sharma^{a,*}, Shreya Gupta^a, Anujit Ghosal^{c,d}, Ashok Kumar Nadda^e, Rajan Jose^{f,g}, Pooja Sharma^h, Sunil Kumarⁱ, Pardeep Singh^j, Pankaj Raizada^j

^a University Institute of Biotechnology, Chandigarh University, Mohali, 140413, Punjab, India

^b Department of Biotechnology, Chandigarh College of Technology, Chandigarh Group of Colleges, Landran, 140307, Punjab, India

^c Department of Food & Human Nutritional Sciences, University of Manitoba, MB, R3T 2N2, Canada

^d Richardson Centre for Functional Foods and Nutraceuticals, University of Manitoba, MB, R3T 6C5, Canada

^e Department of Biotechnology and Bioinformatics, Jaypee University of Information Technology, Waknaghat, Solan, 173 234, India

^f Center for Advanced Intelligent Materials, Universiti Malaysia Pahang, 26300, Kuantan, Malaysia

^g Faculty of Industrial Sciences & Technology, Universiti Malaysia Pahang, 26300, Kuantan, Malaysia

^h Environmental Research Institute, National University of Singapore, 1 Create Way, 138602, Singapore

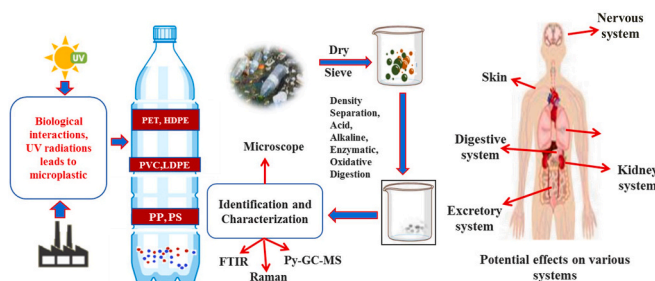
ⁱ Waste Reprocessing Division (WRD), CSIR- National Engineering Environmental Research Institute, Nagpur, 440 020, India

^j School of Advanced Chemical Sciences, Shoolini University, Solan, Himachal Pradesh, 173212, India

HIGHLIGHTS

- MPs contamination in potable water is reviewed in depth.
- Characterization techniques for MPs in drinking water are discussed.
- The health and environmental impacts of MPs are provided in detail.
- Covers the treatment techniques of MPs.
- Biodegradable and compostable plastics are needed.

GRAPHICAL ABSTRACT



ARTICLE INFO

Handling editor, S Selvam

Keywords:

Degradation
Health-savvy culture
Microplastics
Potable water
Toxicity

ABSTRACT

Synthetic plastics, which are lightweight, durable, elastic, mouldable, cheap, and hydrophobic, were originally invented for human convenience. However, their non-biodegradability and continuous accumulation at an alarming rate as well as subsequent conversion into micro/nano plastic scale structures via mechanical and physio-chemical degradation pose significant threats to living beings, organisms, and the environment. Various minuscule forms of plastics detected in water, soil, and air are making their passage into living cells. High temperature and ambient humidity increase the degradation potential of plastic polymers photo-catalytically under sunlight or UV-B radiations. Microplastics (MPs) of polyethylene terephthalate, polyethylene, polystyrene, polypropylene, and polyvinyl chloride have been detected in bottled water. These microplastics are entering into the food chain cycle, causing serious harm to all living organisms. MPs entering into the food chain are usually inert in nature, possessing different sizes and shapes. Once they enter a cell or tissue, it causes mechanical damage, induces inflammation, disturbs metabolism, and even lead to necrosis. Various generation

* Corresponding author.

E-mail addresses: sspandit.89@gmail.com, swati.e8750@cumail.in (S. Sharma).

<https://doi.org/10.1016/j.chemosphere.2023.137848>

Received 12 April 2022; Received in revised form 11 November 2022; Accepted 10 January 2023

Available online 12 January 2023

0045-6535/© 2023 Elsevier Ltd. All rights reserved.