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Need for Microplastics Regulation in India

CHAITY[1]

ABSTRACT

Microplastics are tiny plastic particles found almost everywhere, such as in our air, water, food, and even inside our bodies. They come from various sources, including personal care products, synthetic clothing, and the wear and tear of larger plastic items. These particles are harmful to human health, animals, soil, and oceans. Studies have linked them to serious health risks like cancer, reproductive problems, and damage to vital organs. In India, microplastic pollution is a growing concern, especially with the large use of synthetic textiles and cosmetic products containing microbeads. Although some action has been taken, such as the Bureau of Indian Standards labelling microbeads as unsafe, calling for a ban on its usage, the ban, however, has not been implemented to date. Other countries like the USA, UK, EU, and South Korea have introduced laws to ban or regulate microplastics, which should push for similar action in India. There is need for a strong and detailed legal framework in India that clearly defines microplastics, restricts their use, improves labelling and waste management, and holds industries accountable. In addition to regulation, promoting eco-friendly alternatives like bioplastics and encouraging innovation in recycling can help control the spread of microplastics. A combined effort involving policymakers, industries, scientists, and the public is urgently needed to reduce the environmental and health impacts of microplastics in India.

Keywords: *Microplastics, Impact, Regulation, USA, UK, Europe, Challenges.*

I. INTRODUCTION

Plastic pollution is at an all-time high, threatening the health and habitat of all the living beings around it. A study revealed that "depending on sex and age, people consume between 39,000 and 52,000 particles of microplastic annually".[2] The regular wear and tear of plastic products generates particles and gases that are released in the surrounding environment, worsening climate change.

Plastic products contain multiple chemical compounds in its formulation worldwide, among those "more than 20% have been classified by the European Union as being of concern due to their toxicity and persistence, accumulating in human fatty tissues".[3] These compounds

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[2] Tooba Ali, *Health Risks Posed by Microplastics in Tea Bags: Microplastic Pollution – A Truly Global Problem*, Vol. 109(3), (2023).
[3] *Ibid*.

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expose us to danger, threatening our health and that of our planet. These microplastics disturb the vital role played by marine microorganisms in sequestering carbon dioxide and of producing oxygen.

Unfortunately, microplastics are now found in almost all ecosystems viz. 'atmosphere, soil, seas and oceans and in many organisms such as fish, birds, domestic animals and humans'. Immediate remedial actions are required at the global scale to effectively manage the use of plastic and to reduce the pollution caused by it. Because of their "high resistance to degradation, microplastics linger in the environment for a long time".[4] Since no concrete solution exists to deal with microplastics, restrictions and regulations become necessary to fill the lacuna in the meanwhile.

II. MICROPLASTICS AND THEIR EFFECTS

Microplastics are "synthetic solid particles or polymeric matrices, with regular or irregular shape and with size ranging from 1 micron to 5 millimetre, of either primary or secondary origin, which are insoluble in water."[5] They are categorised into two types on the basis of their source of origin i.e. primary and secondary microplastics. Primary microplastics are "intentionally manufactured plastics at microscopic size", these are added to commercial products like exfoliating personal care items and cleaning products in the form of microspheres and microbeads, as well as employed in various industrial purposes. On the other hand, secondary microplastics refer to "small plastic fragments that originate from the disintegration of larger plastic debris, such as from the wear and tear of larger plastics in use through physical, chemical and biological processes".[6]

These microplastics are prone to accumulation in food sources and reach humans upon consumption of such food through the process of bio-magnification. Microplastics have been "detected throughout the human body, including in the blood, saliva, liver, kidneys, and placenta."[7] Studies show that chemicals and heavy metals present in microplastics can cause "oxidative damage, DNA damage, and changes in gene activity, known risks for cancer development, along with disruption to nervous, reproductive, and other vital systems."[8]

The exact risk to human health due to microplastics remains a mystery since no dedicated

[4] J.P.G.L. Frias, Roisin Nash, *Microplastics: Finding a Consensus on the Definition*, Vol. 138 MARINE POLLUTION BULLETIN 145, (2019).
[5] *Ibid*.
[6] Jing Song et al., *Defining Primary and Secondary Microplastics: A Connotation Analysis*, Vol. 4(6) ACS ES&T WATER, 2330 (2024).
[7] Stephanie Dutchen, *Microplastics Everywhere*, HARVARD MEDICINE, (Jun. 2, 2025), https://magazine.hms.harvard.edu/articles/microplastics-everywhere.
[8] *Ibid*.

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research has been done so far, to evaluate on potential risks and negative impact of microplastics on humans due to ingestion of these foods. At the same time, microplastics are harming the environment at an unprecedented rate, effecting the marine life by depositing in the body of fish and other organisms, essentially starving them.[9] When found on land, they are known to leech out harmful chemicals in the soil, destroying the fertility and nutrients necessary for growth of crops. Airborne microplastics contribute to air pollution and are inhaled by animals and humans, depositing in the lungs and harming the respiratory system.[10]

III. CHALLENGES IN MICROPLASTIC MANAGEMENT

Microplastic have become ubiquitous in nature, present in the environment from the air we breathe, water we drink, food we consume and even in habitats such as lakes, rivers and seas. They are present all around us, getting disseminated into our surrounding through various everyday activities, from the "rubbing of car tires against abrasive roads during acceleration and braking" to washing of clothes, where a "single synthetic garment can release up to 1900 synthetic microfibers in a single machine cycle, getting released into the waters."[11] Tea bags are mostly "made of food grade polymers such as nylon, subjected to high temperatures during the brewing process", releasing MPs into the beverage.[12] Face masks have been linked with the presence of MPs in the human lungs, acting as a direct source of inhalation of microplastics.[13]

While recycling has been promoted as a 'green and sustainable solution' to deal with the problem of plastic waste, "the practice itself could be generating huge quantities of microplastics".[14] According to a study, "recycling may be making matters worse by producing an even more microplastics which are unintentionally released" into the surrounding areas of the recycling facilities.[15] Microplastics are not captured by the existing systems because they are not designed to filter-out such microscopic fragments, thereby getting released into the environment.

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[9] Eswar Marcharla et al., *Microplastics in Marine Ecosystems: A Comprehensive Review of Biological and Ecological Implications and its Mitigation Approach Using Nanotechnology for the Sustainable Environment*, Vol. 256 ENVIRONMENTAL RESEARCH, (2024).

[10] Joana Correia Prata, *Airborne Microplastics: Consequences to Human Health?*, Vol. 234 ENVIRONMENTAL POLLUTION, (2018).

[11] Khaled Ziani et al., *Microplastics: A Real Global Threat for Environment and Food Safety: A State of the Art Review*, Vol. 15(3) NUTRIENTS 617, (2023).

[12] TOOBA, *supra* note 1.

[13] Andres F. Prada et al., *Disposable Face Masks: A Direct Source for Inhalation of Microplastics*, ARXIV, (Jun. 2, 2025), https://arxiv.org/abs/2308.16295.

[14] Rewati Karan, *A Micro Monster: India's Growing Microplastic Pollution*, FINANCIAL EXPRESS, (Jun.2, 2025), https://www.financialexpress.com/sustainability-2/a-micro-monster-indias-growing-microplastic-pollution/3785264/.

[15] *Ibid*.

The creation of microplastics during the "recycling process presents a paradox in sustainability efforts".[16] The unintentional release of microplastics during the process of recycling hinders the entire purpose of waste reduction and minimising the environmental effect of plastic pollution. To reduce the emission of microplastics, recycling methods must be improved and innovated, and stronger regulations must be put in place to spare no effort in curbing the menace of microplastics.

IV. REGULATION OF MICROPLASTICS

The increase in plastic pollution needs a collaborative effort from "regulators, scientists and the general public about how to deal with this problem that affects ecosystems and human health".[17] Due to inadequate awareness among the masses about the dangers of microplastics, enough actions are not being taken to regulate it at all. Before the situation gets any worse, prudent regulatory actions must be taken, the results of which can be observed quickly.

The problem of microplastics in India is dire, with an estimated release of "around 391,879 tonnes of microplastics in the environment by the end of year 2024"[18], which is only set to increase. The Central Pollution Control Board (CPCB) has also "acknowledged the presence of microplastics in India's water bodies and organisms, primarily entering through sewage, wastewater, and surface runoff, due to inadequate filtration in treatment systems and contributions from plastic infrastructure".[19] In terms of composition, the majority of microplastic pollution in India is attributed to the "textiles market, which is dominated by polyester synthetic fibres and the personal care products, 45% of which contains microbeads".[20]

The Bureau of Indian Standards (BIS) has categorised microbeads as "unsafe" in the year 2017 and proposed a ban on its usage in cosmetics products, however, initially slated to come into effect in the year 2020, the ban has not been implemented so far.[21] Indicating a lackadaisical approach towards this problem which needs prompt corrective action in the form of regulatory framework. Policy and regulations from a few jurisdictions are briefly discussed below before moving on to suggestions for a microplastics framework for India.

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[16] *Ibid*.
[17] KHALED, *supra* note 10.
[18] KHALED, *supra* note 10.
[19] NATIONAL GREEN TRIBUNAL, https://greentribunal.gov.in/sites/default/files/news_updates/Reply/by/CPCB(NEWS/ITEM/TITLED/NEWS/REVEALS/EXTENT/OF/MICROPLASTIC/POLLUTION/IN/ASHTAMUDI/LAKE/APPEARING/IN/THE/HINDU/DATED/2024.05.2024).pdf (Jun. 3, 2025).
[20] *Ibid*.
[21] *Government Classifies Microbeads as "Unsafe" for Cosmetic Products*, THE INDIAN EXPRESS, (Jun. 3, 2025), https://indianexpress.com/article/india/government-classifies-microbeads-as-unsafe-for-cosmetic-products-4677321/.

USA: the Microbead-Free Waters Act of 2015 was passed by the US Congress to handle the issue of "microbeads present in the water supply, prohibiting its manufacturing, packaging, and distribution in rinse-off cosmetics and personal care products along with non-prescription drugs containing plastic microbeads".[22] The law aims to reduce microplastic pollution by eventually phasing-out the use of these microbeads in certain products.

UK: the Environmental Protection (Microbeads) (England) Regulations of 2017 was enacted by the Parliament in 2018, banning manufacture and sale of plastic microbeads used in cosmetics and personal care products. The aim of the law was to protect the environment and the food supply from further pollution by microbeads and to build consumer confidence in products without these harmful particles.[23]

EU: the EU issued a Commission Regulation (EU) 2023/2055 in the year 2023 to "regulate synthetic polymer microparticles also known as microplastics, as substances on their own and in mixtures". This framework falls under the "Registration, Evaluation, Authorization and Restriction of Chemicals or REACH regulation, which protects human health and the environment from the risks that can be posed by chemicals".[24]

CHINA: the Ministry of Ecology and Environment had implemented a phased ban on production and sale of chemicals containing plastic microbeads from the year 2020 onwards in a bid to prevent plastic pollution.[25]

THAILAND: the import, manufacture, and sale of rinse-off cosmetics containing plastic microbeads has been banned by the Ministry of Public Health since the year 2020 to reduce plastic waste and protect the marine environment.[26]

SOUTH KOREA: the Government has banned production and sale of microbeads contained in rinse-off cosmetics in the year 2017. Additionally, a Special Act on Microplastic Reduction and Control has been proposed with the objective to ban manufacture, import, and sale of products with excessive primary microplastics, including spanning cosmetics, health foods,

[22] *The Microbead-Free Waters Act: FAQs*, US FOOD & DRUG ADMINISTRATION, (Jun. 3, 2025), https://www.fda.gov/cosmetics/cosmetics-laws-regulations/microbead-free-waters-act-faqs.
[23] Damian Carrington, *Plastic Microbeads Ban Enters Force in UK*, THE GUARDIAN, (Jun. 4, 2025), https://www.theguardian.com/environment/2018/jan/09/plastic-microbeads-ban-enters-force-in-uk.
[24] *EU Regulates Microplastics under REACH*, SGS, (Jun. 4, 2025), https://www.sgs.com/en-in/news/2023/10/safeguards-12623-eu-regulates-microplastics-under-reach.
[25] Jianli Liu et al., *The Value of China's Legislation on Plastic Pollution Prevention in 2020*, Vol. 108 SPRINGER NATURE 601, (2022).
[26] Winnie Xu, *Thailand Officially Enforced the Cosmetics Microbeads Ban*, CHEM LINKED, (Jun. 4, 2025), https://cosm biobased plastics and biodegradable plastics etic.chemlinked.com/news/cosmetic-news/thailand-officially-enforced-the-cosmetic-microbeads-ban?.

consumer chemicals, quasi-drugs.[27]

INDIA: the regulatory framework in India must be inclusive and all-encompassing in nature containing a suitable definition of microplastics, so that maximum restrictions can be placed on a variety of pollutants i.e. microbeads, microfibres, microspheres, etc. The provisions must contain labelling requirements on products, standard of acceptable levels of microplastics in water, air, soil and food items, along with additional requirements on industries to reduce microplastics. Greenwashing of products to be strictly restricted and ban on intentional microplastic additives in wash-off cosmetic products. Compliance mechanism for industry, to ensure all the requirements are strictly followed, must also be incorporated so that the regulation does not remain a mere toothless document.

V. WAY FORWARD

While research efforts are ongoing to tackle the issue of microplastics and "scientists are exploring plastic-eating microorganisms, along with plastic alternatives, individuals can advocate for reduced plastic manufacturing and more recycling."[28] Better choices can be made by shifting to eco-friendly alternatives such as bioplastics, which are biobased and biodegradable plastics, eventually reducing the use of fossil-based plastic in a bid to achieve sustainability.

Meanwhile, policy and regulatory efforts are an aspect that can be strengthened by further putting restrictions in place and bring about a shift in governance. Management of microplastics through a multidimensional approach including technological innovation, improved waste management practices, shift towards sustainable materials and consumption along with stricter regulation seems to be the best foot forward in tacking the menace of microplastic pollution.

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[27] Lorraine Li, *South Korea to Introduce Microplastic Control Act*, CHEM LINKED, (Jun. 4, 2025), https://cosmetic.chemlinked.com/news/cosmetic-news/south-korea-to-legislate-microplastic-control-act.
[28] STEPHANIE, supra note 6.

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