



Microplastics in Human Blood

For Prelims: Microplastics.

For Mains: Environment Pollution and Degradation.

Why in News?

Tiny particles of plastics, called [Microplastics](#), were detected in human blood for the first time, according to a study by a group of researchers in the Netherlands.

- The researchers adapted existing techniques to detect and **analyze particles that were as small as 700 nanometers** in size.
- They **targeted five common plastics**, including **Polyethylene Terephthalate (PET)**, and polyethylene.

What are Microplastics?

▪ **About:**

- They are **defined as plastics less than five millimeters in diameter**—smaller in diameter than the standard pearl used in jewelry. It can be harmful to our ocean and aquatic life.
- There are **two categories of microplastics**: primary and secondary.

▪ **Classification:**

- **Primary Microplastics:** They are tiny particles designed for commercial use and microfibers shed from clothing and other textiles.
 - E.g. Microbeads found in personal care products, plastic pellets and plastic fibres.
- **Secondary Microplastics:** They are formed from the breakdown of larger plastics such as water bottles.
 - This breakdown is caused by exposure to environmental factors, mainly the sun's radiation and ocean waves.

What does the Study Say?

- The scientists **analysed blood samples from 22 anonymous donors, all healthy adults and found plastic particles in 17.**
 - Half the samples contained PET plastic, which is commonly used in drinks bottles.

- A third contained polystyrene, used for packaging food and other products.
- A quarter of the blood samples contained polyethylene, from which plastic carrier bags are made.
- This is the **first indication that we have polymer particles in blood.**
 - Previous work had shown that microplastics were 10 times higher in the faeces of babies compared with adults and that babies fed with plastic bottles are swallowing millions of microplastic particles a day.
- The particles can **travel around the body and may lodge in organs.** The impact on health is as yet unknown.
- The results **support the hypothesis that human exposure to plastic particles results in the absorption of particles into the bloodstream, but further study is needed to assess the impacts** of exposure and whether it is a public health risk.

What are the Concerns related to Microplastics?

- Microplastics can latch on to the outer membranes of red blood cells and **may limit their ability to transport oxygen.**
- The particles have also been found in the **placentas of pregnant women, and in pregnant rats they pass rapidly through the lungs** into the hearts, brains and other organs of the foetuses.
- Microplastics **cause damage to human cells in the laboratory** and air pollution particles are already known to enter the body and cause millions of early deaths a year.
 - In general, babies and young children are more vulnerable to chemical and particle exposure.

What are the Initiatives to Tackle Microplastics?

- **Elimination of Single Use Plastic:** In 2019, the Prime Minister of India pledged to [eliminate all single-use plastic in the country by 2022](#), with an immediate ban in urban Delhi.
- **Important Rules:** [Plastic Waste Management Rules, 2016](#) state that every local body has to be responsible for setting up infrastructure for segregation, collection, processing, and disposal of plastic waste.
 - Plastic Waste Management (Amendment) Rules 2018 introduced the concept of [Extended Producer Responsibility \(EPR\)](#).
- **Un-Plastic Collective:** [Un-Plastic Collective \(UPC\)](#) is a voluntary initiative launched by the UNEP-India, Confederation of Indian Industry and WWF-India.
 - The Collective seeks to minimise externalities of plastics on the ecological and social health of our planet.
- **Global Partnership on Marine Litter (GPML):** The GPML was launched at the [Earth Summit](#) in 2012 in response to a request set out in the Manila Declaration.
- **London Convention, 1972:** The [1972 Convention on the Prevention of Marine Pollution by Dumping Wastes and Other Matter](#) was signed to control all sources of marine pollution and prevent pollution of the sea through regulation of dumping into the sea of waste materials.
- **Plastic Pacts:** The [Plastics Pacts](#) are business-led initiatives to transform the plastics packaging value chain for all formats and products.

Way Forward

- **Combination of Degradation Mechanisms:** A combination of photo and biological degradation systems for effective and complete decomposition of microplastics has been suggested.
- **International Collaboration:** Plastic waste around the world demands a new global treaty modelled on the [Montreal Protocol](#) and the [Paris Agreement](#).

- The global problem of plastics will only be solved if all countries and decision-making policies decide to monitor microplastics along their respective coasts and also implement orders to use only biodegradable plastics.
- **Reducing Plastic Consumption:** Plastic consumption can be reduced **to ensure the reduction in the level of microplastic pollution.**
 - Government, industry and the community shall work together to significantly reduce the amount of litter seen along beaches and in oceans.
 - Personal initiatives such **as zero-waste trips, shunning disposable and using own utensils, quitting the use of bottled water and giving up plastic packaging are some of the steps** that every citizen can take to curb microplastic pollution.
- **Economic Support for Recycling Projects:** The economical support including tax rebates, R&D funds, technology incubation, **Public-Private Partnerships** and support to projects that recycle single-use items and turn waste into a resource can be enforced.

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Q. Why is there a great concern about the 'microbeads' that are released into environment? (2019)

- (a) They are considered harmful to marine ecosystems.
- (b) They are considered to cause skin cancer in children.
- (c) They are small enough to be absorbed by crop plants in irrigated fields.
- (d) They are often found to be used as food adulterants.

Ans: (a)

Source: TH

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