Study about Inhalable Microplastics

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Why in news?

A new study has revealed that inhalable microplastics are becoming a hidden toxin in the air of Indian cities, exacerbating already severe pollution levels.

- **Inhalable microplastics –** They are tiny airborne plastic particles, which are ***less than 10 micrometres (µm)*** that stay suspended in air and can be inhaled into the lungs, unlike larger microplastics.
- **Common Sources –** Synthetic clothes (polyester), tyre/brake dust, plastic packaging, paints, cosmetics, and waste burning.
- **Indoor vs. Outdoor –** Concentrations are often ***higher indoors*** (where people spend 90% of their time) due to poor ventilation and enclosed plastic materials.

Key Findings

- **Atmospheric Pollution -**
  - **Traditional criteria pollutants** – PM10, PM2.5, carbon monoxide, lead, sulphur oxides, nitrogen oxides, Ozone.
  - **Emerging respirable contaminants** – Inhalable microplastics (new pollutant category) driven by 400 million metric tonnes of plastics produced annually.
- ***52.1 million tonnes of plastic waste*** are released into the environment each year, globally.
- **Pollution in Metropolises -** Researchers examined inhalable microplastics (<10 µm) in the air of 4 major Indian cities – Delhi, Kolkata, Mumbai, and Chennai.
- **Average concentration** – ***8.8 µg/m³ of inhalable microplastics*** across the 4 cities, and confirms microplastics as a new component of urban particulate pollution.
- **Daily exposure –** Average city resident inhales ***approximately 132 µg of microplastics per day.***
- **Toxic co-pollutants** – Heavy metals (***Lead, cadmium***), hormone-disrupting chemicals (eg, ***diethyl phthalates***), and antibiotic-resistant microbes, including fungi (eg, ***Aspergillus fumigatus***).
- **Health risk** – Linked to cancer, hormone-related diseases, breast problems, respiratory illnesses and cardiovascular risks.
- **Vulnerable groups** – Children, pregnant women, the elderly, and those with chronic respiratory or heart conditions.
- **Contribution to pollution –** Microplastics now make up about 5% of total city air pollution.

- **Seasonal variation –** Levels spike during ***winter evenings***, with concentrations ***rising by 74%,*** worsening smog conditions.
- **Inter-city variation –** Delhi (14.18 µg/m³) & Kolkata (14.23 µg/m³) worst hit (~14 µg/m³), whereas Mumbai (2.65 µg/m³) & Chennai (4 µg/m³) are safer.
- **Factors Influencing Microplastic Pollution** – Meteorological conditions, Urban population density, Waste mismanagement.

References

The Hindu | Inhalable microplastics worsening Indian cities' air