Nonylphenol Ethoxylates and Nonylphenol

Source: TOI

Why in News?

A report titled **"Nonylphenol — An Endocrine Disrupting Chemical"** was **released by Toxics Link,** an environmental research organisation, and the US-based non-profit Environmental Defense Fund.

- The report **highlights the widespread use of Nonylphenol Ethoxylates (NPEs) and Nonylphenol (NP) in India** and the associated environmental and health risks

What are Nonylphenol Ethoxylates (NPEs) and Nonylphenol (NP)?

- **Chemical Characteristics:** These are **surfactants that contribute to environmental pollution**, particularly **causing frothing in the Yamuna River,** indicating high levels of pollutants.
    - These are recognised as an **endocrine-disrupting chemical**, toxic to aquatic life, and detrimental to human health, affecting reproductive and developmental processes.
- **Regulatory Status:** NPEs are **banned in many countries** for use in detergents; however, **India currently lacks specific regulations** governing these chemicals.
    - NP was **banned in the cosmetics sector** in India in 2009.
- **Usage in Industries:** NP and NPEs are **prevalent in various sectors**, including textiles and leather, detergents and cleaning products, paper and pulp, food packaging, cosmetics, construction, automotive, agrochemicals, paints, and metalworking fluids.
- **Health and Ecological Concerns:**
    - **Toxicity to Aquatic Life:** NP **is toxic to fish, aquatic plants, and invertebrates,** causing acute and chronic poisoning that reduces survival rates, impairs growth, and leads to reproductive failure.
    - **Human Health Risks:** NP acts as an **endocrine-disrupting chemical, mimicking estrogen and causing hormonal imbalances,** which can lead to reproductive disorders and increased cancer risk.
    - **Environmental Persistence:** NP is resistant to degradation and **can remain in aquatic ecosystems for long periods**, continuously impacting wildlife and potentially entering the human food chain.
- **Recommendations for Safer Alternatives:**
    - The report suggests **adopting safer, cost-effective, and technically viable alternatives to NP and NPEs**. However, the transition towards such alternatives has been slow in India.

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River of foam cuts across Delhi

Every year, as winter sets in, thick sheets of foam blanket the Yamuna. This froth can have adverse effects if consumed, or even touched

WHAT IS FROTH?

Foam bubbles are produced when organic matter decomposes. These foam-producing molecules have one end that repels water and another that attracts water. They work to reduce the surface tension on the water surface. These foam bubbles are lighter than water, so they float on the surface as a thin film that gradually accumulates.

What causes Yamuna's froth blanket?

- Untreated sewage may contain soap/detergent particles
- Industrial run-off
- Organic matter from decomposing vegetation
- Presence of filamentous bacteria that let out surfactant molecules
- Pollutants from sugar and paper industries in UP that travel through the Hindon Canal

Health hazards

- Short-term exposure can lead to skin irritation, allergies
- Ingestion may cause gastrointestinal problems and diseases like typhoid
- Long term exposure can cause neurological issues and hormonal imbalances

How can froth formation be stopped?

IN THE SHORT-TERM

- Rid Okhla pondage of water hyacinth
- Detergents must be biodegradable so they do not persist and lose their ability to cause foam

IN THE LONG TERM

- UP, Haryana, Delhi need to upgrade sewage treatment plants
- Industrial pollution to be stopped
- Increasing the flow of the river

The substances that pollute the Yamuna

Biological O_2 demand Standard: 3mg/l or less

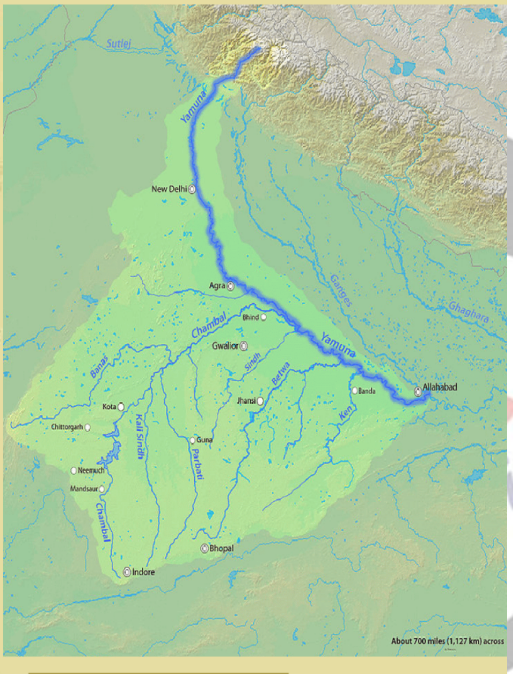
BOD is a measure of the amount of oxygen required to remove waste organic matter from water in the process of decomposition by aerobic bacteria.

Dissolved O_2 demand Standard: 5mg/l or more

DOD is the amount of oxygen in aquatic environments that is accessible to fish, invertebrates, and all organisms in the water.

Faecal coliform Standard: 500-1,000 ml

Faecal Coliform: These are bacterial organisms most commonly used to monitor the removal of pathogens from wastewater treatment plants.



Yamuna River

Length: 1376 km

Source: The river Yamuna, a major tributary of river Ganges, originates from the Yamunotri glacier in Uttarkashi district of Uttarakhand.

Basin: It meets the Ganges at the Sangam (where Kumbh mela is held) in Prayagraj, Uttar Pradesh after flowing through Uttarakhand, Himachal Pradesh, Haryana and Delhi.

Important Dams: Lakhwar-Vyasi Dam (Uttarakhand), Tajewala Barrage Dam (Haryana) etc.

Important Tributaries: Chambal, Sindh, Betwa and Ken.

UPSC Civil Services Examination, Previous Year Question (PYQ)

Q. How is the National Green Tribunal (NGT) different from the Central Pollution Control Board (CPCB)? (2018)

1. The NGT has been established by an Act whereas the CPCB has been created by an executive order of the Government.
2. The NGT provides environmental justice and helps reduce the burden of litigation in the higher courts whereas the CPCB promotes cleanliness of streams and wells, and aims to improve the quality of air in the country.

Which of the statements given above is/are correct?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

Ans: (b)