



Biotransformation Technology

For Prelims: Biotransformation Technology, Biodegradable, Plastic Waste Management, Elimination of Single Use Plastic and Plastic Waste Management.

For Mains: Plastic Waste Management, Biotransformation Technology.

Why in News?

A UK-based startup has claimed to have developed a **Biotransformation Technology** that could alter the state of **plastics** and make them **biodegradable**.

What is Biotransformation Technology?

▪ About:

- Biotransformation technology is a **novel approach to ensure plastics that escape refuse streams** are processed efficiently and broken down.
- Plastics made using this technology are given a pre-programmed time during which the manufactured material looks and feels like conventional plastics without compromising on quality.
- Once the product expires and is exposed to the external environment, **it self-destructs, and bio transforms into bioavailable** wax.
- This wax is then consumed by **microorganisms, converting waste into water, CO₂, and biomass**.
- This biotransformation technology is the **world's first that ensures polyolefins** fully biodegrade in an open environment causing no microplastics.

▪ Need for such a Technology:

- India is generating 3.5 billion kgs of plastic waste annually and that the per capita plastic waste generation has **also doubled in the past five years**. Of this, a third comes from packaging waste.
- In 2019, plastic packaging waste from **e-commerce firms was estimated at over a billion kilograms** worldwide, according to Statista.
- Seeing such a burden of plastic waste, which could potentially harm biodiversity, it is needed to devise technology in order to tackle the Plastic Menace.

▪ Utility:

- Food packaging and health care industries are the **two prime sectors that could use** this technology to reduce waste.
- The increase in cost is relatively small **compared to conventional plastic** that does not contain.

What are the Alternatives to Reducing Plastic Waste?

- A switch to **jute or paper-based packaging could potentially cut down plastic waste**. This could also build **sustainability within the paper industry and** save on the import bill on ethylene solutions.

- The **Wooden Packaging** is yet another alternative, but that will make the packaging bulkier and increase cost.
- The Government of Tamil Nadu, in Chennai, organised **National Expo and Conference of Startups** to raise awareness on alternatives to single-use plastics.
- The alternatives showcased were made using **coir, bagasse, rice and wheat bran, plant and agricultural residue**, banana and areca leaves, jute and cloth.

What are the Initiatives Related to Plastic Waste?

- The Indian government has launched multiple initiatives to move the country towards sustainability. They introduced a plastic waste management gazette to help tackle the ever-growing plastic pollution caused by single-use plastics.
- In 2022, the government imposed a ban on single-use plastics to bring a stop to its use in the country.
- The National Dashboard on [Elimination of Single Use Plastic and Plastic Waste Management](#) brings all stakeholders together to track the progress made in eliminating single-use plastic and effectively managing such waste.
- [An Extended Producer Responsibility \(EPR\)](#) portal helps in improving accountability, traceability, and facilitating ease of compliance reporting in relation to EPR obligations of the producers, importers and brand-owners.
- India has also developed a [mobile app to report single use plastics grievances](#) to check sale, usage or manufacturing of single use plastics in their area.

UPSC Civil Services Exam, Previous Year Questions (PYQ)

Prelims

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)

Exp:

- Microbeads are **small, solid, manufactured plastic particles** that are less than 5mm and do not degrade or dissolve in water.
 - Mainly made of polyethylene, microbeads can also be prepared from petrochemical plastics such as polystyrene and polypropylene. They may be added to a range of products, including rinse-off cosmetics, personal care and cleaning products.
- Microbeads, because of their small size pass unfiltered through the sewage treatment system and reach the water bodies. The untreated microbeads in the water bodies are taken up by the marine animals, thus producing toxicity and causing harm to the marine ecosystem.
 - In 2014, Netherland became the first country to ban cosmetics microbeads.
- Therefore, option (a) is the correct answer.

Mains

Q. What are the impediments in disposing the huge quantities of discarded solid waste which are continuously being generated? How do we remove safely the toxic wastes that have been accumulating in our habitable environment? (2018)

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