



BIOPLASTICS - GS III MAINS

Q. Bioplastics come with many ecological pros themselves along existing bottlenecks and limits. Can bioplastics serve as a possible substitute for standard ones? Discuss (10 marks, 150 words)

News: *Ministry of Environment tightens rules on bioplastics*

What's in the news?

- The Environment Ministry has introduced rules that make it harder for makers of disposable plastic ware to label such products as 'biodegradable', introducing a stipulation that they must not leave any microplastics behind.

Key takeaways:

Biodegradable plastic and compostable plastic are projected as the two broad kinds of technological fixes to India's burgeoning problem of plastic waste pollution.

- Biodegradable plastic involves plastic goods being treated before they are sold.
- Compostable plastics, on the other hand, do degrade but require industrial or large municipal waste management facilities to do so.

Bioplastics:

- Bioplastics are a diverse group of materials made from renewable biomass sources.
- Such as vegetable fats and oils, corn starch, straw, woodchips, sawdust, recycled food waste, and even microorganisms.
- They offer a more sustainable alternative to traditional plastics derived from fossil fuels.

Key Characteristics of Bioplastics:

1. Bio-based:

- Made from renewable resources, reducing reliance on finite fossil fuels.

2. Biodegradable:

- Some bioplastics can break down naturally by microorganisms into water, CO₂, and biomass under specific conditions.

3. Compostable:

- Some bioplastics can be composted in industrial or home composting facilities, returning nutrients to the soil.

4. Variety of Properties:

- Different bioplastics have different properties, making them suitable for various applications.



Recent Rules for Bioplastics:

- As per new amendments to India's Plastic Waste Management (Amendment) Rules, 2024, biodegradable plastics will be defined as materials which are not only capable of degradation by biological processes in specific environment such as soil, landfill but also as materials that do not leave any microplastics.

Significance of Bioplastics:

- Bioplastics surpass Petro plastics in terms of fossil-fuel consumption, greenhouse gas emissions, and energy efficiency.
- Biodegradable plastics are easily recyclable and non-toxic.
- They reduce the carbon footprint.
- Bioplastics do not require the consumption of non-renewable raw materials.
- Production of bioplastics reduces non-biodegradable waste that pollutes the environment.
- They are free from harmful additives like phthalates or bisphenol A, making them safer for health.
- Bioplastics do not alter the flavour or scent of the contained food.
- They are equally durable and versatile, finding applications in agriculture, textiles, medicine, and packaging.
- Biopolymers are gaining popularity in cities across Europe and the United States due to their ecological benefits.

Negative Impact of Bioplastics:

- Bioplastic production consumes approximately 80% of the energy required for conventional plastic production.
- Only 40% of bioplastic samples tested for biodegradability by the Central Pollution Control Board in 2009 passed the test.
- Compostable plastics can take around 40 days to compost, posing a risk of ingestion by small animals during that time.
- Bioplastics claim biodegradability when exposed to water, but standards require disintegration into bits smaller than 2mm and conversion of at least 30% of carbon into carbon dioxide within six months.
- Bioplastics may contaminate seas for over six months and may not degrade in colder sea temperatures.
- Micro-plastics from bioplastics cause severe damage to marine life.
- It's difficult for people to differentiate bioplastics from regular plastics in the trash, especially in regions with limited waste segregation.
- Not all bioplastics are biodegradable.

Though with many ecological pros themselves, bioplastics are a possible substitute for standard ones. However, it is essential to recognise and address their existing bottlenecks and limits.