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Explained | What is Biotransformation technology

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A UK-based startup claims to have developed Biotransformation technology that can alter the state of plastics and make them biodegradable without leaving behind any microplastics

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Biotransformation technology is a novel approach to ensure plastics that escape refuse streams are processed efficiently and broken down. | Photo Credit: AKHILESH KUMAR

E-commerce giant **Amazon generated** an estimated 321 million kilograms (709 million pounds) of plastic from packaging waste in 2021 alone. This is a result of billions of

boxes it shipped to its customers globally, according to a December 2022 report by Oceana. The ocean advocacy group notes that this is enough plastic to circle the Earth over 800 times as air pillows.

While Amazon refuted Oceana's claim, stating that it follows a science-based approach to reduce packaging waste, there is a lot left to be done.

A UK-based startup, based at Imperial College in London, claims to have developed a technology that could alter the state of plastics and make them biodegradable. The company calls the process "biotransformation". It claims the technology would digest the plastic packaging waste naturally with the help of microbes and biodegrade the waste without leaving behind any microplastics.

What is Biotransformation technology?

Biotransformation technology is a novel approach to ensure plastics that escape refuse streams are processed efficiently and broken down. The tech was co-developed by the Imperial College in London, UK, and a Britain-based startup, Polymateria.

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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 biotransforms 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," said Niall Dunne, CEO of Polymateria.

Why do we need it?

India's Environment Minister Bhupender Yadav, last year in New Delhi said, the country 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.

A joint research project by Department of Management Studies, IIT Delhi, and Sea Movement noted that Amazon generated, nearly 210 million kgs (465 million pounds) of plastic from packaging waste in 2019. They also estimated that up to 10 million kgs (22.44 million pounds) of Amazon's plastic packaging ended up in the world's freshwater and marine ecosystems as pollution in the same year.

However, Amazon India has now eliminated the single-use plastics across its fulfilment centers. Flipkart has also done the same in 2021 across its supply chain.

Where can this technology be used?

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" this technology, said Mr. Dunne.

Is this being used in India?

Some well-known Indian firms in food and packaging industries **deploy such technologies**. Within healthcare and pharma industries, this technology provides biodegradable solutions for non-woven hygiene products like diapers, sanitary napkins, facial pads, etc.

Are we heading in the right direction?

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.

Last year, the Indian 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.

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.



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