

Commercialisation of Bio-Based Biodegradable PLA Plastics

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Why in News?

The Union Minister of State for Science & Technology formally launched the commercial transition and pilot-scale manufacturing of bio-based, biodegradable polylactic acid (PLA) bioplastics in India.

Key Highlights of the Project

- The initiative is executed by under the **BioE3 (Biotechnology for Economy, Environment, and Employment) Policy** under the Department of Biotechnology (DBT).
- A **100 Tonnes Per Annum (TPA)** pilot-scale facility is being established at BCML's integrated manufacturing complex at **Kumbhi, Uttar Pradesh**.
- **Sugar-to-Plastic Conversion-** Converts agricultural, sugar-based renewable feedstock (sugarcane molasses and bagasse derivatives) into lactic acid, which is polymerized into PLA bioplastics.
- **Dual Manufacturing Strategy**
 - **Commercial Scale Venture-** An industrial-scale bioplastic plant to cater to market demand for compostable packaging, agricultural films, and consumer goods.
 - **BioE3 Innovation Platform-** The TPA pilot facility acts as an R&D platform to develop specialized, next-generation PLA grades and advanced co-polymers for high-value applications.

Key Highlights of the Project



BioE3

Biotechnology for
Economy, Environment
and Employment

Executed under
the **BioE3 Policy**
of the Department
of Biotechnology
(DBT).



100 TPA
pilot-scale facility

at BCML's integrated
manufacturing complex
in Kumbhi, Uttar Pradesh.



Kumbhi
(Uttar Pradesh)

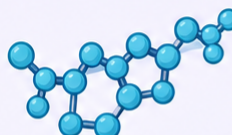
Sugar-to-Plastic Conversion



Sugarcane molasses
and bagasse derivatives
(renewable feedstock)



Lactic acid



Polymerization



PLA bioplastics

Dual Manufacturing Strategy



Commercial Scale Venture

An industrial-scale bioplastic plant to meet market demand for compostable packaging, agricultural films and consumer goods.



BioE3 Innovation Platform

The TPA pilot facility acts as an R&D platform to develop specialized, next-generation PLA grades and advanced co-polymers for high-value applications.



From farm waste to sustainable future.



Polylactic Acid (PLA)

- **Chemical Nature** - A bio-based, aliphatic thermoplastic polyester derived from fermented plant starch (sugarcane, corn, or cassava) rather than petroleum.
- **Biodegradability**
 - Unlike conventional petro-plastics (such as Polyethylene or Polypropylene) which persist for centuries, PLA degrades via hydrolysis followed by microbial digestion into water, carbon dioxide, and organic biomass.
 - Fully compostable under industrial composting conditions within 90-180 days without leaving toxic chemical residues or microplastics.
- **Carbon Footprint** - Emits roughly **60-80% fewer greenhouse gases** during production compared to traditional fossil-fuel-derived plastics.

BioE3 Policy & India's Bioeconomy

- **BioE3 Framework (Biotechnology for Economy, Environment, and Employment)**- To drive high-performance, sustainable biomanufacturing, shifting India from chemical-based manufacturing to circular bio-foundries.
- **Surge in India's Bioeconomy**- India's bioeconomy expanded from **~\$10 billion in 2014 to nearly \$195 billion**, positioned to reach \$300 billion.

- **Waste-to-Wealth** - Diverts agricultural biomass into high-value biopolymers, providing supplementary income streams for sugarcane farmers and reducing dependence on imported single-use plastics (SUPs).

Significance

- Provides a commercially viable, domestically manufactured substitute for single-use packaging items banned under the *Plastic Waste Management Amendment Rules*.
- Reduces reliance on imported PLA resins (currently sourced primarily from the US and Europe), building indigenous biomanufacturing capabilities (*Vocal for Local to Global*).
- Industrial success will depend on establishing dedicated industrial composting infrastructure and lowering synthesis costs to compete with cheap petroleum-based virgin plastics.

Reference

[News on Air | commercial use of bio-based biodegradable PLA plastic](#)

