India Bio Plastics Market size was valued at USD 447.25 Mn in 2023 and the India Bio Plastics Market revenue is expected to reach USD 1809.51 Mn by 2030, at a CAGR of 22.1 % over the forecast period.

These plastics are considered more environmentally friendly compared to conventional plastics because they often have a smaller carbon footprint and are derived from renewable resources.

Manufacturing cost of 1 liter bisleri bottles is 2.5 to 5.65  rupees(inc labour and production costs)

The cheapest degradable polymer today is Polybutylene adipate terephthalate (PBAT) which is available at Rs. 280-300/kg, whereas conventional plastic raw materials cost around Rs. 90/kg. As a result, the market's willingness for degradable plastic is less.

The estimated plastic waste generation is approximately 430107 Tonnes Per Annum  during 2020-21. TN Govt. in G.O. (MS). No. 84 dated: 25.06.2018, notified ban on manufacture, store, supply, transport, sale or distribute of use and throwaway Plastics irrespective of thickness including plastic carry bags. w.e.f. 01.01.2019. Annual Report 2020-21 on Implementation of PWM Rules 2016 (As amended) CPCB, Delhi Page | 29  Plastic waste collected is segregated, low value plastic(plastic waste that is universally hard-to-recycle) & MLP used for Road laying, recyclable plastic waste sold to recyclers and non-recyclable plastic waste disposed to cement industries for Co-processing.  There are 305 plastic manufacturing/recycling units (Recycling Units: 230 Nos.Plastic Manufacturing Units: 15 Nos.) , 3 MLP manufacturing units &14 no. of compostable plastic manufacturing units in the State.  TNPCB is issuing Consent under Water and Air act to plastic manufacturing (Producers)/recycling units located in industrial and commercial Zones and Consent is not issued to units located in residential areas.  Violations have been observed, Closure Direction and disconnection of power supply were issued to 6 plastic recycling units who were in operation without obtaining consent from the Board and Registration as per PWM Rules, 2016  15 Municipal Corporations, 121 Municipalities and 528 Panchayats have submitted annual report to TNPCB.

Non-recyclable plastics, which are high in calorific value, are used as a substitute for fossil fuels (like coal and petcoke) in cement kilns. This process is called co-processing.

ir Pollution:

Emission of Harmful Gases: Burning plastics can release toxic gases like dioxins, furans, NOx, SOx, and volatile organic compounds (VOCs) if the combustion process is incomplete or poorly controlled.

Particulate Matter (PM): The burning process can generate fine particulate matter, contributing to air pollution.

Some plastics contain heavy metals like lead or cadmium, which could be released during combustion and persist in the environment if not captured effectively.

Incomplete combustion or impurities in plastics can lead to ash residues, which may contain harmful chemicals or metals.

Burning plastics can produce unpleasant odors, affecting local air quality and communities.

Plastic has several disadvantages compared to bioplastics, including:

1. Environmental Impact:

Non-Biodegradability: Conventional plastics take hundreds of years to decompose, leading to massive pollution, especially in oceans and landfills.

Toxicity: When plastic degrades, it releases harmful chemicals into the environment, potentially contaminating soil, water, and wildlife.

2. Fossil Fuel Dependency:

Oil-Based: Most plastics are derived from petroleum, a non-renewable resource. The extraction and processing of oil contribute to environmental damage, including greenhouse gas emissions.

3. Pollution and Waste:

Single-Use Nature: Many plastic products are designed for single-use, contributing significantly to the growing waste problem. Bioplastics, in contrast, can be designed for compostability or use from renewable sources.

4. Energy-Intensive Production:

High Energy Consumption: The manufacturing process for traditional plastics requires significant amounts of energy, leading to a larger carbon footprint compared to the production of bioplastics, which often uses renewable resources.

5. Wildlife Harm:

Ingestion and Entanglement: Plastic waste is harmful to wildlife, especially marine life, which can mistake plastic for food or become entangled, leading to injury or death. Bioplastics, depending on their composition, may be less harmful or biodegradable.

6. Recycling Challenges:

Limited Recycling: While plastic can technically be recycled, it often faces issues such as contamination and downcycling, where the recycled material is of lower quality. Bioplastics are designed for easier recycling and composting but face different challenges, such as contamination in recycling streams with traditional plastics.

7. Chemical Additives:

Harmful Chemicals: Traditional plastics may contain harmful additives like phthalates and bisphenol A (BPA), which can leach into food or the environment, posing health risks. Many bioplastics aim to reduce or eliminate these chemicals.

In contrast, bioplastics are generally more sustainable, biodegradable, and derived from renewable resources, offering a cleaner alternative with reduced long-term environmental impact. However, bioplastics are not without their own challenges, such as cost and production efficiency.

Reduced Carbon Emissions:  
Bioplastics produce fewer greenhouse gases throughout their lifecycle, from production to disposal, requiring less energy and emitting less carbon than conventional plastics.

Enhanced Biodegradability:  
Bioplastics naturally decompose within 3–6 months under suitable conditions, compared to the 450 years required for conventional plastics. They decompose without releasing toxins, minimizing environmental damage.

Recyclability:  
Bioplastics can be recycled before degrading, extending their lifespan and reducing waste. In contrast, conventional plastics degrade quickly after recycling and often end up in landfills or oceans.

Reduced Plastic Pollution:  
Compostable bioplastics leave only natural components behind, reducing waste pollution and preventing harmful toxins from entering the environment.

Improved Food Safety:  
Made from natural materials, bioplastics avoid harmful chemicals and bacteria, offering safer options for food and drink packaging.

Conservation of Natural Resources:  
By replacing crude-oil-based plastics, bioplastics reduce reliance on finite resources like hydrocarbon gas liquids, supporting long-term sustainability.

Economic and Consumer Benefits:  
With growing consumer demand for eco-friendly products, businesses adopting bioplastics appeal to sustainability-conscious customers, fostering brand loyalty and driving market growth.

Glycerol is a by-product of Third Generation Bio-Fuel which is mixed with water to obtain Glycerin a raw material in our project and turns out to be cost-effective.

bioplastics can be used to synthesize fuels and value-added chemicals after their usage is complete, depending on their chemical composition and degradation pathway.

Bio-oil and Syn Gas can be produced by pyrolysis of PHAs(PolyHydroxyAlkanoates) and PHAs(Poly Lactic Acids).

Biogas can be obtained from anaerobic digestion of bioplastics .

Lactic Acid from PLA:

Monomers from PHAs used as pharmaceuticals, biopolymers.

bioplastics through fermentation can yield ethanol, propanol, acetic acid, or succinic acid

1. Versatility Beyond Bags

Broader Application: Bioplastics are not limited to carry bags. They are used in food packaging, medical equipment, agricultural films, and consumer goods where cotton or jute alternatives are impractical.

Water Resistance: Unlike cotton or jute, bioplastics are water-resistant and suitable for items like disposable cups, plates, and containers.

2. Lower Carbon Footprint

Sustainable Production: Bioplastics are made from renewable resources such as cornstarch, sugarcane, and other organic materials, reducing dependency on fossil fuels.

Reduced Emissions: The lifecycle of bioplastics emits significantly less CO₂ compared to traditional plastics or the energy-intensive cotton production process.

3. Enhanced Waste Management

Biodegradability: Bioplastics decompose under proper conditions, unlike conventional plastics. This minimizes landfill waste and ocean pollution.

Circular Economy Potential: Bioplastics can be repurposed into fuels and chemicals, creating a sustainable waste cycle.

4. Cotton Bag Limitations

Environmental Costs of Cotton: Cotton production requires high amounts of water, land, and pesticides. For example, making one cotton tote can require 20,000 liters of water, making it less eco-friendly in some contexts.

Limited Use Cases: Cotton bags cannot replace plastic in applications requiring flexibility, barrier properties (e.g., to protect food), or lightweight packaging.

5. Alignment with Economic Goals

Industry Transition: Bioplastics support industries shifting from petroleum-based plastics to sustainable materials. This creates jobs in the green economy.

Consumer Demand: Increasing awareness and demand for sustainable products drive businesses to adopt bioplastics for branding and marketability.