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# Plant Based Biomanufacturing Market – Global Industry Size, Share, Trends, Opportunity, and Forecast, Segmented By Product Type (Antibodies, Vaccines, Proteins, Biologics, Enzyme, Others) By Technology (Upstream v/s Downstream) By Source (Whole Plant, Plant Cells, Seed, Leaf, Others) By End User (Biotechnology & Pharmaceutical Companies, Contract Manufacturing Organizations, Others) By Region & Competition, 2021-2031F

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## Abstracts

The Global Plant-Based Biomanufacturing Market is set for considerable expansion, with projections indicating growth from USD 6.81 Billion in 2025 to USD 8.72 Billion by 2031, at a 4.21% Compound Annual Growth Rate. This innovative field utilizes plant systems, such as whole crops and plant cell cultures, to create high-value biological products like therapeutic proteins, industrial enzymes, and alternative food ingredients. A primary catalyst for this market's growth is the significant cost advantage in upstream production compared to traditional mammalian cell cultures, alongside the rapid scalability offered by leveraging existing agricultural infrastructure. Furthermore, the inherent safety of plant hosts, which eliminates the risk of human pathogen contamination found in animal-derived systems, serves as a crucial operational driver. The most transformative factor is indeed cost-effective production and reduced capital expenditure; unlike traditional systems requiring expensive bioreactors, plant-based methods utilize agricultural fields or greenhouses, dramatically lowering upstream investment and operational costs. For instance, BioBetter's August 2025 'Plant Molecular Farming of Growth Factors' white paper highlights their tobacco plant platform's ability to address high-cost bottlenecks by enabling sustainable, scalable

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recombinant protein production without conventional fermentation infrastructure. This market expansion is also driven by the escalating global demand for biologics and biosimilars, necessitating scalable alternative production methods. Plant-based platforms are demonstrating their commercial viability, as seen in Protalix BioTherapeutics' March 2025 report of $53.0 million in annual revenue for Fiscal Year 2024, a 31% increase largely due to its plant-cell-expressed therapeutic, Elfabrio, and PlantForm Corporation's 2025 collaboration with Baiya Phytopharm to produce artificial plant-made exosomes, showcasing broadening applications.Despite these strong drivers, a significant impediment to market expansion is the extensive complexity and high expenditure associated with downstream processing and purification. This technical hurdle often negates the cost efficiencies achieved during upstream cultivation, as isolating and purifying target molecules to stringent standards requires sophisticated, capital-intensive infrastructure and expensive consumables, thereby increasing the final cost of goods. This economic challenge consequently deters commercial partners and limits adoption to high-margin niche applications rather than mass-market commodities, contributing to a cautious investment climate and constraining capital, with private investment in plant-based products reported at approximately $309 million in 2025 by the Good Food Institute. Concurrently, the market is experiencing notable trends, including a distinct surge in the commercialization of plant-made growth factors specifically for the cellular agriculture and cultivated meat sectors. This strategic pivot allows biomanufacturers to address critical cost barriers in cell-based meat production, exemplified by Iceland's ORF Genetics securing €5 million to expand its barley-based MESOkine portfolio with plans for a fourteenfold production capacity increase by 2027, as reported by Silicon Canals in September 2025. Simultaneously, biomanufacturers are increasingly expanding into the high-value cosmetic ingredients sector, leveraging plant systems to synthesize complex bioactive compounds for premium skincare. This trend capitalizes on the "clean beauty" movement, developing plant-derived epidermal growth factors and collagen that offer superior stability and bio-similarity without ethical concerns, a performance advantage confirmed by Core Biogenesis' plant-derived oleosome-protein fusions being 10 times more stable than conventional peptide-based actives, according to Global Cosmetic Industry in January 2025.

**Market Driver**

The most transformative driver for the Global Plant-Based Biomanufacturing Market is cost-effective production and reduced capital expenditure. Unlike traditional mammalian cell culture systems that necessitate expensive, high-maintenance stainless steel bioreactors, plant-based systems utilize agricultural fields or controlled greenhouses as

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natural production hosts. This fundamental shift significantly lowers upstream capital investment and operational costs, making the manufacturing of complex proteins economically viable for a broader range of applications. According to BioBetter in August 2025, their tobacco plant platform addresses critical high-cost bottlenecks by enabling sustainable, scalable production of recombinant proteins without the need for conventional fermentation infrastructure. Simultaneously, the market is propelled by the rising global demand for biologics and biosimilars, which necessitates alternative production modalities capable of meeting commercial volume requirements. As patents for blockbuster biologics expire and the need for accessible therapeutics grows, plant-based platforms are proving their commercial capability to deliver approved drugs at scale. This market validation is evident in the financial performance of established sector players; Protalix BioTherapeutics reported annual revenue of $53.0 million in March 2025, a 31% increase driven primarily by sales of its plant-cell-expressed therapeutic, Elfabrio. Highlighting the sector's expanding versatility, PlantForm Corporation initiated a strategic collaboration with Baiya Phytopharm in 2025 to produce artificial plant-made exosomes, further diversifying the applications of this biomanufacturing approach.

**Market Challenge**

The extensive complexity and high expenditure associated with downstream processing and purification constitute a significant bottleneck restricting the expansion of the Global Plant-Based Biomanufacturing Market. While plant systems offer upstream scalability, the technoeconomic burden of isolating and purifying target molecules to pharmaceutical or food-grade standards often negates the cost efficiencies gained during cultivation. This stage necessitates sophisticated, capital-intensive infrastructure and expensive consumables, which drastically increases the final cost of goods. Consequently, the inability to achieve price parity with traditional manufacturing methods deters potential commercial partners and limits the technology's adoption to high-margin niche applications rather than mass-market commodities. This economic hurdle directly hampers market growth by creating a high barrier to entry and stalling the development of necessary industrial capacity. The substantial capital expenditure required for purification facilities makes securing return on investment difficult, leading to a cautious investment climate that starves the sector of essential expansion funds. According to the Good Food Institute, the industry faced a constrained capital environment in 2025, with private investment in plant-based products reported at approximately $309 million. This restricted funding, driven by the financial risks of scaling complex processing infrastructure, directly slows the construction of the supply chains needed to meet global demand.

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## Market Trends

The market is witnessing a distinct surge in the commercialization of plant-made growth factors tailored specifically for the cellular agriculture and cultivated meat sectors. This trend represents a strategic pivot for biomanufacturers who are leveraging their molecular farming platforms to produce animal-free cytokines and growth media components, thereby addressing the critical cost barriers of cell-based meat production while opening a lucrative revenue channel beyond human therapeutics. This industrial scaling is exemplified by recent investments in dedicated manufacturing capacity; Silicon Canals reported in September 2025 that Iceland's ORF Genetics secured €5 million to expand its barley-based MESOkine portfolio, with plans to increase its production capacity fourteenfold by 2027 to support the growing demand from the cultivated meat industry. Simultaneously, biomanufacturers are increasingly expanding into the high-value cosmetic ingredients sector, utilizing plant systems to synthesize complex bioactive compounds for the premium skincare market. By capitalizing on the consumer shift toward "clean beauty," companies are developing plant-derived epidermal growth factors and collagen that offer superior stability and bio-similarity to mammalian equivalents without the ethical concerns of animal extraction. This efficacy advantage is driving rapid adoption among formulation developers, as Global Cosmetic Industry confirmed in January 2025 that Core Biogenesis' plant-derived oleosome-protein fusions are 10 times more stable than conventional peptide-based actives, validating the superior performance of plant-made ingredients for advanced dermatological applications.

## Key Market Players

Amyris, Inc.

Ginkgo Bioworks, Inc.

Zymergen Inc.

Evolva Holding SA

Tate & Lyle PLC

Molecular Assemblies, Inc.

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Cambia Biologics

Green Biologics Ltd.

Novozymes A/S

Kiverdi, Inc.

**Report Scope**

In this report, the Global Plant Based Biomanufacturing Market has been segmented into the following categories, in addition to the industry trends which have also been detailed below:

Plant Based Biomanufacturing Market, By Product Type

Antibodies

Vaccines

Proteins

Biologics

Enzyme

Others

Plant Based Biomanufacturing Market, By Technology

Upstream

Downstream

Plant Based Biomanufacturing Market, By Source

Whole Plant

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- Plant Cells
- Seed
- Leaf
- Others

Plant Based Biomanufacturing Market, By End User

- Biotechnology & Pharmaceutical Companies
- Contract Manufacturing Organizations
- Others

Plant Based Biomanufacturing Market, By Region

- North America
  - United States
  - Canada
  - Mexico
- Europe
  - France
  - United Kingdom
  - Italy
  - Germany
  - Spain
- Asia Pacific

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China

India

Japan

Australia

South Korea

South America

Brazil

Argentina

Colombia

Middle East & Africa

South Africa

Saudi Arabia

UAE

**Competitive Landscape**

Company Profiles: Detailed analysis of the major companies present in the Global Plant Based Biomanufacturing Market.

**Available Customizations:**

Global Plant Based Biomanufacturing Market report with the given market data, TechSci Research offers customizations according to a company's specific needs. The following customization options are available for the report:

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## Company Information

Detailed analysis and profiling of additional market players (up to five).

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# Contents


## 1. PRODUCT OVERVIEW

1.1. Market Definition
1.2. Scope of the Market
  1.2.1. Markets Covered
  1.2.2. Years Considered for Study
  1.2.3. Key Market Segmentations

## 2. RESEARCH METHODOLOGY

2.1. Objective of the Study
2.2. Baseline Methodology
2.3. Key Industry Partners
2.4. Major Association and Secondary Sources
2.5. Forecasting Methodology
2.6. Data Triangulation & Validation
2.7. Assumptions and Limitations

## 3. EXECUTIVE SUMMARY

3.1. Overview of the Market
3.2. Overview of Key Market Segmentations
3.3. Overview of Key Market Players
3.4. Overview of Key Regions/Countries
3.5. Overview of Market Drivers, Challenges, Trends

## 4. VOICE OF CUSTOMER

## 5. GLOBAL PLANT BASED BIOMANUFACTURING MARKET OUTLOOK

5.1. Market Size & Forecast
  5.1.1. By Value
5.2. Market Share & Forecast
  5.2.1. By Product Type (Antibodies, Vaccines, Proteins, Biologics, Enzyme, Others)
  5.2.2. By Technology (Upstream v/s Downstream)
  5.2.3. By Source (Whole Plant, Plant Cells, Seed, Leaf, Others)
  5.2.4. By End User (Biotechnology & Pharmaceutical Companies, Contract

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Manufacturing Organizations, Others)
5.2.5. By Region
5.2.6. By Company (2025)
5.3. Market Map

## 6. NORTH AMERICA PLANT BASED BIOMANUFACTURING MARKET OUTLOOK

6.1. Market Size & Forecast
6.1.1. By Value
6.2. Market Share & Forecast
6.2.1. By Product Type
6.2.2. By Technology
6.2.3. By Source
6.2.4. By End User
6.2.5. By Country
6.3. North America: Country Analysis
6.3.1. United States Plant Based Biomanufacturing Market Outlook
6.3.1.1. Market Size & Forecast
6.3.1.1.1. By Value
6.3.1.2. Market Share & Forecast
6.3.1.2.1. By Product Type
6.3.1.2.2. By Technology
6.3.1.2.3. By Source
6.3.1.2.4. By End User
6.3.2. Canada Plant Based Biomanufacturing Market Outlook
6.3.2.1. Market Size & Forecast
6.3.2.1.1. By Value
6.3.2.2. Market Share & Forecast
6.3.2.2.1. By Product Type
6.3.2.2.2. By Technology
6.3.2.2.3. By Source
6.3.2.2.4. By End User
6.3.3. Mexico Plant Based Biomanufacturing Market Outlook
6.3.3.1. Market Size & Forecast
6.3.3.1.1. By Value
6.3.3.2. Market Share & Forecast
6.3.3.2.1. By Product Type
6.3.3.2.2. By Technology
6.3.3.2.3. By Source

+357 96 030922
info@marketpublishers.com

6.3.3.2.4. By End User

## 7. EUROPE PLANT BASED BIOMANUFACTURING MARKET OUTLOOK

7.1. Market Size & Forecast
7.1.1. By Value
7.2. Market Share & Forecast
7.2.1. By Product Type
7.2.2. By Technology
7.2.3. By Source
7.2.4. By End User
7.2.5. By Country
7.3. Europe: Country Analysis
7.3.1. Germany Plant Based Biomanufacturing Market Outlook
7.3.1.1. Market Size & Forecast
7.3.1.1.1. By Value
7.3.1.2. Market Share & Forecast
7.3.1.2.1. By Product Type
7.3.1.2.2. By Technology
7.3.1.2.3. By Source
7.3.1.2.4. By End User
7.3.2. France Plant Based Biomanufacturing Market Outlook
7.3.2.1. Market Size & Forecast
7.3.2.1.1. By Value
7.3.2.2. Market Share & Forecast
7.3.2.2.1. By Product Type
7.3.2.2.2. By Technology
7.3.2.2.3. By Source
7.3.2.2.4. By End User
7.3.3. United Kingdom Plant Based Biomanufacturing Market Outlook
7.3.3.1. Market Size & Forecast
7.3.3.1.1. By Value
7.3.3.2. Market Share & Forecast
7.3.3.2.1. By Product Type
7.3.3.2.2. By Technology
7.3.3.2.3. By Source
7.3.3.2.4. By End User
7.3.4. Italy Plant Based Biomanufacturing Market Outlook
7.3.4.1. Market Size & Forecast

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7.3.4.1.1. By Value
7.3.4.2. Market Share & Forecast
7.3.4.2.1. By Product Type
7.3.4.2.2. By Technology
7.3.4.2.3. By Source
7.3.4.2.4. By End User
7.3.5. Spain Plant Based Biomanufacturing Market Outlook
7.3.5.1. Market Size & Forecast
7.3.5.1.1. By Value
7.3.5.2. Market Share & Forecast
7.3.5.2.1. By Product Type
7.3.5.2.2. By Technology
7.3.5.2.3. By Source
7.3.5.2.4. By End User

## 8. ASIA PACIFIC PLANT BASED BIOMANUFACTURING MARKET OUTLOOK

8.1. Market Size & Forecast
8.1.1. By Value
8.2. Market Share & Forecast
8.2.1. By Product Type
8.2.2. By Technology
8.2.3. By Source
8.2.4. By End User
8.2.5. By Country
8.3. Asia Pacific: Country Analysis
8.3.1. China Plant Based Biomanufacturing Market Outlook
8.3.1.1. Market Size & Forecast
8.3.1.1.1. By Value
8.3.1.2. Market Share & Forecast
8.3.1.2.1. By Product Type
8.3.1.2.2. By Technology
8.3.1.2.3. By Source
8.3.1.2.4. By End User
8.3.2. India Plant Based Biomanufacturing Market Outlook
8.3.2.1. Market Size & Forecast
8.3.2.1.1. By Value
8.3.2.2. Market Share & Forecast
8.3.2.2.1. By Product Type

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8.3.2.2.2. By Technology
8.3.2.2.3. By Source
8.3.2.2.4. By End User
8.3.3. Japan Plant Based Biomanufacturing Market Outlook
8.3.3.1. Market Size & Forecast
8.3.3.1.1. By Value
8.3.3.2. Market Share & Forecast
8.3.3.2.1. By Product Type
8.3.3.2.2. By Technology
8.3.3.2.3. By Source
8.3.3.2.4. By End User
8.3.4. South Korea Plant Based Biomanufacturing Market Outlook
8.3.4.1. Market Size & Forecast
8.3.4.1.1. By Value
8.3.4.2. Market Share & Forecast
8.3.4.2.1. By Product Type
8.3.4.2.2. By Technology
8.3.4.2.3. By Source
8.3.4.2.4. By End User
8.3.5. Australia Plant Based Biomanufacturing Market Outlook
8.3.5.1. Market Size & Forecast
8.3.5.1.1. By Value
8.3.5.2. Market Share & Forecast
8.3.5.2.1. By Product Type
8.3.5.2.2. By Technology
8.3.5.2.3. By Source
8.3.5.2.4. By End User

## 9. MIDDLE EAST & AFRICA PLANT BASED BIOMANUFACTURING MARKET OUTLOOK

9.1. Market Size & Forecast
9.1.1. By Value
9.2. Market Share & Forecast
9.2.1. By Product Type
9.2.2. By Technology
9.2.3. By Source
9.2.4. By End User
9.2.5. By Country

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9.3. Middle East & Africa: Country Analysis
9.3.1. Saudi Arabia Plant Based Biomanufacturing Market Outlook
9.3.1.1. Market Size & Forecast
9.3.1.1.1. By Value
9.3.1.2. Market Share & Forecast
9.3.1.2.1. By Product Type
9.3.1.2.2. By Technology
9.3.1.2.3. By Source
9.3.1.2.4. By End User
9.3.2. UAE Plant Based Biomanufacturing Market Outlook
9.3.2.1. Market Size & Forecast
9.3.2.1.1. By Value
9.3.2.2. Market Share & Forecast
9.3.2.2.1. By Product Type
9.3.2.2.2. By Technology
9.3.2.2.3. By Source
9.3.2.2.4. By End User
9.3.3. South Africa Plant Based Biomanufacturing Market Outlook
9.3.3.1. Market Size & Forecast
9.3.3.1.1. By Value
9.3.3.2. Market Share & Forecast
9.3.3.2.1. By Product Type
9.3.3.2.2. By Technology
9.3.3.2.3. By Source
9.3.3.2.4. By End User

## 10. SOUTH AMERICA PLANT BASED BIOMANUFACTURING MARKET OUTLOOK

10.1. Market Size & Forecast
10.1.1. By Value
10.2. Market Share & Forecast
10.2.1. By Product Type
10.2.2. By Technology
10.2.3. By Source
10.2.4. By End User
10.2.5. By Country
10.3. South America: Country Analysis
10.3.1. Brazil Plant Based Biomanufacturing Market Outlook
10.3.1.1. Market Size & Forecast

+357 96 030922
info@marketpublishers.com

10.3.1.1.1. By Value
10.3.1.2. Market Share & Forecast
10.3.1.2.1. By Product Type
10.3.1.2.2. By Technology
10.3.1.2.3. By Source
10.3.1.2.4. By End User
10.3.2. Colombia Plant Based Biomanufacturing Market Outlook
10.3.2.1. Market Size & Forecast
10.3.2.1.1. By Value
10.3.2.2. Market Share & Forecast
10.3.2.2.1. By Product Type
10.3.2.2.2. By Technology
10.3.2.2.3. By Source
10.3.2.2.4. By End User
10.3.3. Argentina Plant Based Biomanufacturing Market Outlook
10.3.3.1. Market Size & Forecast
10.3.3.1.1. By Value
10.3.3.2. Market Share & Forecast
10.3.3.2.1. By Product Type
10.3.3.2.2. By Technology
10.3.3.2.3. By Source
10.3.3.2.4. By End User

**11. MARKET DYNAMICS**

11.1. Drivers
11.2. Challenges

**12. MARKET TRENDS & DEVELOPMENTS**

12.1. Merger & Acquisition (If Any)
12.2. Product Launches (If Any)
12.3. Recent Developments

**13. GLOBAL PLANT BASED BIOMANUFACTURING MARKET: SWOT ANALYSIS**

**14. PORTER'S FIVE FORCES ANALYSIS**

14.1. Competition in the Industry

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14.2. Potential of New Entrants
14.3. Power of Suppliers
14.4. Power of Customers
14.5. Threat of Substitute Products

**15. COMPETITIVE LANDSCAPE**

15.1. Amyris, Inc.
  15.1.1. Business Overview
  15.1.2. Products & Services
  15.1.3. Recent Developments
  15.1.4. Key Personnel
  15.1.5. SWOT Analysis
15.2. Ginkgo Bioworks, Inc.
15.3. Zymergen Inc.
15.4. Evolva Holding SA
15.5. Tate & Lyle PLC
15.6. Molecular Assemblies, Inc.
15.7. Cambia Biologics
15.8. Green Biologics Ltd.
15.9. Novozymes A/S
15.10. Kiverdi, Inc.

**16. STRATEGIC RECOMMENDATIONS**

**17. ABOUT US & DISCLAIMER**

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