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White Biotechnology Market Forecasts to 2032 – Global Analysis By Product (Biofuels, Biomaterials, Biochemicals and Industrial Enzymes), Source Material, Organism Types, Technologies, End User and By Geography

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Abstracts

According to Stratistics MRC, the Global White Biotechnology Market is accounted for $382.40 billion in 2025 and is expected to reach $822.40 billion by 2032 growing at a CAGR of 11.56% during the forecast period. White biotechnology, sometimes referred to as industrial biotechnology, is the process of creating sustainable products and industrial processes using live cells and enzymes. It emphasises the replacement of traditional petroleum-based procedures with bio-based processes for the production of chemicals, minerals, and fuels. White biotechnology improves process efficiency, lowers energy consumption, and lessens its impact on the environment by utilising renewable resources like biomass. It is essential to industries including bioenergy, textiles, agriculture, and pharmaceuticals. This environmentally beneficial strategy encourages waste reduction, biodegradability, and a smaller carbon footprint during manufacturing, all of which contribute to the circular economy.

According to the International Energy Agency (IEA), Modern bioenergy constitutes 50% of all renewable energy used in the world today and is expected to grow 3% per year through 2025.

Market Dynamics:

Driver:

Rising demand for sustainable and eco-friendly production

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White biotechnology is becoming more and more popular among industries as a way to meet strict environmental laws and lower carbon footprints. It reduces long-term ecological harm by making it possible to produce biodegradable materials. The market for bio-manufactured items is being driven by consumers' preference for green products. Governments and organisations are sponsoring biotech research and infrastructure, as well as eco-innovations. White biotechnology is therefore emerging as a key component of sustainable industrial change.

Restraint:

High R&D costs and regulatory hurdles

Innovative biotechnological process development calls for specialised staff, sophisticated machinery, and extensive testing stages. By requiring stringent adherence to safety and environmental regulations, regulatory barriers make market entry even more difficult. Getting agency clearances can be expensive and time-consuming. These obstacles restrict the involvement of small and medium-sized businesses and postpone the commercialisation of products. Innovation may consequently stall, which would limit market expansion as a whole.

Opportunity:

Advancements in synthetic biology and enzyme engineering

Advancements in synthetic biology and enzyme engineering enable the development of specialised microbes capable of more sustainably producing bio-based products, fuels, and chemicals. Improved enzyme engineering lowers expenses and has a less negative effect on the environment by increasing reaction selectivity and yield. Additionally, strain optimisation and metabolic pathway design are accelerated by synthetic biology, increasing the scalability of commercial bioprocesses. In line with the objectives of global sustainability, these technologies facilitate the transition from petrochemical to renewable resources. Because white biotechnology offers more cost-effective and environmentally friendly manufacturing processes, companies are adopting it more and more.

Threat:

Competition from conventional chemical processes

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Decades of optimisation have made these conventional techniques more cost-effective for large-scale manufacturing. Their extensive infrastructure eliminates the need for more funding. The uncertainty surrounding regulatory approvals for biotechnology products is another reason why many industries are reluctant to make the shift. Chemical processes' quicker output rates give them a competitive advantage as well. White biotechnology hence has difficulties expanding its market share and garnering broader acceptance.

Covid-19 Impact

The COVID-19 pandemic had a mixed impact on the White Biotechnology Market. While supply chain disruptions and workforce shortages initially hindered production and research activities, the demand for sustainable and locally produced bio-based products surged. Increased focus on health, hygiene, and sustainability accelerated the adoption of white biotechnology in pharmaceuticals, food, and cleaning products. Governments and industries invested more in bio-based innovations to ensure resilience, ultimately fostering long-term growth and driving advancements in green bioprocessing technologies.

The biomaterials segment is expected to be the largest during the forecast period

The biomaterials segment is expected to account for the largest market share during the forecast period by offering sustainable alternatives to petroleum-based materials. It drives innovation in biodegradable plastics, medical implants, and packaging solutions, aligning with global environmental regulations. Advancements in fermentation and enzymatic processes enhance the efficiency and scalability of biomaterial production. Increasing demand from industries such as healthcare, agriculture, and consumer goods boosts market expansion. As companies prioritize eco-friendly and renewable solutions, biomaterials continue to fuel growth in white biotechnology applications.

The industrial manufacturing segment is expected to have the highest CAGR during the forecast period

Over the forecast period, the industrial manufacturing segment is predicted to witness the highest growth rate, due to enhanced production efficiency through bio-based processes. It reduces reliance on fossil fuels by utilizing renewable raw materials, leading to sustainable manufacturing practices. Enzymes and microbes developed through white biotechnology streamline chemical reactions, cutting down energy

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consumption and waste generation. This segment also supports the development of biodegradable plastics and eco-friendly chemicals, aligning with global environmental goals. Increasing demand for green industrial solutions continues to drive innovations and investments in this sector.

Region with largest share:

During the forecast period, the Asia Pacific region is expected to hold the largest market share due to increasing industrial demand, government incentives for sustainable production, and a large bio-based feedstock supply. Countries like China, India, and Japan are investing heavily in R&D and bio-refinery infrastructure. The market benefits from rising environmental concerns and the need to reduce reliance on petrochemicals. Rapid urbanization and strong industrial output further fuel demand, particularly in pharmaceuticals, food, and bio-plastics, positioning Asia Pacific as a key hub for future white biotech expansion.

Region with highest CAGR:

Over the forecast period, the North America region is anticipated to exhibit the highest CAGR, owing to strong contributions from the United States and Canada. The region leads in advanced bioprocess technologies, patent filings, and biotech startups. Regulatory support and funding for sustainable biomanufacturing, especially in biofuels, specialty enzymes, and industrial chemicals, propel market development. However, high production costs and strict compliance requirements may hinder rapid scalability. While growth continues, it is more stable and research-intensive, making North America a leader in white biotechnology innovation rather than volume-driven expansion.

Key players in the market

Some of the key players profiled in the White Biotechnology Market include Koninklijke DSM N.V., DuPont de Nemours, Inc., BASF SE, Evonik Industries AG, Novozymes A/S, Corbion N.V., Lonza Group Ltd, Amyris, Inc., Ginkgo Bioworks, Kaneka Corporation, Akzo Nobel N.V., Henkel AG & Co. KGaA, Mitsubishi Corporation, Cargill, Inc., Archer Daniels Midland Company (ADM), Fujifilm Holdings Corporation, BioAmber and Codexis, Inc.

Key Developments:

In April 2025, DSM partnered with Inscripta to co-develop innovative well-aging skincare

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ingredients. Leveraging Inscripta's GenoScaler™ platform, the collaboration aims to engineer microbial strains for sustainable production of bio-based cosmetic actives. This partnership enhances dsm firmenich's biotech capabilities in personal care through precision strain development and green manufacturing.

In September 2024, DuPont and Royal DSM established a 50/50 joint venture named Actamax Surgical Materials LLC to develop and commercialize innovative biodegradable hydrogel-based biomedical materials. These include surgical sealants, tissue adhesives, and adhesion barriers aimed at enhancing patient outcomes, minimizing surgical complications, and supporting advanced wound management solutions.

In June 2024, BASF and Saarland, Marburg & Kaiserslautern Universities launched a joint research project using Basfia succiniciproducens to convert sugar and CO? into bio-based fumaric acid—an important intermediate in the chemical industry.

Products Covered:

- Biofuels
- Biomaterials
- Biochemicals
- Industrial Enzymes
- Other Products

Source Materials Covered:

- Agricultural Feedstock
- Forest Biomass
- Industrial Waste
- Marine Biomass

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Other Source Materials

Organism Types Covered:

Bacteria

Yeast

Fungi

Microalgae

Other Organism Types

Technologies Covered:

Biocatalysis

Bioprocessing

Biosynthesis

Other Technologies

End Users Covered:

Agriculture

Food & Beverage

Industrial Manufacturing

Personal Care

Other End Users

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Regions Covered:

- North America
  - US
  - Canada
  - Mexico
- Europe
  - Germany
  - UK
  - Italy
  - France
  - Spain
  - Rest of Europe
- Asia Pacific
  - Japan
  - China
  - India
  - Australia
  - New Zealand
  - South Korea
  - Rest of Asia Pacific

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South America

Argentina

Brazil

Chile

Rest of South America

Middle East & Africa

Saudi Arabia

UAE

Qatar

South Africa

Rest of Middle East & Africa

What our report offers:
- Market share assessments for the regional and country-level segments
- Strategic recommendations for the new entrants
- Covers Market data for the years 2024, 2025, 2026, 2028, and 2032
- Market Trends (Drivers, Constraints, Opportunities, Threats, Challenges, Investment Opportunities, and recommendations)
- Strategic recommendations in key business segments based on the market estimations
- Competitive landscaping mapping the key common trends
- Company profiling with detailed strategies, financials, and recent developments
- Supply chain trends mapping the latest technological advancements

Free Customization Offerings:

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customization options:

- Company Profiling
  - Comprehensive profiling of additional market players (up to 3)
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- Regional Segmentation
  - Market estimations, Forecasts and CAGR of any prominent country as per the client's interest (Note: Depends on feasibility check)
- Competitive Benchmarking
  - Benchmarking of key players based on product portfolio, geographical presence, and strategic alliances

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Note: Tables for North America, Europe, APAC, South America, and Middle East & Africa Regions are also represented in the same manner as above.

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