White Biotechnology Market Report by Product (Biofuels, Biochemicals, Biopolymers), Application (Bioenergy, Food and Feed Additives, Pharmaceutical Ingredients, Personal Care and Household Products, and Others), and Region 2024-2032

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Report description:

The global white biotechnology market size reached US$ 310.6 Billion in 2023. Looking forward, IMARC Group expects the market to reach US$ 755.2 Billion by 2032, exhibiting a growth rate (CAGR) of 10.1% during 2024-2032. The increasing focus on renewable resources and reduced carbon footprint, escalating demand for sustainable and eco-friendly solutions, and rising regulatory support for bio-based products and processes are some of the major factors propelling the market.

White biotechnology, also known as industrial biotechnology, refers to the application of biotechnological principles to develop innovative and sustainable solutions for industries. Unlike traditional biotechnology that focuses on healthcare and pharmaceuticals, white biotechnology harnesses the power of biological processes to create eco-friendly and resource-efficient products and processes in sectors such as manufacturing, agriculture, and energy. It involves the use of microorganisms, enzymes, and biocatalysts to produce bio-based materials, chemicals, and fuels. It holds the promise of reducing environmental impact, conserving natural resources, and replacing conventional chemical processes with greener alternatives. By leveraging biological systems to drive industrial advancements, white biotechnology aims to foster a more sustainable and economically viable future.

The increasing number of industries shifting toward sustainable and environmentally friendly practices represents the primary factor driving the market growth. Moreover, white biotechnology includes the application of biological processes, such as microbial fermentation and enzymatic reactions, to produce a wide range of bio-based products, including chemicals, materials, and biofuels. In line with this, the rising adoption of white biotechnology as it offers a compelling solution to address the growing

concerns about climate change, resource depletion, and pollution by providing alternatives to traditional chemical-based processes is propelling market growth. Apart from this, the escalating demand for bio-based solutions as governments, consumers, and industries prioritize sustainability, is another major growth-inducing factor. Furthermore, rising research, investment, and innovation in the development of biobased products and technologies by the manufacturing, agriculture, and energy industries is contributing to market growth.

White Biotechnology Market Trends/Drivers:

Rise in environmental concerns and sustainability

The escalating global environmental concerns, including climate change and resource depletion, are propelling the white biotechnology market forward. As industries acknowledge their role in these challenges, the demand for sustainable alternatives intensifies. White biotechnology offers a transformative solution by leveraging biological processes to develop bio-based products that reduce the carbon footprint and minimize waste. Industries are increasingly adopting these eco-friendly solutions to align with sustainability goals, thereby enhancing their environmental stewardship and corporate social responsibility efforts. The urgent need to mitigate the adverse effects of traditional industrial practices on the planet's ecosystems has positioned white biotechnology as a preferred choice for industries transitioning to more sustainable operations.

Increase in government regulations and incentives

Governments across the globe are enacting policies and providing incentives that favor the adoption of bio-based technologies. Regulatory frameworks that promote the use of renewable resources and bio-based products create a supportive environment for industries to embrace white biotechnology. Incentives such as tax credits, grants, and subsidies encourage research, development, and implementation of sustainable solutions. By aligning their strategies with these regulations and incentives, industries can not only achieve compliance but also tap into opportunities for innovation and growth. The collaboration between governmental support and the white biotechnology market ensures a regulatory framework that fosters sustainable industrial practices and accelerates the transition to greener alternatives.

Escalating consumer demand for green products

Changing consumer attitudes and preferences have fueled the demand for products that are produced responsibly and have minimal environmental impact. In response, industries are turning to white biotechnology as a means to create greener, more sustainable products. Consumers are increasingly seeking transparency regarding the production processes and materials, encouraging businesses to adopt bio-based solutions that meet these evolving expectations. The integration of white biotechnology allows industries to deliver products that resonate with environmentally conscious consumers, thereby enhancing brand reputation and market competitiveness. The alignment between consumer demand and the offerings of the white biotechnology industry reinforces the shift toward sustainable consumption and drives industries to prioritize eco-friendly practices in their operations.

White Biotechnology Industry Segmentation:

IMARC Group provides an analysis of the key trends in each sub-segment of the global white biotechnology market report, along with forecasts at the global, regional and country levels for 2024-2032. Our report has categorized the market based on product and application.

Breakup by Product:

-□Biofuels
-□Biochemicals
-□Biopolymers

Biochemicals represent the most popular product

The report has provided a detailed breakup and analysis of the market based on the product. This includes biofuels, biochemicals, and biopolymers. According to the report, biochemicals represented the largest segment.

Biochemicals, integral to the white biotechnology market, are a diverse range of chemical compounds derived from biological sources, encompassing enzymes, organic acids, biopolymers, and biofuels. Their significance lies in their eco-friendly nature and sustainable production processes, aligning with the principles of white biotechnology. Biochemicals offer greener alternatives to

conventional petrochemical-based products, meeting growing consumer and industrial demands for environmentally friendly solutions.
Furthermore, there has been a rise in demand for bio-based chemicals as industries increasingly prioritize reducing carbon footprints and transitioning to sustainable practices. This demand, coupled with advancements in bioprocessing and biocatalysis, propels the growth of the white biotechnology market. Biochemicals drive economic growth and contribute to a more sustainable future, shaping industries toward adopting green practices and accelerating the development of innovative solutions across numerous sectors.
Breakup by Application:
-Bioenergy
-Food and Feed Additives
-Pharmaceutical Ingredients
-Personal Care and Household Products
-Others

Bioenergy accounts for the majority of the market share
A detailed breakup and analysis of the market based on the application has also been provided in the report. This includes bioenergy, food and feed additives, pharmaceutical ingredients, personal care and household products, and others. According to the report, bioenergy accounted for the largest market share.
Bioenergy refers to energy derived from organic materials, such as biomass, agricultural residues, and waste, through processes like fermentation, anaerobic digestion, and pyrolysis. It serves as a powerful driver by fostering the development of sustainable and renewable energy sources. The utilization of biological processes to convert organic matter into biofuels like biogas, bioethanol, and biodiesel aligns with the core principles of white biotechnology, promoting eco-friendly alternatives to fossil fuels. Moreover, there has been a rise in demand for bioenergy as industries seek to reduce their carbon footprint and embrace greener energy solutions. This demand, coupled with ongoing research in bioprocess optimization and genetic engineering, stimulates the segment growth. Furthermore, bioenergy addresses energy security and accelerates the adoption of bio-based solutions, shaping a more sustainable energy landscape while driving innovation and industry growth.
Breakup by Region:

-North America
oUnited States
oCanada
-Asia-Pacific
oChina
oJapan
oIndia
oSouth Korea
oAustralia
oIndonesia
oOthers
-Europe
oGermany
oFrance
oUnited Kingdom
oItaly
oSpain
oRussia
oOthers

-Latin America
o Brazil
o Mexico
o Others
-Middle East and Africa

North America exhibits a clear dominance in the market
The market research report has also provided a comprehensive analysis of all the major regional markets, which include North America (the United States and Canada); Asia Pacific (China, Japan, India, South Korea, Australia, Indonesia, and others); Europe (Germany, France, the United Kingdom, Italy, Spain, Russia, and others); Latin America (Brazil, Mexico, and others); and the Middle East and Africa. According to the report, North America accounted for the largest market share.
North America held the biggest share in the market due to its wide industrial base and a strong emphasis on sustainability and environmental responsibility that creates a fertile ground for the adoption of eco-friendly solutions. Government initiatives and policies that promote bio-based products, renewable energy, and reduced carbon emissions further strengthen the growth of the white biotechnology market.
Additionally, North America's thriving research and innovation ecosystem accelerates advancements in bioprocessing, genetic engineering, and biocatalysis, spurring the development of cutting-edge technologies. The rise in demand from diverse industries to meet the evolving consumer preferences for sustainable products and the need to address environmental challenges aligns with the core principles of white biotechnology. As corporations and governments in the region invest in bio-based alternatives and environmentally conscious practices, North America serves as a driving force in shaping a greener, more sustainable future while propelling the growth and expansion of the white biotechnology market.
Competitive Landscape:
Key players in the white biotechnology market are making innovative advancements that underscore the industry's transformative potential. They are leveraging cutting-edge technologies, such as synthetic biology and are engineering microorganisms for more efficient bio-based production, offering sustainable alternatives to conventional chemical processes. Enzyme engineering techniques are also at the forefront, optimizing biocatalysts for improved reaction efficiency and selectivity across diverse applications. Moreover, the integration of advanced analytics and machine learning is revolutionizing process optimization, enabling precise control and cost reduction. Moreover, the adoption of circular economy principles is driving innovations focused on repurposing waste streams and byproducts, fostering a closed-loop approach to bioprocessing. These innovations highlight the agility of key market players and underscore their commitment to sustainable solutions, environmental stewardship, and the reshaping of industries towards a greener future.
The market research report has provided a comprehensive analysis of the competitive landscape in the market. Detailed profiles of all major companies have also been provided. Some of the key players in the market include:
-Archer Daniels Midland Company
-BASF SE
-Cargill Inc.
-DuPont de Nemours Inc.
-Fujifilm Holdings Corporation
-General Electric Company
-Henkel AG & Co. KGaA
-Kaneka Corporation
-Koninklijke DSM N.V.
-Lonza Group AG
-Mitsubishi Corporation
-Novozymes A/S
Recent Developments:
-In December 2021, BASF Venture Capital (BVC), a leading player in the venture capital space, executed a strategic investment in

Bota Biosciences Ltd. (Bota Bio), a pioneering industrial synthetic biotech company headquartered in Hangzhou, China. This investment marks a significant move by BVC to tap into the innovative potential of Bota Bio's advanced biotechnology platforms. The strategic alliance between BVC and Bota Bio underscores the commitment of both entities to push the boundaries of sustainable production practices.
-In August 2020, Cargill Inc., a global leader in the agriculture and food industry, invested $15 million in the establishment of a novel bioindustrial plant in India. This strategic move underscores the company?s commitment to advancing sustainable and innovative solutions within the bioindustrial sector. The investment in the new bioindustrial plant showcases Cargill's dedication to harnessing cutting-edge technologies and processes to produce bio-based materials, chemicals, and other value-added products. This initiative aligns seamlessly with Cargill's overarching sustainability goals and its commitment to reducing environmental impact.
-In April 2020, Archer Daniels Midland Company (ADM) announced the suspension of ethanol production at its corn dry mill facilities in Cedar Rapids, Iowa, and Columbus, Nebraska. This move is reflective of ADM's adaptability to market dynamics, as the company shifts its focus toward responding to higher demand for specific products. Moreover, ADM is reallocating resources to produce alcohol for hand sanitizer, a product that has seen a surge in demand due to its essential role in public health during the ongoing global circumstances.

Key Questions Answered in This Report
1. What was the size of the global white biotechnology market in 2023?
2. What is the expected growth rate of the global white biotechnology market during 2024-2032?
3. What are the key factors driving the global white biotechnology market?
4. What has been the impact of COVID-19 on the global white biotechnology market?
5. What is the breakup of the global white biotechnology market based on the product?
6. What is the breakup of the global white biotechnology market based on the application?
7. What are the key regions in the global white biotechnology market?
8. Who are the key players/companies in the global white biotechnology market?

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