

## **North America Biocatalysts Market Size Analysis Report - Market Share, Forecast Trends and Outlook (2025-2034)**

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### **Report description:**

The North America biocatalysts market attained a volume of 48.35 KMT in 2024. The market is expected to grow at a CAGR of 5.60% during the forecast period of 2025 and 2034, to attain a volume of 83.37 KMT by 2034.

#### North America Biocatalysts Market Growth

The growth of the North America biocatalysts market is primarily driven by the pharmaceutical industry, which accounted for more than half of the share (52.3%) of the world's production in 2022. Additionally, its exports have been rising for the past few years. According to the US Bureau and Labour Statistics, the top six states that led the exports in the pharmaceutical sector, namely Puerto Rico, Indiana, North Carolina, California, Massachusetts, and Illinois exported more than USD 75 trillion worth of products in 2023. As these values grow further during the coming years, owing to increased health awareness and the development of advanced disease treatments, the biocatalyst demand is expected to witness a sharp surge.

#### Key Trends and Recent Developments

Strategic industry collaborations, research partnerships, technological advancements, and rising investments from stakeholders are the key trends of North America biocatalysts market.

#### July 2024

Olon, a leading biocatalyst production and research brand in US, announced the acquisition of French company GTP Bioways Group which specialised in R&D and production of enzymes, proteins, and other pharmaceutical ingredients. Through the integration, Olon Biotech expanded and diversified its technological products, supporting every stage of their lifecycle, from R&D and preclinical phases to industrialisation, through microbial and mammalian fermentation and biocatalysis.

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November 2023

Cardiff-headquartered bioscience leader, Biocatalysts Ltd successfully completed the purchase of three enzyme manufacturing companies, namely, Breatec, Weiss Biotech, and Biosun from its parent company BRAIN Biotech AG, creating a new Bioproducts segment under the brand. The acquisitions enhanced the company's ability to extract synergies within the BRAIN group and intensify focus on strong growth in the European and North American markets.

October 2022

As per North America biocatalysts market report, Boston-based Ginkgo Bioworks collaborated with Merck to engineer up to four enzymes for use as biocatalysts in the latter's active pharmaceutical ingredient (API) manufacturing facilities. Through this collaboration, Ginkgo leveraged its expertise in cell engineering and enzyme design, along with its latest automated high throughput screening, manufacturing process development and optimisation, bioinformatics and analytics capabilities to deliver optimal strains of targeted biocatalysts.

October 2021

Olon, a leading research and production organisation for biocatalysts and enzymes announced the creation of an International Network of Scientific Excellence to launch large-scale biocatalysis processes and technologies used for industrial processes around the world. The network enabled collaboration between one of the most advanced and well-known experts in the academic and industrial spheres, Van't Hoff Institute for Molecular Sciences (HIMS-Biocat) from the University of Amsterdam (UvA). It has pioneered in ground-breaking research of enzyme engineering and use of enzymes to encourage green chemical reactions in the industrial domain.

Strategic Industry Collaborations are Propelling the Growth of North America Biocatalysts Market

Industry leaders in North America are seeking strategic collaborations among themselves to leverage each other's expertise, increase investment in research and product development, and expand biocatalyst portfolios to enter new markets by pooling their respective resources. For instance, Germany-based BRAIN Biotech Zwingenberg and Biocatalysts Ltd, subsidiaries of BRAIN Biotech AG, aligned their strengths to transform enzyme development in the life science industry with the launch of BRAIN-Biocatalysts Life Science Solutions. It combined BRAIN's enzyme discovery and optimisation expertise with Biocatalysts' commercial-scale manufacturing facilities to deliver end-to-end solutions for the life sciences sector. Moreover, their collaboration offered a transparent IP strategy to participants guaranteeing them exclusive control over their innovations, driving large-scale adoption of biocatalysts in several ways.

Technological Advancements Enhancing the Productivity of Biocatalysts Industry in North America

The industry in North America is witnessing several technological advancements which are driving its productivity and efficiency. Enzyme engineering, protein design, bioprocessing technologies, genetic engineering, and innovations in computational biology are to name a few. These have enabled the development of highly efficient, stable, and specific bioenzymes to be used as biocatalysts in a range of industries and varied environmental conditions. A relevant example of such effort in the North America biocatalysts market would be the development of a new computer-assisted model that employs a few tests and sample data to determine the accurate conditions of temperature and solvent concentration at which an enzyme could achieve its highest performance. Such innovations are promoting large-scale commercial use of biocatalysts with enhanced efficacy and competency.

Growing Investments are Creating New North America Biocatalysts Market Opportunities

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Biocatalysts industry growth in the country is also being led by investments from various sources which include the private sector, public sector, national as well as international grants. The investments are not just limited to the startup stages but also continue at later stages, as the high demand for biocatalysts in the region guarantees significant returns to investors. Such financial aids and advances help emerging biocatalyst ventures to establish their foothold in the North America biocatalysts market and work towards their constant expansion by upscaling commercial operations, entering new application areas, and building collaborative efforts for research and development. For instance, Cascade Biocatalysts, a Boston-based biocatalysis company raised USD 2.6 million in pre-seed funds from venture capitalists Ten VC, Amplify.LA, Boost VC, Range Ventures, Spacecadet, Cool Climate Collective and various others in August 2023, where it planned to make the industrial use of enzymes more affordable and accessible.

#### Increase in Partnerships Encouraging North America Biocatalysts Market Expansion

Partnerships between academic institutions facilitate the exchange of knowledge and technical capabilities often required for industrial research, discovery of new enzymes, the identification of novel applications, and the development of innovative procedural methods to synthesise biocatalysts efficiently. Such collaborations create new opportunities for players in the North America biocatalysts market to tap their resources and investments into, aiming for future growth and expansion. Relevantly, they optimise the production and use of biocatalysts in various fields, including pharmaceuticals, food and beverages, and biofuel production. For instance, as a part of the International Network for Biocatalysis, launched in 2021, Olon in collaboration with HIMS and Biosphere announced the development of a new biocatalyst production process through the engineering of a target enzyme. This is expected to enhance the synthesis of biocatalysts in North America, meeting its growing demand in the coming years.

#### North America Biocatalysts Market Trends

Biocatalysts are preferred over their chemical counterparts due to enhanced sustainability and the ability to reduce carbon emissions in a variety of industrial and manufacturing processes. Their benefits align with the environmental targets and mandates set forth by the US and Canadian governments, resulting in their increased adoption among industry participants. Besides, their growing preference among the general population owing to eco-friendly and natural origins is also prompting governments to incentivise their use, leading to their greater consumption in North America and supporting the North America biocatalysts market growth.

In August 2024, for instance, the Canadian Ministry of Agriculture announced a fund worth CAD 6,592,913 to the Bioindustrial Innovation Canada (BIC) under the AgriScience Program to develop specialised technologies that can convert renewable resources, such as agricultural residues, into useful bioenergy, biofuels, and biodegradable plastics. Biocatalysts will play a crucial role in the development of such technologies, driving the efficient utilisation of these funds.

#### North America Biocatalysts Products Industry Segmentation

□North America Biocatalysts Market Report and Forecast 2025-2034□ offers a detailed analysis of the market based on the following segments:

##### Market Breakup by Type:

- Hydrolases
- Oxidoreductases
- Transferases
- Others

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#### Market Breakup by Source:

- Microorganisms
- Plants
- Animals

#### Market Breakup by Application:

- Food and Beverages
- Cleaning Agent
- Biofuel Production
- Agriculture and Feed
- Biopharmaceuticals
- Others

#### Market Breakup by Country:

- United States
- Canada

#### North America Biocatalysts Market Share

##### Use of Hydrolase in Several Industrial Processes Encouraging the Growth of Biocatalysts Market in North America

Hydrolase enzymes are used to catalyse the hydrolysis of chemical bonds in a variety of industries including pharmaceutical, food processing, and biofuel production to enhance their manufacturing processes. Industry leaders, are thus, investing in the research and development of hydrolase enzymes, thereby increasing their share in the North America biocatalysts market. For instance, Biocatalysts Ltd., a leader in the North American biocatalysts industry launched a new hydrolase enzyme called Nuclease 46L for the degradation of different types of nucleic acids. It provides a cost-effective solution for the elimination of DNA in several biotechnological applications. Such discoveries will potentially increase the market share of hydrolase in the UK biocatalyst industry.

Besides, the share for oxidoreductase is also rising gradually in North America due to growing exports from the textile industry. According to the National Council of Textile Organisation (NCTO), in 2022, the value of U.S. man-made fibre, textile and apparel shipments amounted to a total of USD 65.8 billion, compared to USD 64.04 billion in 2021. Moreover, the overall exports of fibres, textiles and apparel were equivalent to USD 34 billion in 2022 compared to USD 28.4 billion in 2021. As the growth trend continues, the demand for oxidoreductase will witness a continuous rise in the coming years.

##### Agriculture and Feed Sector Accounts for the Largest Biocatalysts Demand in North America

As per North America biocatalysts market analysis, the demand for biocatalysts is increasing in the agriculture and feed sector as North America witnesses a rise in population and a corresponding change in food consumption patterns. According to USDA, the United States, which has the largest agriculture and feed market in North America, recorded the sector's contribution to be around USD 1.530 trillion to national GDP in 2023, accounting for a 5.6% share. Out of this, the country's poultry farms contributed USD 203.5 billion or approximately 0.7% share of the GDP. With these values growing further in the coming years, the demand for biocatalysts is expected to rise in agriculture and feed sector.

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Another key factor driving the biocatalysts demand growth is the increased adoption of biofuels across several industries, especially in the transport, energy, and manufacturing industries. Biocatalysts are often deployed to increase the pace of biomass conversion, raising the efficiency level of the overall biofuel production process. According to the US Energy Information Administration (EIA), the United States produced 18.7 billion gallons and consumed 17.6 billion gallons of biofuels in 2022. These values are expected to grow further as industry leaders prioritise environmental sustainability over irresponsible fuel use, thereby increasing the demand for biocatalysts in the region.

#### Microorganism-based Catalysts Leading the Biocatalysts Market Share in North America

Microorganism-based biocatalysts are leading the market share owing to their use in a wide range of large and small-scale industrial applications. They are relatively more cost-effective and can be mass-produced from several microbial sources such as bacteria, fungi, and yeast. Moreover, their ability to operate in mild conditions is increasing their preference among industry leaders and manufacturers. For instance, in February 2021, Biocatalysts Ltd. launched a microbial, halal and kosher-certified alternative to the porcine-derived phospholipase A2 enzyme, namely, Lipomod 833L2, which can be widely used in the production of sauces and mayonnaise across the food and beverage sector.

Similarly, the share of plant-based biocatalysts is also increasing owing to the changing food consumption of North Americans, especially, the growing shift towards veganism and vegetarianism. The United States and Canada, two of the largest markets for vegan and vegetarian food products are driving their demand growth. Industry reports suggest that while Canada has a vegan population of 4.6% and a vegetarian population of 7.6%, the United States records an overall vegan and vegetarian population to be around 1.5% and 4.2% respectively. These values indicate a high preference for the consumption of food and beverages which use biocatalysts derived from plants.

#### North America Biocatalysts Market Regional Analysis

##### United States is Driving Biocatalysts Consumption in North America Owing to the Rapidly Growing Food and Beverages Industry

The United States is driving the demand for biocatalysts in North America, primarily owing to the expansion of the food and beverages industry. According to USDA, food services, eateries, and beverages accounted for 5% of the national GDP's share in 2023. This was higher than any other allied services in the agriculture and farming industry. Moreover, in 2022, the household expenditure in the food sector was one of the highest, recorded at 12.8% of the overall expenditure. With growing demand and rising population, these values are expected to rise further, having a positive impact on the North America biocatalysts market.

Besides, the industry is also witnessing significant demand growth due to Canada's Clean Fuel Regulation (CFR) which came into effect on July 6, 2022. The regulation aimed to reduce the carbon footprint of liquid transportation fuels and increase the use of biodiesel as well as bioethanol by an additional 2.2 billion litres and 700 million litres respectively, by 2030. This is expected to drastically raise their production levels in the country, further increasing the consumption of biocatalysts that can efficiently convert biomass into these alternative, bio-based fuels.

#### Competitive Landscape

North America biocatalysts market key players are focusing on providing bio solutions to several industries using efficient and specifically engineered biocatalysts. To expand their portfolios, they are rigorously investing in the research and development of new biocatalysts and increasing their production capacities in different countries to leverage the competitive advantages of technical expertise, government support, and high demand capable of enhancing the North America biocatalysts market value.

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## Novonosis Group (Novozymes A/S)

Novonosis Group was established in 2024 as the merger between its predecessor Novonosis A/S and Chr.Hasen. Before the merger, Novonosis focussed on research, development and production of industrial enzymes, microorganisms, as well as biopharmaceutical ingredients. It had multiple offices around the world, including in the United States and Canada. Currently, it serves more than 30 industries and boasts more than 20 manufacturing sites across the globe.

## Codexis, Inc.

Codexis, Inc. was established in 2002 as an enzyme engineering company in California, United States. It got public in April 2010 on NASDAQ and a month later acquired Maxygen's Molecular Breeding technology portfolio. This brought into the business of providing bio solutions across industries using enzyme engineering techniques to improve human and environmental health. Its primary activity, however, is the manufacturing of active pharmaceutical ingredients (API) for molecular diagnosis and treatments of patients.

## DSM-Firmenich AG

DSM-Firmenich AG was formed from the merger of fragrance and perfume giant Firmenich with DSM, the global leader of health, nutrition, and bioscience in 2023. Headquartered in Netherlands, the company adopted the individual portfolios of both brands, becoming a pioneer in the production of nutrition, health and beauty products, using efficient biocatalysts for the addition of different flavours, nutrients, and aroma.

## BRAIN Biotech AG (Biocatalysts Ltd.)

Established in 1993, Brain Biotech AG is a public company located in Germany. It comprises a group of businesses, including biocatalyst giant, Biocatalysts Ltd., that focus on the research, development, and production of bioenzymes and speciality chemicals. The company owns research centres in Germany and production centres across Europe and North America, particularly the United States.

Other key players considered in the North America biocatalysts market report are BASF SE, Sterling Pharma Solutions Limited, AB Enzymes GmbH, Almac Group Limited, and Amano Enzyme Inc., among others.

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