

# The current state of the biotechnology market and its main development trends

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**Abstract.** The biotechnology market is currently in a state of dynamic evolution, with significant global impact and implications. This article provides an overview of the current state of the biotechnology market and its primary development trends. It explores the key drivers behind the growth of biotechnology, including advances in genomics, personalized medicine, and the increasing demand for sustainable solutions in agriculture and industry. The article also delves into the challenges faced by the biotech sector, such as regulatory complexities and ethical considerations. Furthermore, it analyzes the market dynamics and competition, highlighting the contributions of both established players and innovative startups in the biotech landscape. Through the examination of recent trends and breakthroughs in biotechnological research, the article offers insights into the future trajectory of the industry. The biotechnology market is poised for continued growth and transformation, with potential applications in various fields, from healthcare and pharmaceuticals to environmental conservation and renewable energy. The article concludes with a focus on the opportunities and challenges that lie ahead, emphasizing the need for strategic investment, interdisciplinary collaboration, and forward-thinking policies to navigate the evolving landscape of the biotechnology market.

## 1 Introduction

The world agricultural market is in the state of transformation, characterized by positive stage that reflects an evolution towards new technology structure [1-2]. Today's world agricultural market is in the process of transforming, characterized by positive stage that reflects an evolution towards new technology structure. In the modern World Agricultural Market, it is notable that the progress on the global agro-industrial sector has accelerated and it is possible to achieve a positive result from [3]. Biotechnological innovations are now the driving forces of a new revolution in food production. New biotechnological innovations are now the driving forces of a new agro-industrial revolution. In the late 1990s biotechnological advancements, which were first found commercial applications in industrial applications in the late 1990s, are now the main driver of this new agricultural revolution.

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Along with this, the use of biotechnological products in agriculture is an ideal way to address urgent issues such as hunger in the face of limitable land resources and global populations [4]. In the face of limited land resources, large international food and economic organization groups are demanding help in resolving problems with human nutrition. The concern that resonates with major international economic and food organizations is the need for helping to solve the problem of hunger in the face of limited land resources and limitable lands.

As a result of the fact that genetically-modified (GM) products continue to stir the scientific community, many bans and restrictions on GM products in many countries around the world have been introduced.

Relevance and value of the study are multifaceted, as well as its relevance and value. All this is in addition to this, the burgeoning market of agricultural biotechnological products influences the global agribusiness system [5]. The main role of American and European companies plays on the development of new food production in developing countries and subsequently expand its presence internationally. On the basis of a deceleration in biotechnological production products, observed in 2015 due to organic and alternative production methods, it is urgently needed to study an evolutionary trend on food system's development.

A note is necessary to note that the adoption and acceptance of GM crops vary by region and country, there are ongoing debates about the potential risks and beneficial effects of use of them [6]. Agencies from different countries closely monitor the approval and commercialization of GM crops to protect human health and environment.

## 2 Research Methodology

To research the current state of the biotechnology market and identify its main development trends, you can follow a systematic research methodology. Here's a general outline of the steps to conduct such research:

### 1. Define Research Objectives:

Clearly define the objectives of your research. What specific aspects of the biotechnology market are you interested in studying? For example, you might focus on a particular subsector, geographic region, or technological trend.

### 2. Literature Review:

Begin with a comprehensive review of existing literature. This will help you understand the current state of the biotechnology market and identify key trends, challenges, and opportunities. Use academic papers, industry reports, and reputable news sources.

### 3. Data Collection:

Gather relevant data to support your research. This may include market reports, financial data, regulatory information, and industry publications. Consider both primary and secondary data sources.

### 4. Market Segmentation:

Segment the biotechnology market into relevant categories. This might include categories such as agricultural biotechnology, healthcare biotechnology, industrial biotechnology, etc. Analyze each segment separately.

### 5. Competitor Analysis:

Identify key players in the biotechnology market. Analyze their market share, financial performance, product portfolios, and strategies. This can provide insights into market dynamics.

### 6. Technological Trends:

Explore current and emerging technologies within the biotechnology sector. This might include CRISPR gene editing, synthetic biology, personalized medicine, and other innovative areas.

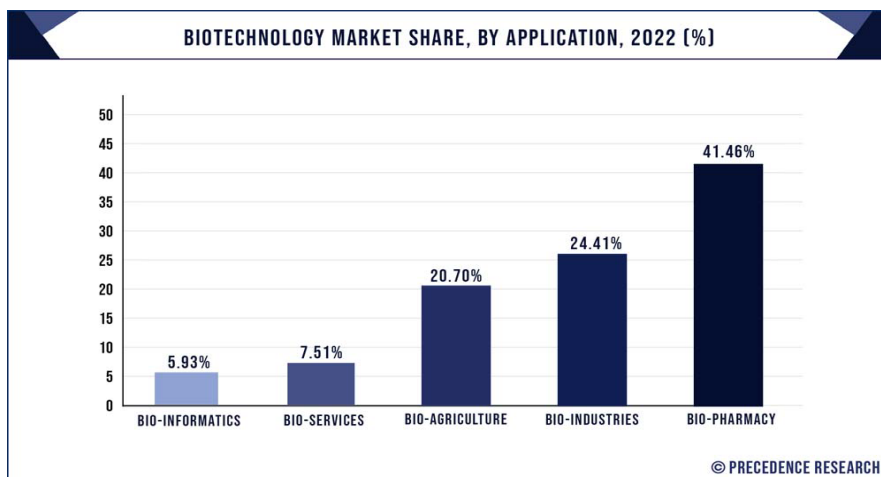
#### 7. Regulatory Environment:

Study the regulatory framework that governs the biotechnology industry. Regulations can significantly impact market dynamics. Understand how different countries or regions approach biotechnology regulation.

### 3 Results and Discussions

In 2013, the global biotechnology market was valued at approximately \$270 billion, with a projected annual growth rate of 10-12%. As we look ahead to 2023, it's anticipated that the market's size will significantly increase, more than doubling to reach approximately \$600 billion [7]. You can get a visual representation of the evolving scope of the global biotechnology market in Figure 1.

This remarkable growth trajectory underscores the expanding significance of biotechnology on a global scale, with advancements in various fields such as medicine, agriculture, environmental science, and beyond contributing to its substantial market expansion.



**Fig. 1.** Biotechnology Market Size, Share, Growth, Forecast 2023-2030

The global biotechnology market exhibits distinct segments, with the biopharmaceutical sector commanding the largest share at approximately 60% of the overall market volume. Industrial biotechnology follows closely behind, contributing around 35% to the market's total volume [8]. In contrast, environmental biotechnologies have displayed comparatively weaker performance, representing just 5% of the global market's aggregate share. You can gain a visual insight into this segmentation within Figure 2, which delineates the different sectors shaping the global biotechnology landscape [9].

This segmentation emphasizes the prominence of biopharmaceuticals and industrial biotechnology as key drivers of the biotechnology market, with their significant contributions to innovation and economic growth. Meanwhile, the smaller but nonetheless important environmental biotechnologies sector continues to address pressing ecological challenges on a global scale.

## GLOBAL BIOTECHNOLOGY MARKET 2020-2026

### SEGMENTATION BY TECHNOLOGY & APPLICATION

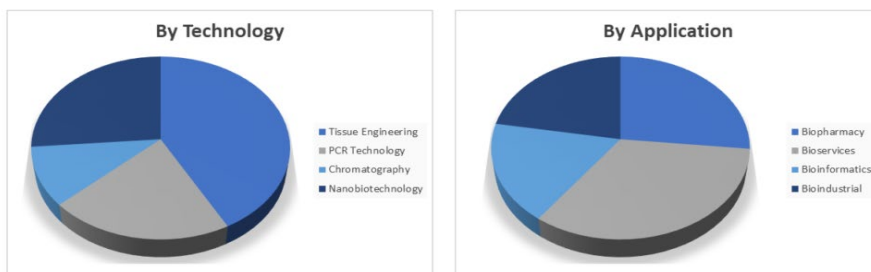


Fig. 2. Biotechnology Market Share 2023 -2031

The biotechnology market has been a key player in the global economy, with steady growth expected from 2023 to 2031. Biotechnology encompasses a broad range of industries, including healthcare, agriculture, industrial biotech, and environmental biotech. The global biotechnology market is projected to maintain a substantial market share throughout this period [10]. The emphasis on biopharmaceuticals and industrial biotechnology within market segmentation underscores their pivotal roles in driving the biotechnology market's growth and innovation. The biotechnology industry holds the potential to address key global challenges, such as ending hunger, curing diseases, enhancing public health emergency responses, ensuring food safety, reducing greenhouse gas emissions, and promoting overall food security. The emergence of modern biotechnology has ignited substantial global debates about the future of global agriculture. However, these discussions have often been influenced by the interests of wealthy nations and have paid insufficient attention to the needs of developing countries, especially concerning the food requirements of low-income populations. The successful operation of grain production now heavily relies on the incorporation of technology in these sectors. Technology has enabled the integration of agricultural production and food processing and plays a crucial role in the development of new and valuable food products [11]. In the modern agri-food sector, technology is an indispensable component for all enterprises.

## 4 Conclusions

When examining the current state of biotechnology in Russia, several issues come to light. These include significant import reliance on essential biotechnology products like feed additives and pharmaceuticals and the absence of indigenous biotechnological products. However, there are some positive aspects in specific areas. For instance, "Red" biotechnologies represent the most financially substantial sector, with an estimated annual value ranging from 60 to 90 billion rubles. This sector is marked by the development of cutting-edge industries focused on producing biotechnological generics to ensure the substitution of imported medicines

While "White" biotechnologies may not have high global demand, a noteworthy distinction lies in the hydrolysis industry. On the other hand, "Green" and "Gray" biotechnologies are experiencing stagnation due to various hindrances to their development. In Russia, for instance, the scientific and production infrastructure for creating waste-

degrading strains in the petrochemical sector is underdeveloped, although there are scientific advancements in the field of bioremediation.

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