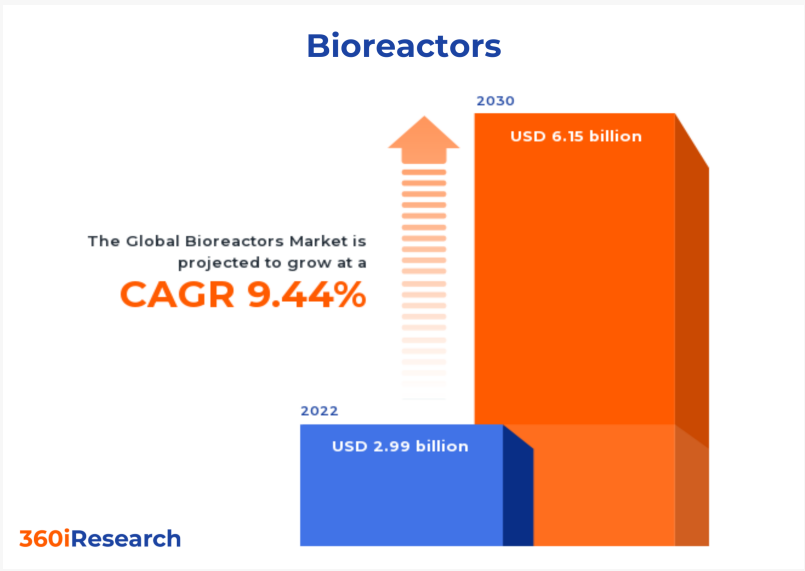
Bioreactors Market worth $6.15 billion by 2030, growing at a CAGR of 9.44% - Exclusive Report by 360iResearch

The Global Bioreactors Market to grow from USD 2.99 billion in 2022 to USD 6.15 billion by 2030, at a CAGR of 9.44%.



Bioreactors Market - Exclusive Report by 360iResearch

PUNE, MAHARASHTRA, INDIA, November 8, 2023 /EINPresswire.com/ -- The "Bioreactors Market by Mechanism (Airlift Bioreactors, Benchtop Bioreactors, Bubble Column Bioreactors), Usage (Full-scale Production, Lab-Scale Production, Pilot-scale Production), Control Type, Material, Scale, Usability, End User - Global Forecast 2023-2030" report has been added to 360iResearch.com's offering.

The Global Bioreactors Market to grow from USD 2.99 billion in 2022 to USD 6.15 billion by 2030, at a CAGR of 9.44%.

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The bioreactor involves designing, producing, using, and maintaining specialized vessels that provide controlled environments for biological processes in various industries such as pharmaceuticals, food & beverage, biotechnology research facilities, and wastewater treatment plants. Increasing demand for personalized medicines and therapeutic antibodies, technological advancements in functional capabilities, and rising investments from government agencies and private sectors to expand the manufacturing of vaccines is driving the market growth. The rising usage of single-use bioreactors across pharmaceutical and waste treatment facilities is expanding the scope of the market. However, certain safety and maintenance issues with high usage of bioreactors are expected to hamper the market growth. Increasing research and

development activities to introduce advanced bioreactors that enable biopharmaceutical businesses to improve the efficiency and precision of their operations is expected to create opportunities for market growth. The ongoing advancements in bioreactors are expected to develop standardized, repeatable cell-based products for regenerative medical applications and establish physiologically realistic in vitro models for drug testing.

Scale: Suitability of 200L-1500L bioreactors for pilot-scale and small-scale commercial manufacturing processes

The 1500L-4000L scale caters to large-scale production facilities that require high throughput and increased output for commercial manufacturing. It is preferred for producing monoclonal antibodies, vaccines, and recombinant proteins. 200L-1500L bioreactors are suitable for pilot-scale and small-scale commercial manufacturing processes that offer efficient scaling-up capabilities from benchtop systems. These bioreactors are commonly used for cell culture processes involving mammalian or microbial cells. The 20L-200L bioreactors serve the needs of process development and optimization at the laboratory and pilot scale. This range provides effective scaling-down capabilities, enabling optimal process conditions for larger-scale systems. The 5L-20L bioreactor is well-suited for research and development applications, initial screening studies, and media optimization. Benchtop bioreactors with working volumes from 5L to 20L offer flexibility in terms of easy handling and reduced space requirements. The above 4000L scale bioreactors cater to large-scale commercial manufacturing operations that require high-capacity production facilities for extensive output demands. These systems are commonly employed for producing biotherapeutics on a massive scale and large-volume fermentation processes.

Control Type: Adoption of automated bioreactors due to high level of precision and consistency in process control

Automated bioreactors are advanced systems that control and monitor critical process parameters, such as pH, temperature, dissolved oxygen, and agitation speed. These bioreactors offer high precision and consistency in process control, resulting in improved product quality and reduced batch variability. Automated bioreactors are preferred in large-scale industrial production processes where continuous monitoring and precise control are essential for optimal performance. Manual bioreactors require operators to adjust process parameters during cell cultivation or fermentation processes manually. These systems provide users with greater flexibility to alter conditions based on specific requirements and are used in smaller-scale research laboratories where frequent adjustments may be required for optimizing experimental conditions.

End User: Increasing applicability in biopharmaceutical industry, for producing biotherapeutics including monoclonal antibodies & vaccines

Bioreactors play a crucial role in the biopharmaceutical industry, producing biotherapeutics such as monoclonal antibodies, vaccines, recombinant proteins, and cell therapy products. These companies rely on bioreactors to provide optimal conditions for cell growth and protein expression while maintaining sterility throughout biomanufacturing. The ability to scale

production from laboratory to large-scale commercial manufacturing makes bioreactors indispensable in biopharmaceutical. CMOs and CROs offer specialized services related to drug development and manufacturing on a contractual basis. CMOs and CROs utilize bioreactors for various applications such as process development, optimization studies, scale-up activities, clinical trial material production, and commercial manufacturing of therapeutic products. Bioreactors are also employed in waste management industries such as landfills and waste treatment plants for anaerobic digestion and biogas production processes. These systems utilize microorganisms to break down organic matter, generate energy from methane gas, and reduce greenhouse gas emissions. The efficient design and operation of bioreactors play a pivotal role in determining the overall effectiveness of these processes. Research laboratories and academic institutions rely on bioreactors for various research activities involving cell culture studies, fermentation processes, biochemical engineering investigations, and developing new bio-based products and alternative energy sources. Bioreactors offer a controlled environment to study cellular responses under different growth conditions, such as pH levels or nutrient availability, enabling researchers to optimize process parameters or investigate novel biological pathways.

Usage: Preferences for full-scale production from various industries due to large volume processing capacity

Full-scale production represents the highest level of bioreactor usage type regarding volume capacity and operational complexity. These large-capacity systems range from 1,000 to over 20,000 liters and are utilized in various industries, such as pharmaceuticals, biotechnology, food processing, agriculture, and environmental management. In full-scale bioreactors, large quantities of cells and microorganisms are cultivated under controlled conditions to produce desired products, such as recombinant proteins and enzymes, for various applications. The primary focus in this segment is high-yield productivity while maintaining product quality and consistency with efficient resource utilization. Lab-scale production refers to small-sized bioreactors used primarily for research at academic institutions or industrial R&D centers with a working volume ranging from 1 liter to 10 liters. Their compact size allows for easy handling and operation within laboratory environments while providing essential features similar to larger-scale systems, such as pH control and temperature regulation. Researchers can perform various experimental procedures in lab-scale production settings, including cell culture optimization studies or media screening tests on a smaller scale before transitioning processes to larger pilot- or full-scale systems, saving time and resources. Pilot-scale production is an intermediate stage between lab- and full-scale productions where processes developed at benchtop scale are scaled up to accommodate larger working volumes of around 100 to a few thousand liters. This stage is crucial for evaluating and optimizing bioprocess parameters since it bridges the gap between small-scale lab studies and commercial-scale manufacturing. In pilot-scale bioreactors, various factors such as mass transfer rates, mixing patterns, and nutrient supply can be studied under more realistic conditions, providing valuable data on process robustness, scalability, and economic feasibility. Pilot facilities also serve as an essential platform for process validation, technology transfer activities, and regulatory compliance testing.

Mechanism: Adoption of photo-bioreactors for the growth of photosynthetic microorganisms

Airlift bioreactors are ideal for low-shear stress processes and high oxygen transfer applications, including aerobic fermentation and cell culture. Benchtop bioreactors, designed for small-scale experiments and process development, are popular in laboratories and research institutions. Bubble column bioreactors utilize gas sparging for mixing and mass transfer, making them suitable for large-scale production due to their simple design and low operating costs. Continuous Stirred Tank Bioreactors (CSTR) offer flexible process control for homogenous liquid-phase reactions. Fluidized bed bioreactors excel in high-density cell culture processes where immobilized cells or microorganisms are suspended in a liquid medium. Microbial bioreactors cater specifically to microorganism cultivation for protein production, enzyme synthesis, and waste treatment applications. Multi-parallel bioreactors allow simultaneous experiments with multiple reactors under controlled conditions. These reactors are favored for process optimization, high-throughput screening, and scale-up studies. Packed bed bioreactors contain immobilized cells or particles within a porous matrix, providing high cell density cultivation and large surface areas for cell attachment. These reactors are utilized in applications such as biofilm-based processes and wastewater treatment. Photo-bioreactors supply controlled light conditions vital for the growth of photosynthetic microorganisms, ensuring optimal cultivation environments.

Material : Increasing usage of stainless steel bioreactors in the pharmaceutical and biotech industries owing to their durability and scalability
Bioreactors are integral components in bioprocess applications, commonly made of glass or stainless steel. Glass bioreactors offer transparency and chemical resistance, allowing for observing culture growth, cell morphology, and processes up to 15 L in volume. On the other hand, stainless steel bioreactors excel in durability and scalability, making them ideal for large-scale manufacturing processes ranging from 20L to 1000L or more, particularly in the pharmaceutical and biotech industries. Each type of bioreactor has distinct advantages depending on specific application requirements. It is recommended that end-users consult with manufacturers/providers to determine the most suitable model for their needs.

Regional Insights:
In the Americas region, specifically in North America, the demand for single-use or disposable bioreactors is increasing due to their ability to reduce cross-contamination risks. The highly developed life sciences industry and robust funding from both public and private sectors are creating a platform for the growth of the bioreactors market in the Americas. Increasing expansion of pharmaceutical manufacturing capabilities, and rapid industrialization are leading to greater production capacity requirements for vaccines, biosimilars, and stem cell therapies, subsequently, rising utilization of bioreactors in the Asia-Pacific. Moreover, government initiatives promoting R&D investments coupled with favorable regulatory policies are expected to benefit the market growth in the Asia-Pacific. In the EMEA, Europe occupies a dominant position within the global bioreactor market with nations such as Germany, France, and UK leading regional growth. This can be attributed to factors such as well-established pharmaceutical companies with robust product pipelines, supportive government policies, increasing collaborations between academic institutions and market players, and a strong

emphasis on bioprocess innovation. On the other hand, the Middle East and Africa are gradually embracing bioreactors as countries such as Saudi Arabia and South Africa continue to invest in biopharma infrastructure development and capacity expansion.

FPNV Positioning Matrix:

The FPNV Positioning Matrix is essential for assessing the Bioreactors Market. It provides a comprehensive evaluation of vendors by examining key metrics within Business Strategy and Product Satisfaction, allowing users to make informed decisions based on their specific needs. This advanced analysis then organizes these vendors into four distinct quadrants, which represent varying levels of success: Forefront (F), Pathfinder (P), Niche (N), or Vital(V).

Market Share Analysis:

The Market Share Analysis offers an insightful look at the current state of vendors in the Bioreactors Market. By comparing vendor contributions to overall revenue, customer base, and other key metrics, we can give companies a greater understanding of their performance and what they are up against when competing for market share. The analysis also sheds light on just how competitive any given sector is about accumulation, fragmentation dominance, and amalgamation traits over the base year period studied.

Key Company Profiles:

The report delves into recent significant developments in the Bioreactors Market, highlighting leading vendors and their innovative profiles. These include 3D Biotek LLC, ABEC, Inc., Adolf Kühner AG, BBI-biotech GmbH, Belach Bioteknik, Bioengineering AG, Bionet Servicios Técnicos, SL, Broadley-James Corporation, Cell Culture Company, LLC, Cellexus Limited, CerCell A/S, Cesco Bioengineering Co., Ltd., Danaher Corporation, Distek, Inc., Electrolab Biotech Limited, Eppendorf SE, FiberCell Systems Inc., G&G Technologies, Inc., GEA Group AG, Getinge AB, IKA-Werke GmbH & CO. KG, Infors AG, Lonza Group Ltd., Merck KGaA, PBS Biotech, Inc., Pierre Guérin SA, Praj Industries Limited, Sartorius AG, Shanghai LePure Biotech Co., Ltd., Solaris Biotechnolgy Srl by Donaldson Company, Inc., Solida Biotech GmBH, Terumo Corporation, Thermo Fisher Scientific Inc., WuXi Biologics (Cayman) Inc., and ZETA GmbH.

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Market Segmentation & Coverage:

This research report categorizes the Bioreactors Market in order to forecast the revenues and analyze trends in each of following sub-markets:

Based on Mechanism, market is studied across Airlift Bioreactors, Benchtop Bioreactors, Bubble Column Bioreactors, Continuous Stirred Tank Bioreactors, Fluidized Bed Bioreactors, Microbial Bioreactors, Multi-Parallel Bioreactors, Packed Bed Bioreactors, and Photo-Bioreactors. The Continuous Stirred Tank Bioreactors commanded largest market share of 24.42% in 2022, followed by Microbial Bioreactors.

Based on Usage, market is studied across Full-scale Production, Lab-Scale Production, and Pilot-scale Production. The Full-scale Production commanded largest market share of 42.63% in 2022, followed by Lab-Scale Production.

Based on Control Type, market is studied across Automated and Manual. The Manual commanded largest market share of 78.68% in 2022, followed by Automated.

Based on Material, market is studied across Glass and Stainless Steel. The Stainless Steel commanded largest market share of 46.68% in 2022, followed by Glass.

Based on Scale, market is studied across 1500L-4000L, 200L-1500L, 20L-200L, 5L-20L, and Above 4000L. The 1500L-4000L commanded largest market share of 29.55% in 2022, followed by 20L-200L.

Based on Usability, market is studied across Reusable and Single-use. The Reusable commanded largest market share of 88.88% in 2022, followed by Single-use.

Based on End User, market is studied across Biopharmaceutical Companies & Manufacturers, Contract Manufacturing Organizations & Contract Research Organizations, Landfills & Waste Treatment Plants, and R&D Departments & Institutes. The Biopharmaceutical Companies & Manufacturers commanded largest market share of 40.43% in 2022, followed by R&D Departments & Institutes.

Based on Region, market is studied across Americas, Asia-Pacific, and Europe, Middle East & Africa. The Americas is further studied across Argentina, Brazil, Canada, Mexico, and United States. The United States is further studied across California, Florida, Illinois, New York, Ohio, Pennsylvania, and Texas. The Asia-Pacific is further studied across Australia, China, India, Indonesia, Japan, Malaysia, Philippines, Singapore, South Korea, Taiwan, Thailand, and Vietnam. The Europe, Middle East & Africa is further studied across Denmark, Egypt, Finland, France, Germany, Israel, Italy, Netherlands, Nigeria, Norway, Poland, Qatar, Russia, Saudi Arabia, South Africa, Spain, Sweden, Switzerland, Turkey, United Arab Emirates, and United Kingdom. The Europe, Middle East & Africa commanded largest market share of 45.13% in 2022, followed by Asia-Pacific.

Key Topics Covered:

2. Research Methodology
3. Executive Summary
4. Market Overview
5. Market Insights
6. Bioreactors Market, by Mechanism
7. Bioreactors Market, by Usage
8. Bioreactors Market, by Control Type
9. Bioreactors Market, by Material
10. Bioreactors Market, by Scale
11. Bioreactors Market, by Usability
12. Bioreactors Market, by End User
13. Americas Bioreactors Market
14. Asia-Pacific Bioreactors Market
15. Europe, Middle East & Africa Bioreactors Market
16. Competitive Landscape
17. Competitive Portfolio
18. Appendix

The report provides insights on the following pointers:
1. Market Penetration: Provides comprehensive information on the market offered by the key players
2. Market Development: Provides in-depth information about lucrative emerging markets and analyzes penetration across mature segments of the markets
3. Market Diversification: Provides detailed information about new product launches, untapped geographies, recent developments, and investments
4. Competitive Assessment & Intelligence: Provides an exhaustive assessment of market shares, strategies, products, certification, regulatory approvals, patent landscape, and manufacturing capabilities of the leading players
5. Product Development & Innovation: Provides intelligent insights on future technologies, R&D activities, and breakthrough product developments

The report answers questions such as:
1. What is the market size and forecast of the Bioreactors Market?
2. Which are the products/segments/applications/areas to invest in over the forecast period in the Bioreactors Market?
3. What is the competitive strategic window for opportunities in the Bioreactors Market?
4. What are the technology trends and regulatory frameworks in the Bioreactors Market?
5. What is the market share of the leading vendors in the Bioreactors Market?
6. What modes and strategic moves are considered suitable for entering the Bioreactors Market?

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