

Biosensors - A Global Market Overview

Market Report | 2025-02-04 | 408 pages | Industry Experts

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Report description:

Global Biosensors Market Trends and Outlook

Biosensors are analytical instruments capable of converting biological reactions from cells, tissues, organisms and enzymes into electrical signals, which help in detecting target chemicals or analytes. A standard biosensor comprises a bioreceptor that clearly recognizes the analyte, along with a transducer for translating the biologically recognized element into a measurable signal. Biosensors are based on specific technologies, including electrochemical, optical, piezoelectric and thermal, each of which has its own or multiple application(s). Whereas medical testing remains the primary application for these devices, they are also widely employed in the areas of agriculture, environment and food & beverage toxicity testing. The combination of sensors with a biological component and a physicochemical detector enables in detecting chemical molecules in conjunction with a systematic device. For instance, during the COVID-19 pandemic, such biosensing systems have been widely used to detect the presence of this dreaded virus.

The global demand for Biosensors is estimated at US\$30.6 billion in 2024 and is projected to reach US\$49.6 billion by 2030 at a CAGR of 8.4% over 2024-2030. Biosensors can be considered to be "technological marvels" that have transformed the very face of diagnostics and patient monitoring. Despite being miniature in size, these devices have attained gigantic proportions in terms of detecting specific biological markers to drive advancements in personalized medicine and enhance efficient healthcare delivery. One of the major factors contributing to rapid increase in demand for biosensors includes proliferation of wearable biosensor technology, comprising smartwatches and fitness trackers that allow continuous monitoring of vital signs and other health parameters by providing real-time data. The applications of biosensors in point-of-care (PoC) testing are also growing at an impressive rate due to providing the option of rapid and convenient diagnostics as against conventional laboratory settings. Biosensors are critical components of portable and easy-to-use testing devices that are used for rapid diagnosis and immediate treatment decisions.

Miniaturized and highly sensitive biosensors are now being developed with the use of nanotechnology with materials, such as nanoparticles and nanowires, which enhance the surface area and reactivity of biosensors to offer improved detection capabilities. Another driving factor in the market has been the emergence of multiplexed biosensors, offering the capability of concurrently detecting multiple analytes in a single sample. This has proven to be an invaluable tool for comprehensive diagnostics by enabling healthcare professionals obtain a wider range of data from a single test sample. Multiplexed biosensors are being successfully

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employed in areas, such as cancer diagnosis, screening of infectious disease and complex biological process monitoring. With artificial intelligence (AI) and big data analytics playing vital roles in virtually every sphere today, it is no surprise that their presence in biosensors has also become prominent. The humongous amounts of data generated by biosensors can be precisely analyzed with AI-based algorithms in order that patterns, trends and anomalies be identified. As a result of this integration, diagnostic accuracy gets enhanced, predictive healthcare becomes more facilitated and personalized treatment regimens based on individual patients can be developed. Another feature stimulating the market for biosensors has been the development of implantable biosensors that are used for remote patient monitoring. These devices are implanted within the body for continuously monitoring specific biomarkers or physiological parameters, and are especially useful in chronic disease management, such as cardiac monitoring and neurology.

Biosensors Regional Market Analysis

With regard to region, the global market for Biosensors is led by North America, the primary reasons for which include growing incidence of chronic diseases, the large number of players in the field offering premium solutions and technological advancements driving innovation. Moreover, the region's healthcare system as a whole is highly developed and government initiatives aimed at further improving the same by providing adequate funds will prove to be beneficial over the mid to longer term. Several companies have come out with novel biosensor-based solutions to keep track of diseases and provide timely solutions for the same. However, Asia-Pacific is expected to witness the fastest growth in demand for Biosensors over the analysis period, owing to a large and rapidly aging population, with a substantial percentage of them suffering from chronic diseases, demanding proper healthcare options. Growing disposable income and enhanced healthcare infrastructure in countries, such as China and India, are further contributing to greater access to advanced diagnostic tools. R&D efforts in the field of biosensors in the region, riding on the back of considerable outlays, are further expected to bolster the market. The use of these devices in environmental monitoring and food toxicity testing has also grown significantly over the recent years, providing further impetus to demand.

Biosensors Market Analysis by Technology

The types of Biosensors based on technology analyzed in the report include Electrochemical Biosensors, Optical Biosensors, Piezoelectric Biosensors and Thermal Biosensors. Among these, the global demand for Electrochemical Biosensors is dominant, with an estimated 2024 share of over 70%. The wide use of these biosensors in home-based glucose monitoring devices and also in point-of-care settings for various applications render them to have a leading position. On the other hand, the worldwide market for Optical Biosensors is likely to record the fastest growth during the 2024-2030 analysis period, since these are ultrasensitive devices offering early detection and monitoring capabilities for a range of non-communicable diseases, such as cancer. The use of Optical Biosensors in research laboratories to detect and quantify pathogens/biomarkers in biological fluids for diagnostic applications are additional factors expected to advance demand for them.

Biosensors Market Analysis by Product Type

Among Non-Wearable and Wearable Biosensors, the global demand for the latter is larger, as also the faster growing. These portable devices can be worn on, inside or near the human body for monitoring health indicators by continuously measuring dynamic physiological parameters in real-time. This results in obtaining a proper digital output for easy interpretation and immediate action. The popularity of Wearable Biosensors has grown considerably following their integration with smartphone and smartwatch technologies due to providing non-invasive monitoring of physical activity and other associated measures, including heart rate and estimated calorie consumption. A blood glucose monitoring device worn as a patch by diabetic patients forms another widely utilized type of biosensor, which offers continuous measurements of blood glucose in the fatty layer under the skin using the enzyme glucose oxidase as a recognition molecule. The advantages of Wearable Biosensors as regards home monitoring will further contribute to market growth over the coming years.

Biosensors Market Analysis by Application

Medical Testing is the primary application for Biosensors globally, since the original rationale behind developing these devices was to ensure a foolproof and effective method to determine test results. Within Medical Testing, the demand for Blood Glucose

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Testing is the largest, followed by Cholesterol Testing and Pregnancy Testing. The major advantage of medical testing through the use of biosensors has been well utilized by the point-of-care (PoC) sector, since results can be made available without much delay. Additionally, the number of PoC tests being performed using biosensors has been increasing and would continue to do so, given the level of technological developments taking place in this field. The market for Biosensors as employed for Agricultural testing, though, is anticipated to progress at the fastest rate over the analysis period. These devices are ideal for rapidly and precisely detecting several varieties of fungi that have the potential to damage crops, Moreover, biosensors also have proven ability in measuring heavy metals, herbicides and pesticides in ground and soil water. Compared to hitherto used methods, these devices can also be used for predicting the onset of soil disease in a fairly precise manner, thereby minimizing the potential damage that can be caused.

Biosensors Market Analysis by End-User

By end-user, Point-of-Care (PoC) Testing is the clear leader in terms of demand for Biosensors worldwide. The foremost reason for this is the precision with which these tests are carried out in various settings, be they hospitals or diagnostic centers, and the rapidity with which results can be made available. In addition, PoC testing, unlike home-based testing, covers a wider scope to include several tests that are either impracticable or impossible to carry out in the latter setting. Going forward, technological developments related to biosensors in point-of-care diagnostics will further boost demand for these devices in this end-use area.

Biosensors Market Report Scope

This global report on Biosensors analyzes the global and regional markets based on technology, product type, application and end-user for the period 2021-2030 with forecasts from 2024 to 2030 in terms of value in US\$. In addition to providing profiles of major companies operating in this space, the latest corporate and industrial developments have been covered to offer a clear panorama of how and where the market is progressing.

Key Metrics

Historical Period: 2021-2023

Base Year: 2024

Forecast Period: 2024-2030

Units: Value market in US\$

Biosensors Market by Geographic Region

☐☐North America (The United States, Canada and Mexico)

☐☐Europe (France, Germany, Italy, Russia, Spain, The United Kingdom and Rest of Europe)

☐☐Asia-Pacific (China, Japan, India, South Korea and Rest of Asia-Pacific)

☐☐South America (Argentina, Brazil and Rest of South America)

☐☐Middle East & Africa

Biosensors Market by Technology

☐☐Electrochemical Biosensors

☐☐Optical Biosensors

☐☐Piezoelectric Biosensors

☐☐Thermal Biosensors

Biosensors Market by Product Type

☐☐Non-Wearable Biosensors

☐☐Wearable Biosensors

Biosensors Market by Application

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- Agriculture Testing
- Environment Testing
- Food & Beverage Toxicity Testing
- Medical Testing
 - o Blood Glucose Testing
 - o Blood Gas Analysis
 - o Cholesterol Testing
 - o Infectious Disease Testing
 - o Pregnancy Testing
 - o Other Testing (Incl. Cardiac Marker, Coagulation Monitoring & Urine Testing)

Biosensors Market by End-User

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- ACON Laboratories, Inc.
- AerBetic
- AgaMatrix, Inc.
- Agilent Technologies, Inc.
- Analog Devices, Inc.
- Ascensia Diabetes Care Holdings AG
- AZUR Environmental
- Bayer AG
- bioMerieux SA
- Bio-Rad Laboratories, Inc.
- Biosensor BV
- Biosensors International Group Ltd.
- Broadcom
- Bruker Corp
- Cranfield Biotechnology Centre
- Cytiva
- Danaher Corporation
- Dexcom, Inc.
- DuPont Biosensor Materials
- Dynamic Biosensors GmbH
- EG & IC Sensors, Inc.
- Ercon, Inc.
- F. Hoffmann-La Roche AG
- GlySens Incorporated
- Huawei Technologies
- Infineon Technologies AG
- Innovative Biosensors, Inc.
- i-SENS, Inc.
- Johnson & Johnson
- Koninklijke Philips N.V.
- LamdaGen Corp
- LifeScan IP Holdings LLC
- LifeScan, Inc.
- LifeSensors, Inc.
- Masimo Corp
- Medtronic Plc
- Molecular Devices Corp
- Molex LLC
- Nanowear, Inc.
- Nix Biosensors, Inc.
- Nova Biomedical
- Panasonic Corp
- PerkinElmer, Inc.
- Pharmaco-Kinesis Corp
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- QTL Biosystems
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- Roche Diagnostics
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- Siemens Healthineers AG
- Strategic Diagnostics
- Sysmex Corporation
- TaiDoc Technology Corp
- TDK Corp
- TE Connectivity Corporation
- Texas Instruments, Inc.
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