

# Global Biopesticides Market - Types, Sources and Applications

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## Abstracts

### Global Biopesticides Market Trends and Outlook

Biopesticides, derived from natural sources such as microorganisms, plant-based compounds, and beneficial organisms, are emerging as vital components of sustainable pest management. Microbial biopesticides employ bacteria, fungi, viruses, or protozoa to control pests through infection or toxin production, while biochemical variants - like essential oils, pheromones, and plant extracts - disrupt pest behavior without harming beneficial species. Predators, parasitoids, and entomopathogenic nematodes are also used as biological control agents in pest suppression. These eco-friendly alternatives are increasingly integrated into organic farming and Integrated Pest Management (IPM) programs due to their target specificity, biodegradability, and lower risk of resistance development. Though challenges remain - such as limited shelf life, narrow pest spectrum, and regulatory complexity - the benefits of reduced toxicity and environmental safety make biopesticides an attractive substitute for synthetic pesticides in agriculture, forestry, and public health.

The global biopesticides market is gaining momentum, estimated at US\$7.1 billion in 2024 and projected to reach US\$14.7 billion by 2030, registering a CAGR of 12.7% during 2024-2030. Market expansion is underpinned by rising demand for organic, residue-free produce, growing environmental awareness, and tightening regulations on synthetic pesticide use. Supportive regulatory frameworks - such as the EU's expedited approval process and the EPA's backing of biological products - are accelerating adoption. Government incentives promoting organic agriculture, alongside mounting retailer and consumer pressure for safer inputs, are reshaping crop protection strategies. Advances in microbial fermentation, RNAi-based technologies, and improved formulations are enhancing product performance and broadening applicability. Coupled

with increasing R&D investments, strategic public-private collaborations, and heightened farmer awareness, especially in emerging markets, the outlook for biopesticides remains strong, with sustained growth anticipated across global agricultural systems.

## Biopesticides Regional Market Analysis

North America holds the largest share of the global biopesticides market at 36.6%, driven by a mature agricultural infrastructure, strong regulatory frameworks, and rising consumer demand for organic produce. The United States and Canada are key contributors within this region's market, driven by stricter regulations on chemical pesticide use, rising environmental awareness, and the strong presence of major biopesticide manufacturers investing in research and development. Regulatory bodies such as the U.S. EPA and Canada's PMRA support market growth by streamlining approval processes and implementing policies that encourage the adoption of biopesticides. In contrast, Asia Pacific is the fastest-growing region, projected to record a 14.6% CAGR from 2024 to 2030. Rapid population growth, food security concerns, and the transition toward sustainable agriculture are accelerating market expansion, particularly in India and China. Government investments in bio-agriculture, bans on hazardous agrochemicals, rising organic farming acreage, and increased consumer awareness about chemical residues are creating a highly opportunistic environment for biopesticide adoption across the region.

## Biopesticides Market Analysis by Type

The bioinsecticides segment is the largest in the global biopesticides market with a 43% share in 2024, driven by their lower development costs, faster registration, and high efficacy in pest control. Products based on *Bacillus thuringiensis* and *Beauveria bassiana* are widely used due to their target specificity and environmental safety, aligning with the rising demand for organic and residue-free produce. This market dominance is driven by growing consumer preference for organic produce, stricter regulations on chemical pesticide use, and increasing awareness of the need to preserve ecological balance. Meanwhile, biofungicides are the fastest-growing segment, projected at a 13.8% CAGR through 2030, as resistance to chemical fungicides increases and regulatory bans on synthetic ingredients tighten. Formulations containing *Trichoderma*, *Bacillus*, and *Pseudomonas* offer dual benefits of disease suppression and soil health improvement, making them key tools in sustainable farming and integrated pest management strategies. As farmers shift to holistic and sustainable crop protection, biofungicides are gaining strong traction in disease-prone regions and high-

value crop systems.

### Biopesticides Market Analysis by Source

The microbial segment leads the biopesticides market by source, accounting for 61.4% share in 2024 and projected to grow at a CAGR of 13% through 2030. This growth is driven by its suitability for organic and residue-free farming, strong regulatory backing, and environmental safety profile. Sourced from bacteria, fungi, and viruses, microbial biopesticides offer broad-spectrum and target-specific pest control with minimal impact on beneficial organisms. Microbial pesticides, when integrated into IPM systems, contribute to improved soil health and lower toxicity, which also facilitates smoother regulatory approvals. The rising demand for organic food and increasing restrictions on synthetic pesticides further accelerate adoption. Technological advancements in formulation and delivery systems improved microbial pesticide efficacy and shelf life. Additionally, biochemical biopesticides such as plant extracts, pheromones, and growth regulators are also gaining momentum due to their non-toxic pest disruption mechanisms and compatibility with organic agriculture. Together, these segments are reshaping sustainable crop protection strategies globally.

### Biopesticides Market Analysis by Application

Foliar spray dominates the biopesticides market, with a 53.4% share in 2024, due to its direct application to plant surfaces, enabling immediate and effective pest and disease control. This method ensures rapid absorption, targeted delivery, and flexibility across crop types and growth stages, making it highly effective and farmer-friendly. Its compatibility with precision farming and ease of integration into existing spraying systems further drives adoption. Conversely, seed treatment is the fastest-growing application segment, projected to expand at a CAGR of 13.3% from 2024 to 2030. This growth is driven by increasing demand for early-stage crop protection, improved seedling vigor, and enhanced resistance to soilborne pathogens. Seed treatment enables targeted pest control with minimal chemical input, supports sustainable farming practices, and complements integrated pest management strategies.

### Biopesticides Market Analysis by Crop Type

The fruits and vegetables segment leads the biopesticides market with a 39.3% share in 2024, driven by their high susceptibility to pests and strong consumer demand for organic, residue-free produce. Biopesticides provide safe, targeted pest control solutions, making them particularly suitable for crops consumed raw, where minimal

chemical residue is essential. Growing adoption of IPM practices, export quality requirements, and stricter regulations on chemical pesticides are further accelerating their use in this segment. On the other hand, the oilseeds and pulses segment is expected to witness the fastest growth at a CAGR of 13.4% from 2024 to 2030, driven by increasing global demand for plant-based proteins, growing pest challenges in high-value crops, and the shift toward sustainable pest management practices. Farmers are turning to biopesticides to enhance yield quality, minimize chemical residues, and support eco-friendly cultivation practices aligned with global export and sustainability benchmarks.

## Biopesticides Market Report Scope

This report on Biopesticides analyzes the global and regional markets based on type, source, application and crop type 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: 2021-2024

Base Year: 2024

Forecast Period: 2024-2030

Units: Value market in US\$

Companies Mentioned: 17+

## Biopesticides Market by Geographic Region

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

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

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

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

Rest of World

## Biopesticides Market by Type

Bioinsecticides

Biofungicides

Bionematicides

Bioherbicides

Other Types (Including Biochemical, Plant Growth Regulators, Semiochemicals, Essential Oils, and Others)

## Biopesticides Market by Source

Microbials

Biochemicals

Beneficial Organisms

## Biopesticides Market by Application

Foliar Spray

Soil Treatment

Seed Treatment

Other Applications (Including Drip Irrigation, Fertigation, Hydroponic Systems, Controlled Environment Agriculture, and Others)

## Biopesticides Market by Crop Type

Cereals & Grains

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- Amano Enzyme, Inc.
- Associated British Foods Plc
- Aum Enzymes
- Aumgene Biosciences Pvt Ltd
- BASF SE
- Biocatalysts Ltd
- Brenntag SE
- CBS BREW

Chr. Hansen Holdings A/S  
DSM-Firmenich  
DuPont de Nemours, Inc.  
Enzyme Development Corp  
Enzyme Innovation  
Infinita Biotech Pvt Ltd  
International Flavors & Fragrances, Inc.  
Kerry Group PLC  
Lesaffre  
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