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Bio-rational Fungicides Market Forecasts to 2032 – Global Analysis By Source (Botanical, Microbial and Mineral-Based & Natural Compounds), Crop Type, Formulation, Application, End User and By Geography

https://marketpublishers.com/r/B75814CB5CEBEN.html
Date: April 2025
Pages: 150
Price: US$ 4,150.00 (Single User License)
ID: B75814CB5CEBEN

Abstracts

According to Stratistics MRC, the Global Bio-rational Fungicides Market is accounted for $1.5 billion in 2025 and is expected to reach $3.9 billion by 2032, growing at a CAGR of 13.9% during the forecast period. Bio-rational fungicides represent a category of environmentally friendly and low-toxicity products designed for the control of fungal diseases in agricultural crops. These substances, originating from natural or biological sources like plant extracts, beneficial microbes, or biochemical compounds, are designed to specifically target pathogens while minimizing effects on non-target organisms. These fungicides help sustainable farming by lowering chemical leftovers, improving plant health, and reducing the chance of pathogens becoming resistant, making them a safer choice than regular fungicides.

According to data from the Indian Ministry of Agriculture and Farmers' Welfare, the consumption of biopesticides increased by more than 40% from 2014–2015 to 2018–2019, with 8,847 metric tonnes used in 2019–2020 and 8,645 metric tonnes in 2020–2021.

Market Dynamics:

Driver:

Growing consumer demand for organic and residue-free food

The need for bio-rational fungicides is being driven by growing health consciousness

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and regulatory scrutiny of synthetic pesticide residues. Food safety is a top priority for consumers, which pushes producers and retailers to use environmentally friendly practices. Farmers are also encouraged to transition to bio-rational alternatives by the strict EU and USDA organic certifications. Governments are accelerating adoption by using incentives to promote sustainable activities. Furthermore, growing disposable incomes in emerging economies increase the demand for high-quality, residue-free produce. Together, these elements propel market expansion and establish bio-rational fungicides as essential instruments for fulfilling international food safety regulations.

Restraint:

Higher cost compared to synthetic fungicides

Because of their restricted economies of scale and intricate extraction procedures, bio-rational fungicides frequently have higher production costs. Due to financial constraints, small-scale farmers, especially those in developing nations, prefer less expensive synthetic substitutes. Furthermore, repeated applications are required due to uneven efficacy under different field conditions, which raises operating costs. Price sensitivity further constrains penetration in price-driven markets like Asia and Africa.

Opportunity:

Expanding applications in integrated pest management (IPM) programs

In IPM frameworks that prioritize ecological balance and less dependency on chemicals, bio-rational fungicides are becoming more popular. Their low non-target toxicity and compatibility with beneficial insects support IPM objectives. Regulatory agencies and agricultural consultants are promoting the adoption of IPM to tackle the issue of traditional fungicide resistance. Partnerships between research universities and agrochemical companies are also fostering innovations in multi-mode action products. By entering IPM, bio-rational fungicides can now be used in greenhouse farming and specialty crops, establishing them as sustainable cornerstones of contemporary agriculture.

Threat:

Counterfeit and substandard bio-rational products

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The spread of fake bio-rational products undermines consumer confidence and jeopardizes crop protection results, especially in unregulated marketplaces. Poor formulations frequently don't contain active substances, which causes treatment failures and costs farmers money. Additionally, counterfeiters undercut real manufacturers by taking advantage of the premium pricing of authentic products. Regulatory loopholes in emerging markets exacerbate this problem.

Covid-19 Impact:

Factory closures and logistical snags caused the pandemic to upset biorational fungicide supply chains, postponing product introductions. Lack of labor hindered R&D and field applications. However, the demand for organic products increased as a result of consumers' increased attention to food safety during the crisis, which helped the industry recover indirectly. Following the epidemic, governments gave sustainable agriculture top priority in stimulus plans, which sped up the approval of biorational products. Additionally, digital channels became essential tools for farmer education, reducing the difficulties associated with outreach brought on by the pandemic.

The fruits & vegetables segment is expected to be the largest during the forecast period

The fruits & vegetables segment is expected to account for the largest market share during the forecast period. This is due to their high susceptibility to fungal infections and the rising demand for blemish-free, residue-free produce. Strict MRL (maximum residue limit) laws in North America and Europe drive export-oriented farming. Furthermore, because these crops are perishable, regular fungicide applications are required, favoring biorational solutions that adhere to organic standards. Advances in shelf-life extension technology further enhance the growth of this segment.

The botanical segment is expected to have the highest CAGR during the forecast period

Over the forecast period, the botanical segment is predicted to witness the highest growth rate due to customer demand for non-toxic, plant-derived products. Neem, garlic, and clove extracts are gaining popularity for their versatility and low environmental impact. Additionally, improvements in extraction methods improve the scalability and stability of the final product. The botanical active components' regulatory clearances and compatibility with organic farming make this market a high-growth frontier.

Region with largest share:

During the forecast period, the Europe region is expected to hold the largest market share. This is primarily due to the strict EU laws that govern synthetic pesticides and the generous subsidies provided for organic production. Sustainable agriculture is a top priority for nations like France and Germany, and bio-rational fungicides are a key component of their Green Deal programs. Furthermore, consumers' strong willingness to spend more on organic produce strengthens the market demand. Cooperative R&D efforts between agrochemical companies and universities further cement Europe's dominance.

Region with highest CAGR:

Over the forecast period, the Asia Pacific region is anticipated to exhibit the highest CAGR, driven by growing horticultural industries in China and India, as well as population-driven food demand. Through programs like India's National Mission on Natural Farming, governments are pushing bio-rational products. Furthermore, adherence to international residue standards is required due to the growing exports of tropical fruits and organic spices. Regional adoption is further accelerated by investments in agritech businesses and growing awareness of sustainable practices.

Key players in the market

Some of the key players in Bio-rational Fungicides Market include Bayer AG, Syngenta Group, BASF SE, Corteva Agriscience, Isagro S.p.A., Valent BioSciences, Koppert Biological Systems, Marrone Bio Innovations, FMC Corporation, Certis USA, Novozymes A/S, Sumitomo Chemical Co., Ltd, UPL Limited, Gowan Company, Andermatt Biocontrol AG, and Stockton Group.

Key Developments:

In May 2022, Sumitomo Chemical has received registration approval in Brazil, the world’s largest country of soybean production, for its soybean fungicide EXCALIA MAX®, which contains the novel active ingredient INDIFLIN®*. Including Brazil, the South American market currently represents some 30% of the global crop protection chemicals sales, and is expected to continue to steadily grow as the biggest market in the world.

In March 2021, BASF and AgBiome signed an agreement to bring a new biological fungicide to the market in Europe, the Middle East, and Africa. The product, marketed

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as Howler® in the United States, provides preventive, long-lasting activity on a broad spectrum of soilborne and foliar diseases.

Sources Covered:

- Botanical
- Microbial
- Mineral-Based & Natural Compounds

Crop Types Covered:

- Cereals & Grains
- Fruits & Vegetables
- Oilseeds & Pulses
- Other Crop Types

Formulations Covered:

- Liquid Formulations
- Dry Formulations

Applications Covered:

- Foliar Spray
- Soil Treatment
- Seed Treatment
- Post-Harvest Treatment

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End Users Covered:

- Agriculture Sector
- Gardening & Horticulture
- Turf & Ornamentals

Regions Covered:

- North America
  - US
  - Canada
  - Mexico
- Europe
  - Germany
  - UK
  - Italy
  - France
  - Spain
  - Rest of Europe
- Asia Pacific
  - Japan

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China

India

Australia

New Zealand

South Korea

Rest of Asia Pacific

South America

Argentina

Brazil

Chile

Rest of South America

Middle East & Africa

Saudi Arabia

UAE

Qatar

South Africa

Rest of Middle East & Africa

What our report offers:
- Market share assessments for the regional and country-level segments
- Strategic recommendations for the new entrants
- Covers Market data for the years 2024, 2025, 2026, 2028, and 2032

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- Market Trends (Drivers, Constraints, Opportunities, Threats, Challenges, Investment Opportunities, and recommendations)
- Strategic recommendations in key business segments based on the market estimations
- Competitive landscaping mapping the key common trends
- Company profiling with detailed strategies, financials, and recent developments
- Supply chain trends mapping the latest technological advancements

Free Customization Offerings:

All the customers of this report will be entitled to receive one of the following free customization options:

Company Profiling

Comprehensive profiling of additional market players (up to 3)

SWOT Analysis of key players (up to 3)

Regional Segmentation

Market estimations, Forecasts and CAGR of any prominent country as per the client's interest (Note: Depends on feasibility check)

Competitive Benchmarking

Benchmarking of key players based on product portfolio, geographical presence, and strategic alliances

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Note: Tables for North America, Europe, APAC, South America, and Middle East & Africa Regions are also represented in the same manner as above.

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