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India Biopesticide Active Ingredients Market Assessment, By Ingredient Type [Trichoderma viride, Beauveria bassiana, Pseudomonas fluorescens, Verticillium lecanii, Bacillus thuringiensis, Others], By Source [Plants, Insects, Microorganisms], By Pest Type [Insecticide, Fungicide, Nematicide, Others], By Application [Soil Treatment, Foliar Treatment, Seed Treatment, Others], By Crop Type [Cash Crop , Fruits & Vegetables, Turf, and Ornamentals], By Region, Opportunities and Forecast, FY2017-FY2031F

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Abstracts

India Biopesticide Active Ingredients Market size was valued at USD 84.2 million in FY2023, which is expected to reach USD 228.6 million in FY2031 with a CAGR of 13.3% for the forecast period between FY2024 and FY2031. Over the decades, the immense use of synthetic chemical fertilizers and insecticides has hampered the soil and natural ecosystem. The green revolution in India to assure sustainable long-term food security to enhance crop production and yield using chemical pesticides has harmful effects on human health and has proven catastrophic for soil microbiota. Replacing synthetic composites, biopesticides have emerged as an organic tool to deal with the goal of sustainable agriculture.

The derivatives of the neem tree (Azadirachta indica A. juss), such as leaf extract, seed cake, and oil, have been extensively used as a fertilizer, reducing the risk of post-harvest loss in stored cereals. In India, under the Central Insecticides Board and Registration Committee (CIBRC) currently, around 970 products are registered, where

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the category distribution is highest for fungal followed by bacterial, viral, and other plant-based pheromones. Generally, biocontrol products are categorized as microorganisms based (microbial biopesticides), plant-derived (botanical pesticides), and pheromones (insect growth regulators).

Commercial Biopesticide Ingredients

India is a diverse country where the environmental conditions and land structure vary from state to state. Commercializing biological pesticide products comprises multi-step processes that have derived many small and large investors involved in the commercial production of biopesticides. Several active ingredients in pesticide products deliver their application according to their specific mode of action. Bacillus Amyloliquefaciens, a broad biological pesticide, assists in preventing fungicide/bacteriacide targeting the organism specifically, including Rhizoctonia, sclerotium, macrophomia, etc. B.Amyloliquefaciens is developed and utilized in India by the ICAR-National Bureau of Agriculturally Important Microorganisms. B.Amyloliquefaciens generates antimicrobial metabolites targeting plant pathogens by disrupting their cell membranes.

Trichoderma Viride, another active ingredient used in biological pesticides, is extensively used in different formulations, such as oil-based ones using paraffin, soybean, mineral, etc. A product comprising T.Viride developed by Green Tech Agro Products, Coimbatore targets Rhizoctonia solani and Macrophomia Phaseolina exclusively used in seed treatment and soil applications. A combination of Trichoderma Viride and Trichoderma Harzianum ingredients are particular in attacking Pythium, Rhizoctonia is commenced by Biotech International Ltd., which can be used in spray and seed treatment. The excellent characteristics of such active ingredients drive the market to invest more and replace synthetic pesticides with bio-ones, which tremendously potentializes the market to grow more.

Constraints Affecting Usage of Biopesticides

Biopesticide production is challenging and requires proper monitoring from investing to distributing. Potential strains should be necessary when selling biopesticides, including packaging, storage, and distribution. Organic bio-inputs certified and regulated by APEDA (Ministry of Commerce) face significant competition for delivering high-quality biopesticides, providing a stage to compete with manufacturers. In addition to constraints, the market experiences investing more in research and development along with the variable cost for registration of biopesticides. Under the Global Harmonized System (GHS), the registration facilitation process of biopesticides should be framed.

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Another obstacle is the 12% Goods and Services Tax (GST) imposition on microbial products and botanical plants to be incorporated in biopesticides or any natural fertilizers.

Biopesticides are comprised of living microbes that experience temperature fluctuations, humidity, and ultraviolet radiation. These factors result in shelf-life instability, which is also a significant concern for the efficiency of biopesticides. Any contamination from the external environment substantially reduces the microbial counts in the field conditions. The mentioned constraints are essential, and more efforts should be implemented to circumvent the rampant unfavorable conditions. These factors generate the extreme potential for the market to expand more in tackling compliances and environmental conditions.

Impact of COVID-19

The COVID-19 pandemic had a devastating impact on the Indian economy, exacerbating the supply chain and different industrial sectors. Food and agriculture sectors were severely affected as the stringent measures by the government led to the shutdown of agricultural practices that posed an extreme threat to food safety and nutrition. The outbreak has consequently led to a decline in biopesticide demand from farmers, ultimately affecting the closure of manufacturing facilities. To compensate for the catastrophic effects of COVID-19, the government began various awareness sessions about food safety, organic farming, and environmental sustainability. The prominent measures and unveiling of the significance of chemical-free and organic foods are driving the market to increase the consumption of biopesticides, which will substantially expand the market.

Impact of Russia-Ukraine War

The war hit countries Ukraine and Russia, both are the largest producers and exporters of arable crops, specifically cereals and oilseeds. The triggered conflict between both nations led to disruptions in food security as the majorly affected sectors are food crops, fertilizers, biopesticides, etc. The havoc and fear experienced by the countries entirely dependent on fertilizer imports from Russia and Belarus forced them to secure alternative sources from the market. Despite sternness, India dominated importing of fertilizers from Russia, which increased dramatically. The annexation of Ukraine and the fall of global wheat supply urges India to increase its wheat export which recorded around 10 million tons during 2022-2023. Consequently, the market will expand for biopesticide ingredients which could fascinate investors to explore the market's

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potential.

Key Players Landscape and Outlook

Companies in India are advancing their technologies to develop biopesticides ingredients that should be specific in their actions. Kan Biosys Pvt. Ltd. specializes in agri-biotech, specifically in plant nutrition and pest management. Their produced biopesticides are used in soil and foliar sprays. Their product, Nemastin, comprises Trichoderma Harzianum, which is exclusively used in soil application in the kharif and rabi seasons. Its unique feature delivers essential input for enriching the rhizosphere with organic matter and nematode-preying fungi. Its unique formulation is very effective in repelling nematodes and is organic-certified.

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