

United States Crop Protection Chemicals Market By Type (Herbicides, Insecticides, Fungicides, Plant Growth Regulators, Others), By Origin (Synthetic, Biopesticides), By Form (Liquid, Solid), By Mode of Application (Foliar Spray, Seed Treatment, Soil Treatment, Others), By Region and Competition, Forecast & Opportunities, 2019-2029F

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Abstracts

United States Crop Protection Chemicals Market was valued at USD 16.01 Billion in 2023 and is anticipated to reach USD 20.49 Billion in the forecast period with a CAGR of 4.37% through 2029. Crop Protection Chemicals, also known as pesticides, are substances used to control, repel, or kill pests that pose a threat to crops. These pesticides include herbicides for controlling weeds, insecticides for controlling a wide range of insects, fungicides used to prevent the growth of molds and fungi, and others. The primary goal of using these chemicals is to increase agricultural productivity by preventing potential losses due to pests.

The Crop Protection Chemicals market in the United States is a significant segment of the agricultural industry. The U.S. is one of the largest markets for pesticides, driven by its vast agricultural sector, the need to maximize crop yield, and the increasing threat of pests and diseases. This market comprises numerous domestic and international players providing a variety of crop protection solutions, from traditional synthetic pesticides to more environmentally friendly biopesticides. Despite the ongoing debates about the environmental and health impacts of these chemicals, their efficacy in pest control keeps their demand high.

Key Market Drivers

Increasing Instances of Pest Attacks

In the United States, escalating instances of pest infestations have significantly increased the demand for crop protection chemicals. Pests, including insects, fungi, and diseases, pose substantial threats to crop yields and food security. The Food and Agriculture Organization (FAO) estimates that between 20% to 40% of global crop production is lost to pests annually, with plant diseases costing the global economy around USD 220 billion and invasive insects approximately USD 70 billion each year. In the U.S., crop losses due to plant pathogens not originating domestically are estimated to cost USD 21 billion per year. These figures underscore the critical need for effective pest management strategies. Climate change, globalization, and evolving pest resistance contribute to the intensification of these attacks, making it imperative for farmers to adopt advanced crop protection solutions.

The adoption of crop protection chemicals, such as insecticides, fungicides, and herbicides, has become pivotal in modern agriculture. These chemicals play a crucial role in mitigating the adverse effects of pest infestations, thereby ensuring a stable and secure food supply. The economic ramifications of crop losses due to pests highlight the significance of proactive pest management strategies. Consequently, farmers are increasingly turning to innovative and effective crop protection solutions to preserve their agricultural investments and enhance overall productivity.

This heightened demand for crop protection chemicals not only reflects the urgent need to combat pest-related challenges but also underscores the pivotal role these chemicals play in sustaining a resilient and productive agricultural sector in the face of evolving environmental and biological threats. The U.S. Department of Agriculture (USDA) continues to support research and development in this area, aiming to provide farmers with effective tools to manage pest-related challenges.

Adoption Of Integrated Pest Management Practices

In the United States, the adoption of Integrated Pest Management (IPM) practices has led to a nuanced relationship with the demand for crop protection chemicals. IPM is a sustainable, science-based approach that combines biological, cultural, physical, and chemical tools to manage pests in a way that minimizes economic, health, and environmental risks.

While IPM emphasizes reducing reliance on chemical pesticides, it does not eliminate

their use. Instead, it advocates for the judicious application of chemical interventions when necessary, integrated with other pest management strategies. This balanced approach ensures effective pest control while mitigating potential negative impacts on human health and the environment. The U.S. Department of Agriculture (USDA) has recognized the importance of IPM in promoting sustainable agriculture. The National Road Map for Integrated Pest Management outlines strategic directions for building and maintaining research, education, and extension programs that focus on IPM priorities across various agricultural settings.

Despite the emphasis on non-chemical methods, the demand for crop protection chemicals remains integral to many IPM programs. These chemicals serve as a key component in the arsenal against resilient pests, especially when other methods are insufficient. The judicious application of targeted chemicals within an IPM framework is viewed as a pragmatic approach to mitigate crop damage effectively.

As a result, the agricultural sector's commitment to sustainable and integrated approaches has spurred innovations in formulations and application methods. The evolving landscape of pest management in the United States reflects a nuanced interplay between the adoption of integrated strategies and the continued demand for crop protection chemicals that align with the principles of sustainability and environmental stewardship.

High Investment in R&D

The United States has long been at the forefront of agricultural research and development (R&D), and this has been a key driver in the advancement of crop protection chemicals. According to the U.S. Department of Agriculture (USDA), agricultural R&D investments have significantly contributed to the development of new pest management solutions, promoting innovations in crop protection. While public agricultural R&D funding in the U.S. has declined in recent years, private-sector investment continues to rise. This shift in funding sources is shaping the evolution of crop protection chemicals, with the private sector focusing on precision agriculture, sustainable solutions, and the development of next-generation chemicals with reduced environmental impact.

The USDA reports that public agricultural R&D investments in the U.S. decreased by nearly a third from 2002 to 2019, highlighting a concerning trend in public funding. However, during this period, private sector investments in agriculture have remained strong, helping fill the gap. For instance, major chemical companies like Corteva and

Bayer continue to lead in the development of innovative pest control solutions. These advancements are particularly critical as the U.S. faces challenges like climate change, pest resistance, and the need for sustainable agricultural practices.

Moreover, the USDA has highlighted that advancements in crop protection chemicals are increasingly intertwined with biotechnological innovations. For example, genetically modified crops that are resistant to pests require specialized chemicals to manage any potential secondary pest outbreaks. These trends are driving continued R&D investments into new chemical solutions to complement agricultural biotech advancements. The combination of private and public R&D efforts is expected to continue fostering the growth and innovation of crop protection chemicals in the U.S. over the next decade.

Key Market Challenges

High Research & Development Costs

The research and development (R&D) costs incurred in the exploration and commercialization of new crop protection chemicals are significantly substantial. The lengthy and expensive process involved in bringing a novel chemical to the market, combined with the inherent uncertainty surrounding regulatory approval, presents a formidable financial challenge for manufacturers. Striking the right balance between the imperative for innovation and the need for cost-effectiveness is a nuanced undertaking, particularly when taking into account the intricate web of potential risks and uncertainties associated with market acceptance and regulatory compliance. It requires careful consideration of factors such as market dynamics, competitive landscape, and evolving regulatory frameworks to navigate through this complex landscape successfully.

Increasing Cases of Resistance in Pests & Weeds

The development of resistance in pests and weeds is an ongoing and complex challenge for the crop protection chemicals market. As farmers and growers rely on chemical solutions to combat harmful pests and weeds, the repeated use of the same chemicals can gradually lead to the evolution of resistance in these target organisms. This process, known as resistance evolution, poses a significant threat to the sustainability of pest management strategies. When pests or weeds become resistant to certain chemicals, it means that these chemicals become less effective in controlling their populations. This can have detrimental effects on crop yields and overall

agricultural productivity. To address this issue, continuous research and innovation are crucial in order to develop new, effective chemicals or alternative approaches that can effectively combat resistant pests and weeds.

Efforts are being made to understand the mechanisms behind resistance evolution and to develop strategies that can help delay or prevent its occurrence. Integrated pest management practices, which combine multiple control methods such as biological control, cultural practices, and chemical treatments, are gaining importance in order to reduce the reliance on chemical solutions and minimize the risk of resistance development. By investing in research, adopting sustainable pest management practices, and promoting a holistic approach to crop protection, the industry can strive towards long-term solutions that ensure the effectiveness and sustainability of pest management strategies.

Key Market Trends

Increasing Adoption of Biologicals & Biopesticides

The United States Crop Protection Chemicals Market is experiencing a notable shift towards the adoption of biologicals and biopesticides, driven by increasing environmental concerns and a growing emphasis on sustainable agricultural practices. Biologicals, encompassing beneficial microorganisms and naturally occurring compounds, are gaining prominence as eco-friendly alternatives to traditional chemical pesticides. This transition reflects a strategic move towards integrated pest management (IPM) systems that harmonize agricultural productivity with environmental stewardship.

Farmers are increasingly integrating biopesticides into their pest management strategies, recognizing their effectiveness and reduced environmental impact. For instance, the U.S. Department of Agriculture's Agricultural Research Service (ARS) has developed a bacteria-based biopesticide, 'Grandevo,' which controls pecan weevil populations while preserving beneficial natural enemies and contributing to pecan aphid control. This biopesticide offers an environmentally safe alternative to chemical insecticides, aligning with sustainable agricultural practices.

The adoption of biologicals and biopesticides signifies a broader commitment within the agricultural sector to sustainability and responsible stewardship. This shift not only reduces chemical usage and minimizes environmental impact but also redefines agricultural practices to prioritize long-term viability and resilience. As environmental

regulations become more stringent and consumer demand for organic and sustainably produced food increases, the integration of biologicals and biopesticides is expected to continue its upward trajectory, reshaping the future of crop protection in the United States.

Development of Novel Formulations and Delivery Systems

Innovation in formulations and delivery systems is a significant and ongoing trend in the United States Crop Protection Chemicals Market. With the growing demand for sustainable and environmentally-friendly solutions, manufacturers are heavily investing in extensive research and development efforts. The goal is to create novel formulations that not only enhance the effectiveness of active ingredients but also minimize their environmental impact.

To achieve this, cutting-edge encapsulation technologies and nano formulations are being explored. These advancements enable controlled and targeted release of chemicals, ensuring maximum efficiency while reducing the need for frequent applications. By precisely delivering the crop protection chemicals where they are needed most, farmers can optimize their usage, leading to a more sustainable and cost-effective approach to crop protection. The continuous advancement in formulations and delivery systems not only benefits the farmers but also contributes to the overall sustainability of agriculture. By maximizing the efficiency of crop protection chemicals and minimizing their environmental footprint, these innovations play a crucial role in ensuring the long-term health and productivity of our crops and ecosystems.

Segmental Insights

Type Insights

Based on the Type, Herbicides emerged as the fastest growing segment in the United States Crop Protection Chemicals Market in 2023. This is driven by the increasing need for efficient weed control in modern agriculture. As farming practices become more intensive, managing weed competition for water, nutrients, and sunlight has become critical for maximizing crop yields. Herbicides are increasingly relied upon for their effectiveness in controlling a wide range of weeds, which, if left unchecked, can significantly reduce crop productivity. The growth of herbicides is also linked to the rise in no-till and reduced-till farming practices, which help conserve soil health but require advanced weed management solutions. Furthermore, the adoption of herbicide-resistant crop varieties is boosting demand for specific herbicides designed to target

resistant weed species. This growing need for efficient and targeted weed control solutions is expected to continue driving the rapid expansion of the herbicide segment in the U.S. crop protection chemicals market.

Origin Insights

Based on the Origin, Biopesticides emerged as the dominant segment in the United States Crop Protection Chemicals Market in 2023. This is attributed to several key factors. Heightened awareness and regulatory emphasis on environmental sustainability have propelled the demand for bio-based solutions. With consumers and regulatory bodies alike scrutinizing agricultural practices more closely, there's a palpable shift towards eco-friendly alternatives, favoring biopesticides over their chemical counterparts. Advancements in biotechnology have significantly enhanced the efficacy and applicability of biopesticides, making them increasingly competitive in terms of performance. Through targeted formulations and innovative delivery mechanisms, biopesticide manufacturers have been able to address longstanding efficacy concerns, further bolstering their market appeal.

Regional Insights

The Mid-West emerged as the dominant region in the United States Crop Protection Chemicals Market in 2023, holding the largest market share. This is due to its extensive agricultural production. Known as the 'Corn Belt,' the Midwest is a key hub for the cultivation of crops such as corn, soybeans, and wheat, which are highly dependent on crop protection chemicals to maintain high yields. The region's large-scale farming operations, coupled with the growing demand for enhanced crop protection solutions, have made it the focal point for pesticide and herbicide use. Farmers in the Midwest face various agricultural challenges, including weed resistance, pest infestations, and environmental factors like weather variability, all of which drive the need for advanced crop protection solutions. The dominance of large-acreage farms in the Midwest further boosts demand for crop protection chemicals, as farmers require effective and scalable solutions to protect their crops efficiently.

Key Market Players

BASF SE

The Dow Chemical Company

DuPont de Nemours, Inc.

Sumitomo Chemical America, Inc.,

Syngenta Crop Protection AG

Bayer CropScience LLC

FMC Corporation

Corteva Agriscience

Nufarm Americas Inc.

Valent BioSciences LLC

Report Scope:

In this report, the United States Crop Protection Chemicals Market has been segmented into the following categories, in addition to the industry trends which have also been detailed below:

United States Crop Protection Chemicals Market, By Type:

Herbicides

Insecticides

Fungicides

Plant Growth Regulators

Others

United States Crop Protection Chemicals Market, By Origin:

Synthetic

Biopesticides

United States Crop Protection Chemicals Market, By Form:

Liquid

Solid

United States Crop Protection Chemicals Market, By Mode of Application:

Foliar Spray

Seed Treatment

Soil Treatment

Others

United States Crop Protection Chemicals Market, By Region:

Northeast Region

Midwest Region

West Region

South Region

Competitive Landscape

Company Profiles: Detailed analysis of the major companies present in the United States Crop Protection Chemicals Market.

Available Customizations:

United States Crop Protection Chemicals Market report with the given market data, TechSci Research offers customizations according to a company's specific needs. The following customization options are available for the report:

United States Crop Protection Chemicals Market By Type (Herbicides, Insecticides, Fungicides, Plant Growth Reg...

Company Information

Detailed analysis and profiling of additional market players (up to five).

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