The Brazilian Bio Pesticides Market
Market, Industry, Status, Opportunities and Challenges

São Paulo
2015
Latin America – especially Brazil – plays an import role in this market, mainly due to potential land openings, but also growing concern by government agencies and conventional pesticide companies of the environmental impact of traditional pesticides and the need for integrated pest management programs for GMO and non-GMO crops. While Brazil has taken over the top global position for traditional pesticide use, the bio pesticide segment has also increased at 2-digit growth levels over the past five years. To better understand this dynamic market, Informa Economics FNP (FNP) will focus on all of the major drivers that impact the demand and supply sides of the Brazilian bio pesticide sector, including government role, R&D developments, current and near future players and the ramifications of GMO crops in this scenario.

Since 2005, FNP has been producing reports and monitoring the Brazilian crop protection sector. Most of the market research carried out has been focused on the traditional crop protection segment. Understanding this lack of data and information for bio pesticides, FNP decided to develop a detailed multi-client report on Brazil’s bio pesticides sector.

To execute this project, FNP will strongly rely on its proprietary database and experience in conducting market research in the crop protection sector. Additionally, in-depth interviews will be conducted with major chain players to better understand and qualify certain issues, trends and drivers. Lastly, the FNP team will analyze subjects and issues of relevance to the clients.

**KEY QUESTIONS TO BE ANSWERED**

- What is the market size in terms of values, volumes and hectares?
- What are the key players market shares? What are their strengths and weakness?
- What are the major crops and the main target pests in each that most favor the penetration of bio-pesticides?
- What is the estimated participation of illegal market? How do illegal products impact the market and needs to be done to fight them?
- What are the types of technologies and Biological AIs (Active Ingredients) being produced in Brazil? What types of products are being imported?
- What is the level of technology (process, quality control, infra-structure) required?
- What are the technology trends? What are drivers for product development?
- How do farmers perceive biological products, brands and companies? What are the key buying factors (KBF’s) and who influences them?
- What is the structure of the present bio-pesticide industry in Brazil? How does the entrance of new players such as crop protection companies and international biocontrol companies affect the market?
- What are the key challenges and opportunities for biopesticide market?
- Are there significant changes in product prices?
- Resistance issues are becoming more recognized and problematic. Do bio-pesticides offer a viable solution to these problems?
- What is the current legislative status of the industry and how it affects company’s competitiveness? What changes are needed and what might be a timetable for their enactment?
- What is the importance of organic farming to the biopesticides products?
- What is the importance of IPM (Integrated Pest Management) to biopesticides products and market?
Clients will receive a comprehensive report covering the topics present in the outline. The fully documented report will include all relevant background statistics, analyses and evaluations, and supporting detail developed during the study. This report will be delivered to clients in Power Point format along with an Executive Summary. If some clients prefer, a web or personal presentation can be made with additional costs covered by the interested clients.

**REPORT OUTLINE**

Based on FNP’s initial meetings with interested parties, the outline of this report will cover the entire value chain for bio pesticides in Brazil. The report will be organized in chapters as follows:

1. **Executive Summary**
2. **Market Size & Demand**
   a. Past Market
   b. Current Market
      i. Treated hectares, value, volume
      ii. By Crop
      iii. By Region
      iv. By Target Pest
      v. By Bio Agent
      vi. By Indication (Fungicide, Insecticide, Nematicide)
      vii. By Application type (Seed Treatment, Foliar)
      viii. Biological treatment cost per hectare vs conventional
      ix. Forecast – 5 years
      x. Formal vs Informal market
      xi. Captive production vs commercial
   c. Potential Market
   d. Organic Farming: Impact on Biopesticide market
   e. Integrated Pest Management (IPM): Impact on Biopesticide Market
   f. Biotechnologies: Impact on Market
3. **Industry Characterization/ Supply**
   a. Number of Companies/Concentration level
   b. Market Shares Key Players
   c. Overview of competitive strategies (focus on crops, broad portfolios, regional sales coverage, etc)
   d. Importance of multinationals
   e. Top Ten Company Profiles
   f. Product Lines Key Players
   g. Captive production
   h. Swot analysis
   i. Overview marketing strategies/services offering by industry
   j. Recent events
      i. M&A,
      ii. Partnerships,
iii. New entrants

4. Products
   a. Registered
      i. By Company
      ii. By Target Pest
      iii. By Crop
   b. Registration Pipeline

5. Government Role in Sector
   a. Overview legislation status
   b. Product Registration: entities involved, timeframe, costs.
   c. External influencers

   a. Breakdown: direct, indirect (coops and dealers)
   b. Packaging preferences
   c. Product types (Macros, Micros, Plant Extracts, etc)
   d. Number of brands sold per dealer
   e. How sold (package deals, etc)
   f. Payment Terms
   g. Price Monitoring – what info if product is registered or not
   h. Sku’s
   i. Formulation Types preference
   j. Industry support and programs to dealers

7. Farmer Behavior Pattern
   a. Perception (products efficiency, companies, brands, tech assistance)
   b. KBF (key buying factors)
   c. Influencers
   d. On farm operations with Bio Pesticides – how & when applied/tank mix; product storage/handling, etc.

8. Innovation Trends
   a. Product Development – drivers (mix of AIs, formulations, etc)
   b. Packaging development (increase shelf life)
   c. Patents

9. Market Barriers and Opportunities
This report covers the main biopesticide market segments but focus largely on the microbial and macrobial products.

<table>
<thead>
<tr>
<th>Product Class</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microbials</td>
<td>Microbial pesticides comprise microorganisms, usually a bacterium, virus, and fungus, that have activity against a particular crop pest. Commercially the most important microbial pesticides are varieties of Bacillus thuringiensis, which are active in the control of several important lepidopteran larvae. e.g. Sumitomo Dipel WP (Bacillus thuringiensis var. kurstaki, strain HD-1) – soil bacterium for control of insect pests.</td>
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<tr>
<td>Macrobiales</td>
<td>Macrobial biological products that are used in crop protection comprise living organisms that are either predatory or parasitic in their action against pests, usually insects (nematodes, predators, parasite). Products in this category include parasitic insects such as wasps that lay their eggs within an insect pest; predatory insects such as ladybugs, lacewings and insect larvae that are predators of insect pests; and nematodes that act as natural parasites on insect larvae. e.g. Koppert Tricho Strip G (Trichogramma galloi) - parasitic wasp for control of sugarcane borer.</td>
</tr>
<tr>
<td>Semiochemicals</td>
<td>Semiochemicals used in crop protection comprise pheromones that act by modifying insect behaviour. These products are used to interfere with insect mating or act as attractants for insect traps. e.g. Globachem Isomate CLR (codling moth pheromones) – traps for controlling fruit moths</td>
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<tr>
<td>Plant Extracts</td>
<td>Products within this category include fermentation-based products with activity as crop protection agents, as well as naturally derived products such as vegetable extracts that have activity against pests and diseases. e.g. Marrone Bio Innovations Regalia Maxx (extract of Reynoutria sachalinensis) – biofungicide based on giant hogweed extract.</td>
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</tbody>
</table>

**Project Scope and Focus Table:**

<table>
<thead>
<tr>
<th>Market Segments/Market Breakdown</th>
<th>Key Crops</th>
<th>Bio Agent</th>
<th>Main Target Pests</th>
<th>Indication*</th>
<th>Consolidated or total market</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microbial</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Macrobial</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Semiochemical</td>
<td>x</td>
<td>x</td>
<td></td>
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<td>x</td>
</tr>
<tr>
<td>Plant Extracts</td>
<td>x</td>
<td>x</td>
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<td>x</td>
</tr>
</tbody>
</table>

*Fungicides, Insecticides, Nematicides, Miticides.
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This study does not include biostimulant (products that improve plant metabolism) products, bio herbicides and synthetic chemical active ingredients that have been inspired to various extents by natural products (e.g. azoxystrobin). Natural extracts based products that are registered by Brazilian Ministry of Agriculture (MAPA) as chemical insecticides are not in the scope of this study (e.g avermectin -Syngenta, spinosad – Dow, tebufenozoiode - Dow, etc). These products will, however, be discussed in the scope of the study when relevant.

It is quite common to find clients interested in specific issues and subjects. Assuming that such issues and subjects are outside of the scope of this study, FNP can give further focus to certain subjects/issues at an additional cost.

REPORT METHODOLOGY

This study is based on a three-step methodology that starts with extensive desk research. FNP has developed other reports on the crop protection industries in Brazil and, as such, has considerable experience in providing the clients with pertinent data and information on the agricultural input chains in Brazil. It is important to note that the bio pesticides industry has gone through major changes in the past 2-3 years and, as such, new information and data sources are continuously being required. Upon the completion of the collection of in-house and secondary data/information, focus will be placed on consolidating such data and information in an orderly fashion.

The second stage of this study effort will involve interviews to enhance the database and qualitative information on the bio pesticides markets in Brazil. Since 2008, numerous changes have taken place on critical issues, including environment, industry consolidation and chain coordination. Important agents and players will be questioned on near-future trends. These interviews will be carried out with thought leaders, including suppliers of agricultural inputs, farmers, bio pesticide players, distribution channels and government entities. It is estimated that some 270 interviews will be conducted for this effort.

In the final analysis, FNP will draw upon their expertise to pinpoint drivers, barriers and trends, enabling the reader to analyze business opportunities and forecasts with a greater level of assurance and accuracy.

<table>
<thead>
<tr>
<th>Stage:</th>
<th>Type</th>
<th>Number</th>
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</thead>
<tbody>
<tr>
<td>Farmers*</td>
<td>In-depth Interviews</td>
<td>150</td>
</tr>
<tr>
<td>Dealers/Coops</td>
<td>In-depth Interviews &amp;</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>Quantitative</td>
<td></td>
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<tr>
<td>Industry</td>
<td>In-depth Interviews</td>
<td>30</td>
</tr>
<tr>
<td>Influencers (Consultants &amp;</td>
<td>In-depth Interviews</td>
<td>20</td>
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<tr>
<td>researchers)</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>270</strong></td>
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*Includes users and non-users of biopesticides; 10 megafarmers (farmers with more than 5 thousand ha of planted area). Interviews will be made for the main crops.
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WHO SHOULD BY THIS REPORT?

This study is designed to bring value to all players involved in the value chain for crop protection product lines, both traditional and bio pesticides. Some of the players that may require data and information on this important study include:

- Crop protection players (traditional and biological)
- R&D companies
- Financial and private equity investors
- Government entities involved with R&D
- Organizations and entities involved in agricultural technologies
- Agriculture consultancy organizations
- Product registration and service companies

REPORT SCHEDULE

<table>
<thead>
<tr>
<th>July –August, 2015*</th>
<th>Initial Participants/Subscriptions</th>
</tr>
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<tbody>
<tr>
<td>September, 2015</td>
<td>Program Start up: Interviews and Data Collection</td>
</tr>
<tr>
<td>October -November, 2015</td>
<td>Analysis and Conclusions</td>
</tr>
<tr>
<td>December, 2015</td>
<td>Final Report Elaboration</td>
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* Project starts after the minimum quotas are sold.

INVESTMENT & ENROLLMENT FORM

The Brazilian Biopesticide Market may be purchased for US$ 25,500. One half of the purchase price will be invoiced upon receipt of this order and with the second half to be invoiced upon delivery of the report. Payments in Brazilian Reals can be made to FNP in Brazil.

☐ Yes, I want to purchase the multi-client study entitled “The Brazilian Bio Pesticides Market: Status, Opportunities and Challenges”. Please enter my order for US$ 25,500.00

A web or personal presentation can be made with additional costs covered by the interest of the client. For more information, please contact.

☐ Please have someone contact me to provide further information.

FAX to Informa Economics FNP at 55-11-4504-1411
To subscribe to The Brazilian Biopesticide Market, please read and agree to the following statement:

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Richard J. Brostowicz, CEO of Informa Economics FNP, has been with AgraFNP since 2003. In this period with the company, Richard has supervised and worked directly on over 150 projects in consulting and market research as well as other risk analysis, feasibility and site location efforts. He began his career at AgraFNP in the Business Intelligence area with focus on market research initiatives with international clients. Prior to AgraFNP, Richard worked some 24 years at Monsanto’s Brazilian operation located in São Paulo. In this company, he worked in numerous departments, including Planning, New Business Development, Manufacturing and ended his career at Monsanto, establishing the Business Intelligence Department. Some of the highlights of his career at Monsanto include the successful approval of Nutrasweet in Brazil, approval of Lactotropin (Bovine Somatotropin) for commercial use in Brazil and the reorganization and implementation of a hybrid distribution system for agricultural chemicals and seeds. Richard also worked some eight years as a financial director for a venture capital firm in Brazil and a few years in consumer market research. He received his bachelor’s degree in marketing from the University of Wisconsin and later completed a post-graduate program in economics with OAS – Organization of American States. Richard has been directly involved with previous editions of this report.

Ana Carolina Burt – is an agronomist graduated from Esalq/University of São Paulo and has a MBA in Agribusiness. Before working at Informa Economics FNP, Carol worked with Basf Crop Protection in the areas of business development, crop and products strategic marketing and sustainability being part of local (Brazil), Regional (Latam) and global teams. Prior to Basf, she worked as a consultant with a local group, focusing on agribusiness projects related to carbon credit and carbon management programs serving large national and multinational companies in agribusiness, cement, aluminum, energy and chemical industries. As undergraduate, she worked as research assistant at University of Arizona, managing cotton crop trials and participating in crop extension programs. Currently, Carol is Business Intelligence manager at Informa Economics FNP. Her focus at FNP has been on ag input projects, commodity logistics, specialty fertilizers, bio stimulants and crop protection.

Marcelo Claudino - has over 20 years’ experience in agribusiness, which followed and delivered more than 350 research markets. Prior to joining Informa Economics FNP, was manager of Intelligence and Market Research on Multinational Agribusiness affiliated companies (Syngenta, Novartis and Sandoz) and Agnelo Agricultural Research and Consulting Market. A specialization in Strategic Intelligence (FIA / USP) and Master Degree in International Economics (UPMF - Grenoble, FR), with a degree in Agricultural Engineering (ESALQ / USP). In recent months, Marcelo was responsible for projects in the segments of pesticides (soy, horticulture and fruit production), seed / biotech (corn), fertilizers (phosphates) and agricultural retailing.

Global assistance will include the Informa Economics head office in Memphis, USA as well as Phillips MacDougal, a strategic consultancy firm within the Informa Group.

ABOUT THE INFORMA ECONOMICS GROUP

Informa is the world leader in broad-based agribusiness, energy and transportation consulting and commodity market analysis. Founded in 1977, the company now serves hundreds of firms and institutions worldwide. In December 2003, the company was acquired by Informa plc, a global business information group. The Informa Economics Group now encompasses Agra CEAS Consulting, Informa Economics FNP...
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Brazil and Washington Policy & Analysis, creating an international network of services and clients with offices in the U.S., Canada, the United Kingdom, Belgium and Brazil, and employing roughly 225 people. Informa offers several broad categories of services:

- Management consulting for agribusinesses, energy companies, renewable fuels companies, transportation service providers/users, related trade associations and government agencies;
- Agricultural and energy commodity market analysis;
- Risk management strategies;
- Education and training; and
- Newsletters and other publications.

Commodity Market Analysis

Informa offers a comprehensive package of well-respected, timely and highly detailed commodity market information. Informa constructs estimates and forecasts of U.S., Canadian and world crop and livestock/meat supply and demand fundamentals and prices. Additionally, Informa analyzes energy markets, transportation, government policies and long-term sector trends. The scope of this work covers the following areas:

- All major grains, oilseeds and products, cotton and fibers;
- Livestock, meat, poultry and dairy;
- Soft commodities, including sugar;
- Specialty vegetable oils;
- Energy;
- Transportation services;
- Weather services; and
- Long-term forecasting.

Informa has developed a global framework for conducting long-term forecasts of supply/demand balances of crops (primarily grains and oilseeds) and livestock, meat and poultry for major countries and world regions. In addition to forecasting global supply/demand balances, prices are forecast for major commodities traded in North America. While Informa’s ongoing short-term commodity market analysis is contained in its standard reports for clients, the long-term forecasting service is provided on a project basis and can be customized to each client’s needs.

Consulting Services

Informa’s Consulting Group provides management and economic consulting services to organizations in the agriculture, renewable fuels, food processing, foodservice and conventional energy sectors. Clients include corporations, cooperatives, trade associations and government agencies in the U.S., Canada and overseas. Informa advises clients on a broad range of economic, market, risk management, financial, strategic and regulatory issues. In order to meet client objectives, Informa utilizes a variety of methods, including:

- Business plan development;
- Strategic planning;
- Financial projections and feasibility determination;
- Site selection studies
- Market research;
- Economic impact analysis;
- Econometric analysis; and
- Risk management strategies.

In addition to business and market-related services, Informa’s Consulting Group conducts analyses of government policies and regulations. Informa consults with government agencies, non-government organizations, agribusinesses and trade associations regarding the impacts of policies and regulations on
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the agricultural and energy markets and industries. Additionally, Informa provides expert testimony for legal cases and government hearings.