

Biopolymers 2009:

Market Analysis and Opportunities

Year One of Kline's Renewable Chemistry Series

To Be Published Quarterly During 2009
Base Year: 2008

Regional Coverage

North America
Eastern Europe
Japan

A series of in-depth market reports and an interactive biorenewable business model that will investigate different scenarios based on oil price, regulatory environment, and raw material costs for different technologies currently being explored within the renewable chemistry market space.

Key questions addressed within this series include:

- What is the size of the biopolymers market globally, by region, by product type and application?
- What are the growth scenarios for biopolymers within each region and application?
- What is the impact of oil price on biopolymer investment and uptake?
- What are the perceived constraints affecting the uptake of biopolymers?
- What technologies are currently used and being developed?
- Who are the leading players in this market, and what investments are they making to expand opportunities within this industry?
- Where are the current centers of excellence for innovation?
- What patents have been applied for and approved within the biopolymers industry?
- What are the perceived and actual restraints with respect to the food and fuel industry regarding raw materials within this market?

Report Scope

Year One of the *Renewable Chemistry* series will focus on the biopolymers market, providing a detailed investigation of:

- Biodegradable polymers from renewable resources, including polylactic acid (PLA), polyhydroxyalkanoates (PHA), and thermoplastic starch (TPS)
- Compostable polymers from renewable sources, including cellulose, chitin, and proteins

An overview of biodegradable polymers from petrochemical sources, such as aliphatic and aromatic polyesters, polycaprolactone (PCL), and polyvinyl alcohol (PVA), will also be included to provide a detailed characterization of the market.

Established markets such as plastics and emerging markets such as medical devices will be assessed to ascertain market potential, key opportunities, and restraints for biopolymer usage.

Analysis will include product consumption, key trends by application, market developments, company profiles, the patent environment, challenges, and business opportunities.

Coverage of Japan, Europe, and the United States will be included within this subscription, with 2008 as the base year. Forecasts will be provided through 2013.

Year Two of the *Renewable Chemistry* Series will focus on performance additives. Companies subscribing in Year One will be involved in shaping the second year of the program.

Key Benefits

Reports in this series will be published on a quarterly basis, along with the biorenewable business model. The biorenewable business model will enable subscribers to develop scenarios around new and emerging technologies and will serve as an invaluable tool in the strategic planning process.

This program provides:

- An independent evaluation of the biopolymers market, giving subscribers a thorough understanding of the market potential and uptake of biopolymers within different industries
- The ability for subscribers to develop multiple scenarios within their business planning, testing assumptions with respect to oil price, regulatory environment, end-user switching propensity, and raw material prices and availability
- An understanding of the competitive landscape, allowing subscribers to protect or grow market share in underdeveloped markets
- An evaluation of the patent landscape, providing subscribers with details on emerging and disruptive technologies that may threaten their existing position

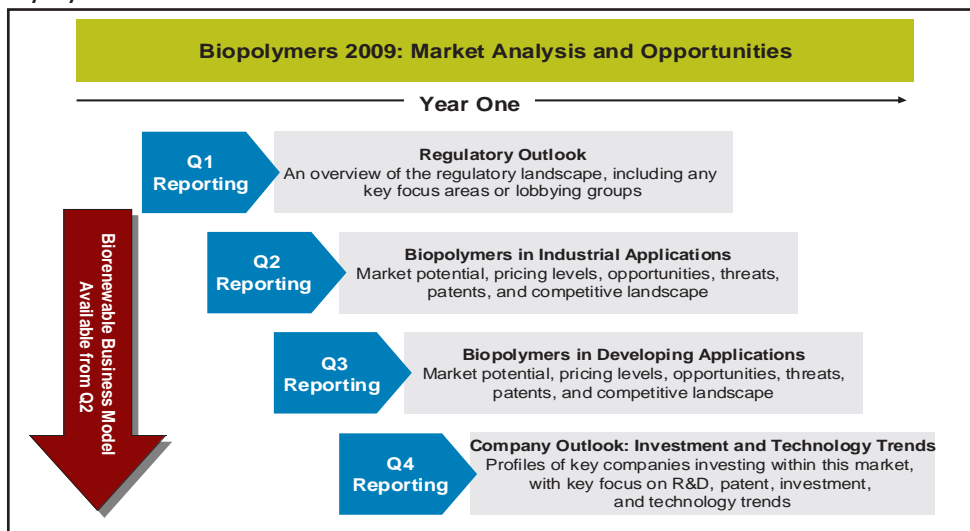
Program Outline

Biorenewables Business Model

The Biorenewables Business Model, which will be available in the second quarter of 2009, will provide an evaluation of the biopolymers industry by:

- Technology
- Raw material sourcing and availability
- Oil price evolution
- Production economics

Subscribers will be able to create different manufacturing scenarios by changing different economic inputs such as raw material and labor costs, as well as macro market criteria such as oil price and regulatory conditions.



The model will be accessible online by anyone in your organization from any enterprise location with a single account code and password. Data can also be exported to Excel format from the online interface.

Quarterly Reports

Q1. Regulatory Outlook

The following information will be provided for North America, Europe, and Japan:

- Key regulatory bodies
- Regulations by each application market regarding green issues and polymer use
- Key organizations involved in the development of the market

Q2. Biopolymers in Industrial Applications

The following information will be provided for the products and applications listed in Table 1:

- Market overview and definitions
 - Key products, technologies, and raw materials
- Market quantification
 - Estimated consumption by region, product, and application
 - Estimated supplier sales by region, product, and application
- Market forecast
 - Key challenges, drivers, and restraints
 - Trends in patent applications
- Competitive landscape
 - Overview of key supplier activities
 - Channels to market

Q3. Biopolymers in Developing Applications

The following information will be provided for the products and applications listed in Table 1:

- Market overview and definitions
 - Key products, technologies, and raw materials
- Market quantification
 - Estimated consumption by region, product, and application
- Market forecast
 - Key challenges, drivers, and restraints
 - Trends in patent applications
- Competitive landscape
 - Estimated supplier sales by region, product, and application

Q4. Company Outlook: Investment and Technology Trends

The following information will be provided for the products and applications listed in Table 1:

- Detailed profiles of leading players
 - Corporate overview
 - Positioning regarding sustainable development
 - Key green initiatives
 - Activities within biopolymers
 - Patent landscape
- Biopolymer company database
 - Company name
 - Key green initiatives
 - Patent activities

Table 1
Report Series Contents

| Products | Applications | Companies |
|---|--|--|
| <ul style="list-style-type: none"> ■ Polylactic acid (PLA) ■ Polyhydroxyalkanoates (PHA) ■ Thermoplastic starch (TPS) ■ Cellulose ■ Chitin ■ Proteins ■ Blends | <ul style="list-style-type: none"> ■ Industrial applications <ul style="list-style-type: none"> - Automotive - Packaging - Fibers - Others ■ Developing applications <ul style="list-style-type: none"> - Orthopedic devices - Sutures - Tissue culture - Others | <ul style="list-style-type: none"> ■ BASF ■ Dow Chemicals ■ DSM ■ DuPont ■ Mitsubishi Corp ■ National Starch and Chemicals ■ NatureWorks LLC ■ Nippon Shokubai ■ Sumitomo |

Methodology

Kline is unmatched in our ability to gather hard-to-get market and competitive intelligence with a high degree of confidence. Kline's market analysis approach places the principal emphasis on primary research techniques to ensure that the foundation of business intelligence and insight is accurate, current, and reliable.

During the course of field research, Kline's professional staff of industry experts conducts in-depth discussions and personal interviews with a wide range of knowledgeable industry participants and opinion leaders, including leading manufacturers and marketers of biopolymers, key end users, and representatives from pertinent government agencies and trade associations.

This approach has proven to be the most effective and reliable approach to obtaining accurate market data, capturing expert insights, and identifying business opportunities. Primary research will comprise the bulk of the overall research methodology for this report.

In addition, this analysis will be supplemented by secondary research drawn from suppliers' product literature and price lists, a search of recent trade and technical literature, Internet sources, and analysis of statistical data from government, industry, and trade associations and agencies.

Kline Credentials

Kline is a worldwide consulting and research firm dedicated to providing the kind of insight and knowledge that helps companies find a clear path to success. The firm has served the management consulting and market research needs of organizations in the chemicals, materials, energy, life sciences, and consumer products industries for nearly 50 years.

Kline's research and consulting services extend across the entire chemicals industry value chain. Our solutions have helped clients develop better ways to create and profit from new business opportunities, respond to competitive and economic threats, improve productivity, achieve sustainable growth, and optimize performance. Kline provides clients with facts, forecasts, and recommendations based solidly on the realities of the market.

Our market research reports and services are designed to provide subscribers with a deeper understanding of their markets, an outlook for their business, and accurate information about their competitors. Our clients tell us they often use Kline's market research to validate their own internal analysis, and many clients rely on Kline reports as their most critical source of information.

For more information about this study or Kline's other services, e-mail us at sales@klinegroup.com, visit our website at www.KlineGroup.com, or contact us at any of our regional offices listed below.

Recently published or in-progress research for the Chemicals industry includes:

- Global Business Opportunities in Synthetic Latex Polymers, 2006-2017
- Synthetic Latex Polymers: A Global Series of Regional Manufacturing Analyses
- Opportunities in High-Performance Barrier Packaging Films USA
- Green Cleaning: A Significant Element of Environmentally Sustainable Solutions - A Kline FlashPoint Report
- Biodiesel: Helping to Solve the Oil Crisis, but at What Cost? - A Kline FlashPoint Report

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- Direct access to the project team
- 1 day of consultation time to be used within six months of the publication date

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