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Enzymes

US Industry Study with Forecasts for **2014 & 2019**

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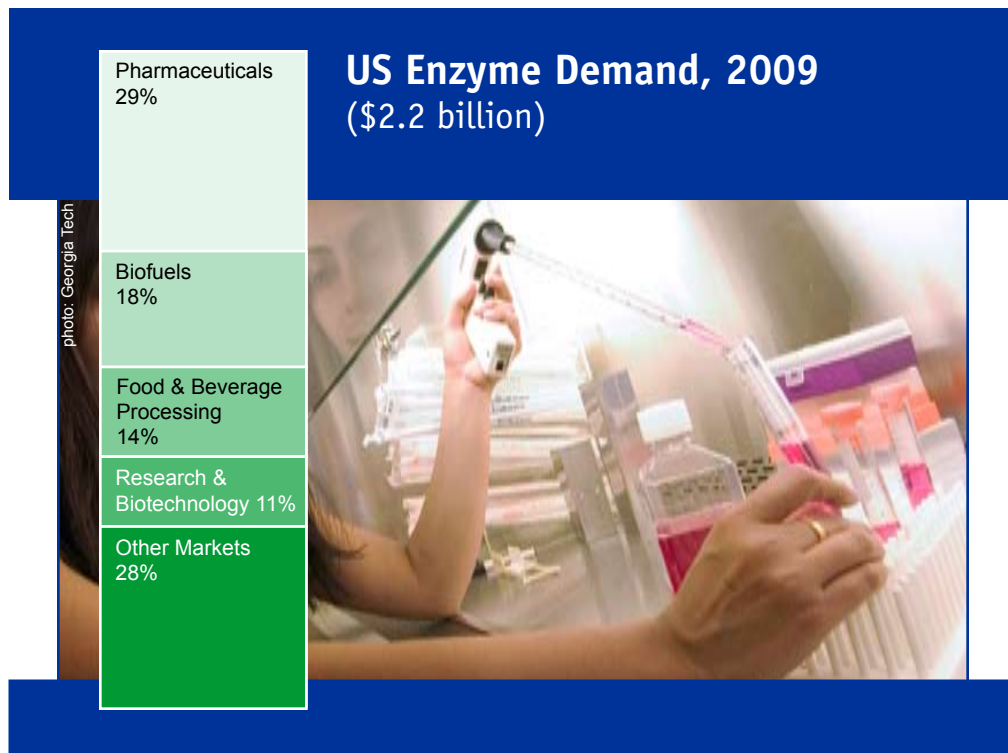
Gains will come from continued expansion of higher-value specialty enzymes used in applications such as pharmaceuticals, research and biotechnology, biocatalysts and biofuels.

US demand to increase 4.8% yearly through 2014

US demand for enzymes is forecast to increase 4.8 percent annually to \$2.8 billion in 2014. Solid industry growth in recent years has been based on advances in higher-value specialty enzymes used in applications such as pharmaceuticals, research and biotechnology, and biocatalysts, as well as in the emerging biofuels market. Going forward, gains will come from continued expansion in these markets as producers introduce new or more efficient enzymes for uses such as cellulosic ethanol production. While specialty enzymes are becoming increasingly important and will pace overall growth in enzyme demand, many industrial enzymes will continue to see advances in markets such as pulp and paper processing, animal feed, cosmetics and toiletries, and cleaning products. In value terms, demand for industrial enzymes will grow at a moderated pace compared to the 2004-2009 period for the larger industrial markets -- including food and beverage processing, cleaning products, and animal feed -- based on downward sales pressures from commoditization and maturing applications.

Biofuels, pharmaceuticals among best market opportunities

The biofuels enzyme market saw explosive growth from 2004 to 2009 as the US biofuels industry rapidly scaled up its production capacity and invested



in new technology to meet the quotas established by the Energy Independence and Security Act of 2007. To date, the biofuels enzyme product mix has been dominated by alpha amylases and glucoamylases used in conventional starch-based ethanol processing. Through 2014, gains will moderate as the industry undergoes a transition to cellulases and related enzymes for producing biomass (cellulosic) ethanol. This will be followed by a return to stronger growth led by cellulases as the US nears the federally mandated production level of 8.5 billion gallons of cellulosic ethanol in 2019.

Pharmaceutical enzymes, the largest market, will continue to see above-

average annual growth through 2014. The double-digit annual gains experienced in pharmaceutical enzymes from 1999 to 2009 were driven by several key enzyme-based medications holding orphan drug status from the US Food and Drug Administration (FDA) for treating rare LSDs, most notably imiglucerase (CEREZYME -- Genzyme) for Gaucher disease. Through 2014, key sources of demand in this market will include continued strength in enzyme replacement therapies (ERTs) for treating LSDs and related disorders, including several new ERT treatments; expanding medical indications for neuromodulators; and growth in enzymes used in cancer treatment.

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Sample Text, Table & Chart

PRODUCTS

Cellulases

3 percent in the fourth quarter of 2009. Demand for cellulases in the market, formerly a significant industrial application for these enzymes, will remain flat through the forecast period as US output of textile mill products experiences slow growth.

Cellulases are enzyme complexes, the components of which participate in the stepwise breakdown of native cellulose or cellulose derivatives to glucose. Cellulase enzymes experienced rapid growth in the early 1990s due to their use in stonewashing denims as a replacement for pumice stones. However, by the mid-1990s the market had become relatively mature, followed by outright declines after the 2001 economic downturn as US textile production dropped dramatically due to heavy competition from lower-wage countries such as China. From 1999 to 2009, growth in US sales of cellulases was driven primarily by the expansion of the animal feed market, in which these enzymes are used to break down non-starch polysaccharides (NSPs) in poultry diets, and by above-average annual growth in the cleaning pulp and paper markets. In the pulp and paper market, cellulases have been adopted to facilitate newer, more environmentally friendly manufacturing processes.

222

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TABLE V-17

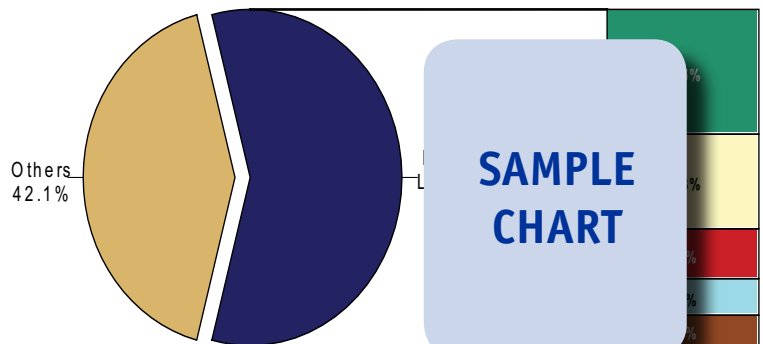
NUCLEASE DEMAND BY PRODUCT & MARKET
 (million dollars)

Item	1999	2004	2009	2014	2019
Research Expenditures (bil \$) \$ nuclease/000\$ research	2				5
Nuclease Demand					8
By Product:					
DNase					7
Other					1
By Market:					
Pharmaceuticals					0
Research & Biotechnology					9
Diagnostics & Other					9
% nuclease					3
Total Enzyme Demand					60

SAMPLE TABLE

CHART VI-1

US ENZYME MARKET SHARE BY COMPANY
 (\$2.2 billion, 2009)

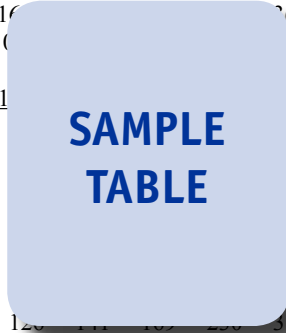


SAMPLE CHART

Sample Profile, Table & Forecast

TABLE IV-1
ENZYME DEMAND BY MARKET
(million dollars)

Item	1999	2004	2009	2014	2019
Nondurable Goods Shipments (bil \$)	100	110	120	130	140
\$ enzyme/000\$ nondurables	0.0001	0.0001	0.0001	0.0001	0.0001
Enzyme Demand	1	1	1	1	1
Pharmaceuticals					90
Biofuels					10
Food & Beverage Processing					55
Research & Biotechnology					90
Cleaning Products					15
Diagnostics					50
Animal Feed					30
Other Markets	120	110	100	90	80



COMPANY PROFILES

MP Biomedicals LLC
 3 Hutton Center Drive, Suite 100
 Santa Ana, CA 92707
 949-833-2500
<http://www.mpbi.com>

Annual Sales:
 Employment:

Key Products: ... for life science
 research appli...

MP Biomedicals is a leading manufacturer and marketer of chemicals and products for the life science, fine chemical and diagnostics markets. The Company offers more than 55,000 products.

The Company participates in the US enzyme industry through the production of enzymes for molecular biology and other life science research applications. Molecular biology enzymes from the Company include DNA polymerases employed in polymerase chain reaction (PCR) processes. Among its DNA polymerases are ARROW Taq and Q-BIOTAQ Taq types, ISIS high-fidelity proofreading varieties, and SUREPRIME standard and hot-start types.

MP Biomedicals' molecular biology products also include reverse transcriptases, and DNA and RNA modifying enzymes. The Company makes a variety of reverse transcriptases for PCR and other applications. DNA and RNA modifying enzymes, which are suitable for use in cloning and gene expression applications, include such products as T4 DNA ligases and calf intestine alkaline phosphatases.

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"... sales of neuromodulator enzymes in the US are expected to grow at a 6.6 percent annual pace to \$202 million in 2014. Noncosmetic applications will outpace cosmetic uses, a turnaround from the 2004-2009 period that will reflect emerging medical uses for botulinum toxins including possible widespread applications such as treating migraine headaches. Additionally, the cosmetic segment may be slowed somewhat ..."

--Section IV, pg. 77-8

OTHER STUDIES

Industrial & Institutional Cleaning Chemicals

US demand for industrial and institutional (I&I) cleaning chemicals will increase 4% annually through 2014. Disinfectants and sanitizers will be the fastest growing type as the food industry faces tighter safety requirements. General purpose cleaners and floor care cleaners will remain the largest segments. This study analyzes the \$8.8 billion US I&I cleaning chemical industry, with forecasts for 2014 and 2019 by market, product and raw material. It also evaluates company market share and profiles industry players.

#2683 September 2010..... \$4900

World Biofuels

Global biofuel demand will grow 10.3% annually through 2014. Bioethanol will see the greatest gains, driven by the large North American market as well as the faster growing markets in the Asia/Pacific region and Europe. The smaller biodiesel market will be the more rapidly growing segment. This study analyzes the 74.1 million metric ton global biofuel industry, with forecasts for 2014 and 2019 by product, world region and for 28 countries. It also evaluates company market share and profiles industry participants.

#2668 September 2010..... \$5900

World Industrial & Institutional Cleaning Chemicals

Global demand for industrial and institutional (I&I) cleaning chemicals will rise 4.4% yearly through 2013. Gains will be fastest in developing countries. The shift toward higher-end formulations with reduced environmental impact will continue, although commodity cleaners will retain their presence. This study analyzes the \$30 billion world I&I cleaning chemical industry, with forecasts for 2013 and 2018 by product, market, world region and for 18 countries. It also evaluates company market share and profiles industry participants.

#2608 April 2010 \$5800

Soy Chemicals

US soy chemical demand will grow 7.8% annually through 2013, driven by the continued penetration of biodiesel, and by the adoption of alternatives to traditional, petrochemical-based materials in manufacturing. Soy oil derivatives such as methyl soyate, polyols, soy-based foamed plastics, waxes and fatty acids hold particularly good prospects. This study analyzes the \$1.9 billion US soy chemical industry, with forecasts for 2013 and 2018 by product and market. It also evaluates market share and profiles industry players.

#2538 September 2009..... \$4700

World Enzymes

Global enzyme demand will rise 6.3% yearly through 2013, driven by strong demand in the specialty enzymes segment and good growth in animal feed and ethanol markets. North America and Western Europe will see healthy market gains while the fastest growth remains in developing countries. This study analyzes the \$5.1 billion world enzyme industry, with forecasts for 2013 and 2018 by product, market, world region and for 16 countries. It also evaluates market share and profiles industry players.

#2506 August 2009..... \$5800

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