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Natural Polymers

US Industry Study with Forecasts to **2010 & 2015**

Study #2156 | January 2007 | \$4300 | 262 pages



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Starch and fermentation product demand will grow at a double-digit pace to nearly \$800 million in 2010 driven by demand for polylactic acid and starch blend polymers in packaging and textile fiber uses.

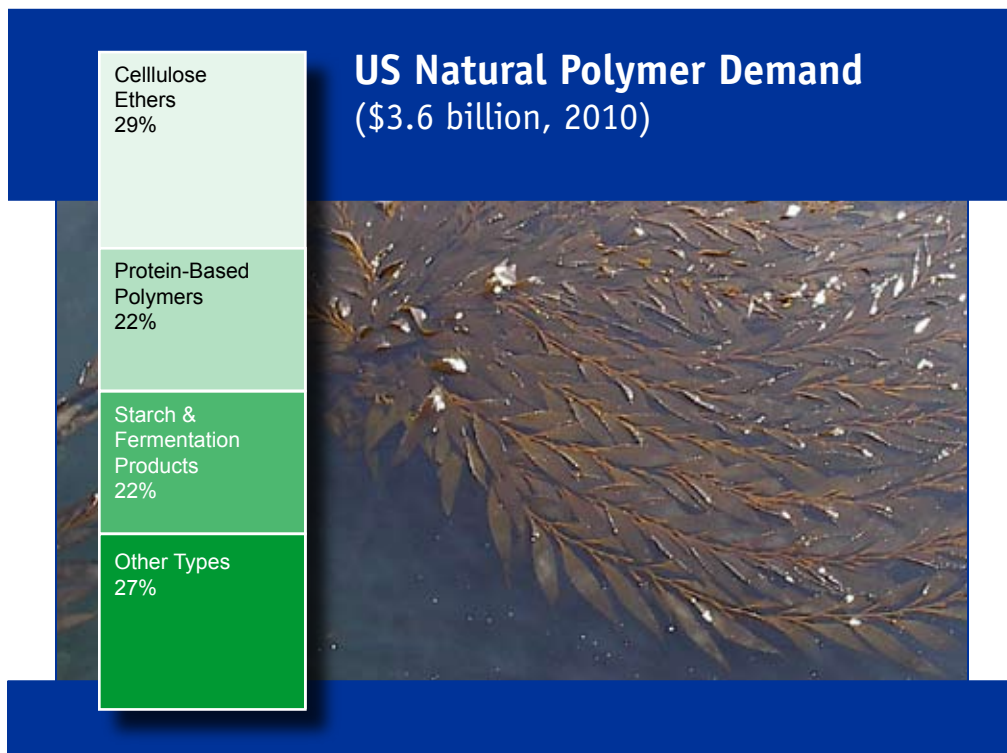
US demand to grow 5.9% annually through 2010

Natural polymer demand is expected to grow 5.9 percent annually to \$3.6 billion in 2010, reaching 1.7 billion pounds. Gains will be stimulated by increased levels of food production, and opportunities in packaging, medical and other areas. Threats to further growth include mature applications and variable supplies for products such as guar gum due to climatic and political uncertainties. With many natural polymers harvested offshore, imports will constitute a growing share of domestic demand.

CMC, starch/fermentation products to lead gains

Cellulose ether demand is projected to increase 4.2 percent yearly to \$1 billion in 2010. Cellulose ethers, which accounted for 31 percent of total demand in 2005, have widespread food, construction and oilfield applications. Methyl cellulose will account for 31 percent of the cellulose ether market due to its entrenched position in construction uses such as plaster, mortar, grouts, stucco and wallpaper pastes. Carboxymethyl cellulose (CMC) demand will expand at the fastest pace with best prospects expected in drilling, workover and completion fluids for the oilfield industry.

Starch and fermentation product demand will grow at a double-digit pace to nearly \$800 million in 2010. Declining prices, attributable to improved production efficiencies and expanded capacity,



will stimulate demand for polylactic acid and starch blend polymers in packaging and textile fiber uses. Hyaluronic acid demand will expand rapidly in medical and cosmetic/toiletry applications such as dermal fillers and orthopedic treatments. Robust growth is anticipated for protein-based polymers like collagen. The marine polymer segment will be driven by opportunities for carrageenan and alginates, while exudate and vegetable gum demand will be boosted by food/beverage and oilfield uses.

Food and beverages to remain dominant market

Food and beverages will remain the leading market for natural polymers,

which are used as thickeners, stabilizers and emulsifiers. Despite only modest 4.1 percent annual growth to \$1.3 billion in 2010, pockets of growth exist in areas such as low fat and reduced carbohydrate food formulations. Products such as CMC and xanthan gum will increasingly be used to improve mouthfeel and texture as fats and sugars are removed. Medical markets will present good opportunities for cellulose ethers and collagen in pharmaceuticals, dermal implants and injections. Oilfield advances will be fueled by increased drilling of new oil and natural gas wells, and the continued maturation of domestic crude oil and gas fields, all of which will increase the need for natural polymers used in well stimulation, exploration and other areas.

Sample Text, Table & Chart

PRODUCTS

Hyaluronic Acid

Hyaluronic acid demand is expected to increase nearly 10 percent annually to \$1.5 billion by 2015. Opportunities are expected in medical and pharmaceutical applications and for acid in medical injections. Demand is expected to pick up over twelve percent annually through 2010. Demand remains both dermal filler injections and orthopedic treatments based on the numbers of patients. Even faster growth in demand will be driven by competition in facial implant applications from botulinum toxin and improving grades of human-derived and bioengineered collagen.

SAMPLE TEXT

Commercial hyaluronic acid (HA) compounds are derived from rooster combs or bovine vitreous humor or through the fermentation of genetically modified *Streptococci* bacteria. HA is a natural polysaccharide polymer belonging to the same class of compounds as starch and cellulose. The substance is found naturally in the extracellular matrix of skin, cartilage, vitreous humor and other body tissue, and plays a role in the movement and proliferation of cells. Based on its *in vivo* functions, HA has been adapted to commercial compounds for treating a number of tissue-related conditions, including osteoarthritis of the joints, and facial wrinkles and folds of the skin. HA is also an ingredient found in many cosmetic skin moisturizers.

Cosmetic and toiletry applications for HA are projected to rise more than eleven percent annually through 2010 to \$34 million. HA is used widely as an ingredient of skin moisturizers and homeopathic supplements not subject to FDA regulations. The product is benefitting from its ability to attract water. As a result, this ingredient is finding expanded use in skin care formulations where the hyaluronic acid attracts and keeps moisture at the top layer of the skin, alleviating dryness.

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TABLE IV-5

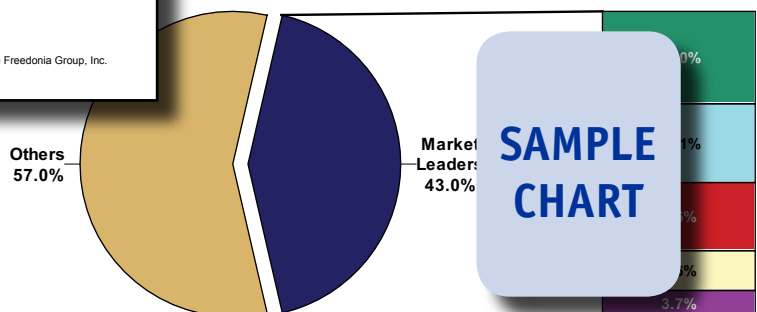
HYDROXYETHYL CELLULOSE DEMAND
(million dollars)

| Item | 1995 | 2000 | 2005 | 2010 | 2015 |
|-------------------------------------|------|------|------|------|------|
| Nondurable Goods Shpts (bil 2000\$) | 1678 | 1743 | 1686 | 1775 | 1865 |
| lb HEC/mil \$ nondurables | 26 | 31 | 38 | 41 | 42 |
| Hydroxyethyl Cellulose (mil lb) | | | | | 79 |
| \$/lb | | | | | 5 |
| Hydroxyethyl Cellulose Demand | | | | | 6 |
| Paints & Inks | | | | | 3 |
| Oilfield | | | | | 5 |
| Construction | | | | | 6 |
| Adhesives | | | | | 0 |
| Other | | | | | 2 |
| % HEC | | | | | 5 |
| Cellulose Ether Demand | | | | | 7 |

SAMPLE TABLE

TABLE V-1

AL POLYMER MARKET SHARE BY COMPANY, 2005
(\$2.7 billion)



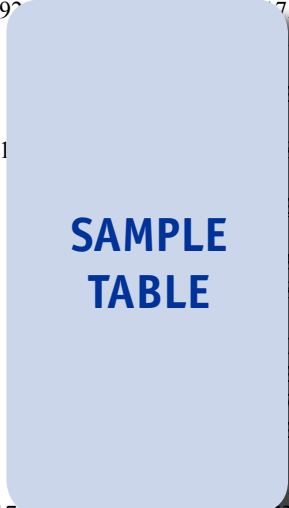
SAMPLE CHART

Sample Profile, Table & Forecast

TABLE III-18

**PACKAGING DEMAND FOR NATURAL POLYMERS
BY APPLICATION & PRODUCT**

| Item | 1995 | 2000 | 2005 | 2010 | 2015 |
|---------------------------------------|------|------|------|------|------|
| Packaging Shipments (bil 2000\$) | 97 | 100 | 103 | 107 | 112 |
| lb polymer/000\$ packaging shpts | | | | | |
| Natural Polymer Demand (mil lb) | | | | | |
| \$/lb | 1 | 1 | 1 | 1 | 1 |
| Natural Polymer Demand (mil \$) | | | | | |
| By Application: | | | | | |
| Loose-Fill | | | | | |
| Film & Other | | | | | |
| By Product: | | | | | |
| Starch & Fermentation | | | | | |
| Starch Blends | | | | | |
| Fermentation Products | | | | | |
| Other | | | | | |
| % packaging | | | | | |
| Total Natural Polymer Demand (mil \$) | 1710 | 2050 | 2700 | 3550 | 4730 |



COMPANY PROFILES

Genzyme Corporation

500 Kendall Street
 Cambridge, MA
 617-252-7500
<http://www.genzyme.com>

Revenues: \$
 US Revenues:
 Employment:



Key Products: hyaluronan- and hyaluronan/carboxymethyl cellulose-based biomaterials

Genzyme is a biotechnology and human health care company. The company's products and services are focused on rare inherited disorders, kidney disease, orthopedics, transplant and immune disease, cancer, and diagnostic testing. The Company operates in seven segments: Therapeutics, Renal, Transplant, Biosurgery, Diagnostics/Genetics, Other and Corporate.

The Company competes in the US natural polymers industry through the Biosurgery segment, which had revenues of \$457 million in 2005. Through the segment, Genzyme develops, manufactures and distributes biomaterials and biotherapeutics for the orthopedic and surgical markets. Biomaterials from Genzyme are based on hyaluronic acid, or hyaluronan. Hyaluronan, a naturally occurring polysaccharide biopolymer found in tissue and cell fluids, is gradually absorbed by the body in gel form. Among the Company's hyaluronan-based biomaterials are products sold under the SYNVISIC and SEpra products. SYNVISIC hyaluronan-based biomaterials are designed for the treatment of pain in the knee. The Company is conducting research and clinical trials for next-generation SYNVISIC products for the treatment of pain caused by

"Loose-Fill -- Demand for natural polymers in the manufacture of loose-fill packaging will grow 5.2 percent yearly to \$27 million in 2010. Advances will be driven by the availability of starch blend polymers with improved performance attributes and competitive prices. Further inroads will be threatened by competition from inflatable bags, bubble packaging, paper wrap and traditional expandable polystyrene loose-fill."

--Section III, pg. 18

OTHER STUDIES

Food Additives

This study analyzes the US food additive industry. It presents historical demand data (1997, 2002, 2007) and forecasts for 2012 and 2017 by product (e.g., flavors and flavor enhancers, texturizers and fat replacers, emulsifiers, preservatives, nutraceuticals, colorants, enzymes, alternative sweeteners, acidulants); and application (e.g., processed foods, dairy products, bakery products, candy). The report also considers market environment factors, evaluates company market share and profiles industry players.

#2305 02/2008..... \$4500

Oilfield Chemicals

US oilfield chemical demand will rise 4.3% per year through 2011. Gains will be driven by a rise in rig counts, more use of well stimulation and enhanced oil recovery (EOR) methods and more deepwater drilling and production. Best prospects include EOR chemicals, drilling fluids and well stimulation chemicals. This study analyzes the \$6 billion US oilfield chemical industry, with forecasts for 2011 and 2016 for formulated products and their raw materials. It also details market share and profiles major players.

#2253 10/2007..... \$4500

World Enzymes

World demand for enzymes will grow 7.6% annually through 2011. Gains will be driven by continued robust growth in pharmaceutical enzyme demand, double-digit increases in demand for biocatalysts for drug and fine chemical production, and the rapid expansion in bioethanol production from grains. This study analyzes the \$4.1 billion world enzyme industry, with forecasts for 2011 and 2016 by product, market, world region and for 15 countries. It also evaluates market share and profiles major players.

#2229 09/2007..... \$5400

Alternative Sweeteners

US demand for alternative sweeteners will grow 4% annually through 2010. Products such as sucralose, erythritol and xylitol will gain market share over more established products like aspartame and sorbitol. Newer types such as stevia and agave nectar will grow the fastest, hoping to appeal to consumers wary of high intensity sweeteners. This study analyzes the \$935 million US alternative sweetener industry to 2010 and 2015 by product and market. It also details company market share and profiles major players.

#2138 01/2007..... \$4300

Degradable Plastic

US degradable plastic demand will grow 16.8% annually through 2010 as these products become more price competitive and continue to benefit from various sustainable resource initiatives. Biodegradable/compostable plastic will remain dominant and grow the fastest, led by polyactic acid (PLA). Packaging will lead market gains. This study analyzes the \$335 million US degradable plastic industry to 2010 and 2015 by type and market. It also evaluates company market share and profiles leading industry players.

#2107 09/2006..... \$4400

About The Freedonia Group

The Freedonia Group, Inc., is a leading international industry market research company that provides its clients with information and analysis needed to make informed strategic decisions for their businesses. Studies help clients identify business opportunities, develop strategies, make investment decisions and evaluate opportunities and threats. Freedonia research is designed to deliver unbiased views and reliable outlooks to assist clients in making the right decisions. Freedonia capitalizes on the resources of its proprietary in-house research team of experienced economists, professional analysts, industry researchers and editorial groups. Freedonia covers a diverse group of industries throughout the United States, the emerging China market, and other world markets. Industries analyzed by Freedonia include:

- Chemicals • Plastics • Life Sciences • Packaging • Building Materials • Security & Electronics • Industrial Components & Equipment • Automotive & Transportation Equipment • Household Goods • Energy/Power Equipment

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