Corn

Part of a Sustainable Environment

Corn Refiners Association Annual Report 2006

Board of Directors

Jack Fortnum, Chairman
Corn Products International, Inc.

Peter A. Salis, Vice Chairman
National Starch and Chemical Company

John Rice
Archer Daniels Midland Company

Ed Harjehausen
Archer Daniels Midland Company

Patrick E. Bowe
Cargill, Incorporated

Ken Yoerg
Cargill, Incorporated

James P. Zallie
National Starch and Chemical Company

Thomas D. Malkoski
Penford Corporation

Timothy Kortemeyer
Penford Products Co.

Michael W. Jorgenson
Roquette America, Inc.

Richard O'Hara
Roquette America, Inc.

J. Patrick Mohan
Tate & Lyle Ingredients Americas, Inc.

D. Lynn Grider
Tate & Lyle Ingredients Americas, Inc.

Honorary Directors

Martin Andreas
Archer Daniels Midland Company

Fred M. Ash
Cerestar USA, Inc.

C. G. Caldwell
National Starch and Chemical Company

Paul E. Grunder
CPC International Inc.

Patric J. McLaughlin
Cerestar USA, Inc.

E. S. Micek
Cargill Trustees

G. M. Mitchell
Cargill Trustees

Donald E. Nordlund
A. E. Staley Manufacturing Company

William H. Powell
National Starch and Chemical Company

Robert M. Powers
A. E. Staley Manufacturing Company

Paul E. Ramstad
American Maize-Products Company

H. T. Reed
Penford Products Co.

John G. Reed, Jr.
Archer Daniels Midland Company

Samuel C. Scott
Corn Products International, Inc.

Michael A. Urbanic
Cargill, Incorporated

Richard Vandervoort
Corn Products International, Inc.

Contents

Corn Industry Statistics

The Year in Review

Audrae Erickson

President
Corn Refiners Association

Ask the average American about corn's role in a sustainable environment and the response will likely focus on ethanol. And with good reason. However, there are many more ways in which corn contributes to a sustainable environment. As a rich carbohydrate source, corn provides the backbone to a number of products that reduce our use of petrochemicals and non-renewable resources. Corn-based chemicals, solvents and fuels not only have a positive impact by reducing our dependence on fossil fuels, but they are also better for the environment. The versatility of carbohydrate chemistry ensures that we will continue to find new ways for corn to benefit the environment.

2006 *Corn Annual*

This year's *Corn Annual* highlights the ways corn contributes to a sustainable environment, including biodegradable products, widely consumed environmentally friendly products and new technologies.

Iowa is the top corn producing state and is home to more corn wet milling plants than any other. It is also home to a significant number of corporate, academic and government researchers and scientists who are finding new uses for corn. The Honorable Charles Grassley shares his knowledge of Iowa's corn industry and how it has helped enhance corn's role in a sustainable environment.

The traditional products of the corn refining industry have long proved useful in products that can be used in place of those made from petroleum-based resources or synthetic chemicals. Corn Refiners Association Chairman Jack Fortnum of Corn Products International, Inc. shows us how corn starch, corn sweeteners, corn oil and corn feed products contribute to a sustainable environment.

Just as research on new uses of corn is proving environmentally beneficial, developments in corn hybrids also have an environmental impact. Corn hybrids that have increased drought tolerance, flood and frost resistance, as well as other valuable traits, are in the pipeline. National Corn Growers Association President Ken McCauley draws on his expertise to demonstrate the many benefits of the next generation of corn.

Corn-based plastics are entering the mainstream marketplace and consumers like what they see. Steve Mojo, Executive Director of the Biodegradable Products Institute, tells us how PLA, PHA and Bio-PDO offer alternatives to petroleum-based plastics that are functional and better for the environment.

Issues of Importance to the Industry

Obesity

Obesity is an important and concerning public health matter. As a result, many scientists, health professionals and government agencies are actively searching for causes and solutions. The media covers this subject with varying levels of expertise. Unfortunately, some greatly oversimplify this important issue by attempting to single out specific food ingredients, sometimes including high fructose corn syrup (HFCS), as a unique or the sole cause for the complex conditions of overweight and obesity.

CRA frequently submits letters to newspapers that publish reports mischaracterizing HFCS, and sends packets of science-based information to reporters. These materials have been effective in educating both the media and the public about the issues. As a result, there has been a marked increase in articles that focus on the science and therefore provide more accurate information on HFCS. A significant development was a balanced, science-based article in *The New York Times*, which reached a large audience and provided several quotes from leading experts that dispute the existence of any unique role played by HFCS in increased overweight and obesity.

CRA has developed a one-page summary of representative quotes from a variety of experts that dispute the myth that HFCS is uniquely responsible for obesity. This document, along with a list of the top 10 published myths about HFCS, has greatly contributed to the public's access to science-based information on HFCS.

Other important developments include new

research presented at Experimental Biology 2006. Kathleen J Melanson, et al., at Rhode Island University recently reviewed the effects of HFCS and sucrose on circulating levels of glucose, leptin, insulin and ghrelin in a study group of lean women. The study found "no differences in the metabolic effects" of HFCS and sucrose. Martine Perrigue, et al., at the University of Washington also presented research that demonstrated that beverages sweetened with sucrose, HFCS and aspartame, as well as 1% milk, all have similar effects on satiety (feeling of fullness).

CRA has distributed science-based information on HFCS in other ways, including sending articles, press releases and other materials to journalists, dieticians and other health professionals who regularly address obesity issues. CRA also exhibits at conferences and provides informative, science-based materials to groups that request information on HFCS. The CRA engages in discussions with relevant professional groups at the American Dietetic Association (ADA) public policy workshop, the ADA annual conference, the Institute of Food Technologists conference, the School Nutrition Association conference and the North American Association for the Study of Obesity conference. We increased our outreach to food manufacturers and other HFCS users through meetings and trade publications.

To ensure that the information we provide is relevant and scientifically sound, CRA utilizes a Scientific Advisory Panel comprised of independent and highly respected outside expert advisors. The Advisory Panel also reviews CRA submissions to federal regulatory agencies and other governmental bodies.

Mexico Sweetener Dispute

The industry experienced a significant victory in the Mexico sweetener dispute in March 2006, when the World Trade Organization Appellate Body reconfirmed an earlier ruling that Mexico's tax on beverages containing HFCS violated its international commitments. As a result, the Mexican Government has agreed to lift the soda tax in January 2007.

The WTO Appellate Body's ruling fostered momentum for a final resolution of the sweetener dispute. In late July 2006, the U.S. and Mexico reached an agreement that established a 15-month HFCS tariff-rate quota to

Shipments of Products of the Corn Refining Industry—2005

Starch Products *(includes corn starch, modified starch and dextrins)*	6,699,213,000
Refinery Products *(includes glucose syrup, high fructose syrup, dextrose, corn syrup solids, maltodextrins)*	32,566,400,000
High fructose corn syrup—42%	10,284,652,000
High fructose corn syrup—55%+	13,219,195,000
Total HFCS	23,503,847,000
Total - Domestic Basic Products	39,265,613,000
Total - Export Basic Products	2,063,625,000
Corn oil *(crude and refined)*	1,079,430,500
Corn gluten feed and corn oil meal	10,046,508,500
Corn gluten meal	2,468,292,000
Steepwater	1,282,614,000
TOTAL SHIPMENTS	**56,206,083,000**

Compiled for the Corn Refiners Association by VERIS Consulting, LLC. Statistics represent shipments by members of the association. Shipments are in pounds, commercial weights, and do not include co-products derived from ethanol production.

Mexico, beginning October 1, 2006. The agreement reconfirms the terms laid out in the North American Free Trade Agreement setting an irreversible path to free trade in sweeteners on January 1, 2008.

Although the deal does not fully compensate the corn refining industry for losses over the past ten years, or fully resolve all outstanding disputes, it solidifies the promise for increasing U.S.-owned corn sweetener presence in Mexico. Since 1997, the sweetener impasse with Mexico has resulted in more than $4 billion in lost HFCS sales, both HFCS exports and U.S.-owned HFCS sales in Mexico, or in excess of 800 million bushels of corn production, including lost corn sales to Mexico intended for sweetener production.

Farm Bill

With a new Farm Bill to be written in 2007, the CRA has been actively involved in informing Congress of the corn refining industry's position on legislation impacting sweetener trade. Under the existing Farm Bill, the marketing allotments in the current sugar program act as a barrier to sweetener trade with Mexico. The CRA will not be in a position to support the U.S. sugar program in the next Farm Bill if marketing allotments, or any aspect of the sugar program, jeopardizes full implementation of free trade in sweeteners under the NAFTA.

Together with the Sweetener Users Association, the CRA is encouraging the House and Senate Agriculture Committees to closely review the sugar program for the next Farm Bill to ensure that it is consistent with the NAFTA.

Trade

In 2005, the industry used nearly 1.9 billion bushels of corn or 16 percent of the total corn crop of 11.8 billion bushels. Corn refiners exported nearly 21 percent of the industry's 2005 shipments equaling 5.4 million metric tons of refined corn products, which contributed over $1.3 billion to the U.S. economy.

Exports of refined corn products are an important segment and have a substantial impact on the industy's health. Reduction of trade barriers through global trade negations under the WTO is the best method to increase exports of value-added products of the industry. Unfortunately, ministers failed to reach a framework deal for the WTO Doha Development Agenda negotiations at the end of July 2006. While WTO member countries are engaged in extensive efforts to restart the negotiations, it is unclear when the talks will resume.

The Bush Administration has pressed forward with regional agreements that represent opportunities for growth in exports of refined corn products. The United States concluded free trade negotiations with Colombia and Peru this year. In both agreements, duties on corn wet milled products will be reduced to zero either immediately or during the implementation phase of the agreements. It is hoped that Congress will ratify the FTA with Peru and the agreement with Colombia in the near future.

FTA negotiations continue with Panama, Korea, Malaysia and Thailand.

Environment

Corn refiners have been long-time proponents of environmental responsibility through use of energy efficient technologies, compliance with environmental regulations and product development. Over the last four years, the CRA has worked successfully with the U.S. Environmental Protection Agency to develop a more accurate way to measure volatile organic compound (VOC) emissions from corn wet milling facilities. The measurement tool was recently approved by EPA and will become the new official method. It will quantify total VOC mass emissions on an individual VOC species basis and will siginificantly improve the understanding of industry VOC emissions.

In Memoriam

The CRA would like to recognize the life of Robert C. Liebenow (1923-2006). Mr. Liebenow was president of the Corn Refiners Association from 1965 to 1990 and was an integral part of ensuring its strength and longevity. Among his many accomplishments, he successfully guided the transition of the Corn Industries Research Foundation to the CRA.

Iowa's Role in Developing a Sustainable Environment

The Honorable
Charles E. Grassley

U.S. Senator
State of Iowa

As a federal lawmaker from rural America, I work hard in Washington to educate folks about the importance of agriculture in our society. Some people take America's agricultural abundance for granted. Others may not understand the sophisticated system that gets a kernel of corn into your cereal bowl or gas tank.

Iowa's farmers provide sustenance for the world. Its rich soil, warm summer weather and ideal amount of rain (most years) make our state an ideal place to plant and grow corn. In 2005, Iowa farmers grew nearly 2.2 billion bushes of corn, the most of any state in the nation. Most years, Iowa produces more corn than an individual country. For instance, Iowa grows three times as much corn as a country like Argentina.

Corn has historically been an important part of Iowa's economy. As a leading livestock producer, Iowa's corn crop also provides farmers a ready-available outlet for the product. The livestock produces waste that can be used for fertilizer which in turn provides nutrients that help bring greater corn yields.

The bounty reaped each year from Iowa's

Exports of Products From Corn–2005

Product	2005	Units	Value
Corn meal	167,311,586	Kilograms	$41,556,873
Corn starch	136,621,645	Kilograms	$56,725,860
Corn oil, crude	160,661,753	Kilograms	$117,204,850
Corn oil, once refined	27,414,259	Kilograms	$21,524,871
Corn oil, fully refined	165,114,016	Kilograms	$133,999,920
Glucose (dextrose)	90,904,441	Kilograms	$ 42,973,013
Glucose syrup not containing fructose or containing in the dry state less than 20% fructose	205,680,808	Kilograms	$54,758,445
Glucose syrup with 20-50% fructose	38,627,510	Kilograms	$9,791,141
Chemically pure fructose	156,249,755	Kilograms	$77,674,546
Fructose syrup with 50%+ fructose	134,151,077	Kilograms	$46,316,824
Fructose solids containing more than 50% fructose	10,631,101	Kilograms	$22,283,939
Bran, sharps and other residues	97,274	Metric tons	$10,126,289
Corn gluten feed	2,853,652	Metric tons	$244,428,750
Corn gluten meal	829,626	Metric tons	$267,924,342
Other residues of starch manufacturing	62,677	Metric tons	$12,213,474
Corn oil cake	3,344,802	Kilograms	$564,202
Dextrins	21,031,181	Kilograms	$15,664,602
Modified starches derived from corn starch	191,296,644	Kilograms	$131,056,597

Source: U.S. Department of Commerce

corn fields helps provide America with food security, economic security and homegrown energy security. Iowa is currently home to 25 ethanol refineries with 11 more under construction. These ethanol plants are tapping into the region's high-quality workforce and offering area farmers a new market for their crop, which will fuel economic growth throughout the entire region.

Ethanol and renewable energy fosters economic development, creates new markets for farmers, brings America closer to energy independence and provides a clean-burning alternative for consumers.

With the best corn production in the country, it's no surprise that Iowa also leads the way in the number of corn wet milling plants. There are seven corn wet milling plants in Iowa. And, we now proudly boast of the fact that the first wet mill plant to be built in more than a decade will come to fruition in Iowa. This new plant will put to use new techniques that will incorporate new energy conservation technology and provide increased starch yields.

The seven plants already in use, along with the new plant to be located near Fort Dodge, contribute heavily to the economy of Iowa. The wet milling industry employs nearly 6,000 individuals with a payroll of more than $270 million. It also purchases corn from nearly 5,000 Iowa farmers, helping farmers add value to their initial corn product.

While Iowa leads the country in corn production, wet corn milling and ethanol, Iowa is also leading the way in creating a more sustainable environment which has had a dramatic impact on corn production. Whether through conventional methods, including no-till planting and contour farming, or high-precision practices, such as Global Positioning Systems and genetically engineered seeds, farmers young and old work to find harmony with the environment and the needs of their farming operation. Iowa corn farmers use less land and increase protection of the environment, while producing more food than ever.

Iowa is proud of its heritage in developing techniques that allow for greater stewardship of the land while increasing productivity. For instance, it was in Iowa where the idea for the first corn picker was drawn. By 1880, Patrick Lawler had drawn his ideas, purchased a blacksmith shop and built two machines. Unfortunately, in the end, he was unable to sell them.

Iowa was also home to the first gasoline-powered tractor. In 1892, John Froelich built a tractor that could propel itself backward and forward. Just a year later, Mr. Froelich, along with several investors, founded the Waterloo Gasoline Traction Engine Company, which later became known as John Deere Tractor Works.

And, Iowa has had some of the most renowned scientists in the world working to develop a better corn plant and seed for farmers. Iowa native, Norman Borlaug, is said to have saved more lives than anyone else in history through his development of high-yielding wheat. But a little known

Courtesy of Cargill, Incorporated

fact to many people is that he also worked to expand yields of corn to help prevent famine. Recently, the International Maize and Wheat Center where Borlaug did much of his research, produced genetically enhanced corn seeds that naturally tolerate the herbicide imazopyr, which has helped quadruple African corn yields.

George Sprague, an Iowa State University and U.S. Department of Agriculture scientist, helped develop the scientific principles that provide the foundation for corn breeding and genetics research. Lines from his Stiff Stalk Synthetic are widely used in producing commercial corn hybrids today.

Now, scientists at Iowa State University are using one of the nation's most powerful computers to help decipher the corn genome. Their work could allow them to expand corn's uses in plastics, fuel and fiber. Through their research, production efficiency could increase by 20 percent over the next ten years.

Iowa is proud of its past, but we are just as proud to be leading the way in using corn for value-added agriculture, such as corn plastics and ethanol, which has given new life to the rural communities that dot the landscape.

From small farming communities to bustling metropolitan centers, Iowa's agricultural network contributes greatly to our economic, social and cultural way of life. It's all part of a sustainable environment. Farming is an honorable way to earn a living and a noble service to humanity to feed the hungry. As the temporary caretakers of Earth's natural resources, farmers understand their stewardship will have lasting consequences for future generations.

Corn: Food and Industrial Uses

Year	HFCS	Glucose and Dextrose	Starch	Fuel Alcohol	Beverage Alcohol	Cereals and other products	Total
1990	379	200	219	349	135	124	1,406
1991	392	210	225	398	161	128	1,514
1992	415	214	218	426	136	129	1,538
1993	441	219	225	458	110	140	1,593
1994	459	224	230	533	100	150	1,696
1995	473	227	226	396	125	161	1,608
1996	492	233	238	429	130	172	1,694
1997	513	229	246	481	133	182	1,784
1998	530	219	240	526	127	184	1,826
1999	540	222	251	566	130	185	1,894
2000	530	218	247	628	130	185	1,938
2001	541	217	246	706	131	186	2,027
2002	532	219	256	996	131	187	2,321
2003	530	228	271	1,168	132	187	2,516
2004	521	222	278	1,323	133	189	2,666
2005	535	225	280	1,600	135	190	2,965
2006	537	227	285	2,150	135	191	3,525

In million bushels
Source: USDA - Economic Research Service. Year beginning Sept. 1.

Corn Refined Products: Sustainable at the Core

Jack Fortnum

Chairman of the Board
Corn Refiners Association

President North America Division
Corn Products International, Inc.

The corn refining industry is constantly evolving and developing new products. In recent years, new products gaining the most attention have focused on replacing petroleum-based plastics and moving toward a carbohydrate economy. But there are several stars of the industry that have long played a role in environmental sustainability—all of the traditional core products of the industry in fact.

Corn Starch

Take corn starch for example. As a simple carbohydrate, corn starch can be manipulated in a variety of ways to produce numerous products that benefit the environment.

In the 1970s, researchers at the U.S. Department of Agriculture developed a process to graft polymers to starch molecules creating a super absorbent capable of holding 2,000 times its own weight in water. It can be used in disposable diapers, sanitary napkins, bandages and baby powders, and can be used to remove water from fuels and to clean up pesticide spills. When used as a soil input, the material improves soil fertility, increases crop yields, cuts irrigation up to 50% and reduces fertilizer usage. It is biodegradable, and unlike poly-acrylate acid-based synthetic polymers, it is non-toxic. It reduces leaching of soil additives into the environment by as much as 30%.

Corn starch can be expanded and extruded to create a viable, ecological packaging material alternative to synthetic foams such as polyethylene and polystyrene that performs just as well and has several environmental advantages. The corn starch-based material can be extruded into loose fill packing peanuts or manipulated to produce sheets or blocks that can be die cut to fit specific items. The material is completely biodegradable. It can be composted or dissolved in water. Petroleum-based counterparts, on the other hand, take hundreds of years to decompose in landfills and emit harmful toxins when incinerated. In addition, production of corn starch-based packing does

U.S. Corn Refining Industry at a Glance—2005

Corn Refining Plants:	26
Location:	12 states
Corn Grind:	1.6 billion bushels
Value of Corn Purchased:	$3.1 billion
Number of Corn Suppliers	41,000
Direct Employment by CRA Member Companies:	65,300*
Capital Investment (Replacement Value):	$13 billion
MAJOR PRODUCTS (estimated)	
Sweeteners (dry weight):	25.1 billion pounds
Starches:	7.3 billion pounds
Ethanol:	1.4 billion gallons
Co-Products:	28.3 billion pounds
Value Added by Manufacture:	$7.8 billion

*Includes employees that provide services in non-corn refining areas.
Compiled by the Corn Refiners Association based on data from the U.S. Department of Agriculture, LMC Commodity Studies, Renewable Fuels Association, and industry data compiled for CRA by VERIS Consulting, LLC.

not require chemical blowing agents that harm the ozone layer.

Courtesy of Archer Daniels Midland Company

Cationic starch has allowed paper manufacturers to use recycled fibers more effectively. Not only does the ability to transform more recycled content into quality papers benefit the environment, but paper manufacturers can also increase machine speeds and conserve energy when using cationic starch in the process. Cationic starches can also be used as alternatives to synthetic agents in wastewater treatment. Cationic starch is a biodegradable and environmentally friendly option for use as a clarifier (separation of solids and liquids) and an emulsion breaker (separation of oils from water).

Recent advances in starch technology allow starch granules to be broken down into nanoparticles, which significantly increases the surface area of the starch granules. The nanoparticles show promise in the area of adhesives because they require less water and subsequently less time and energy to dry. Nanoparticle adhesives may be able to replace the polyvinyl acetate and polyvinyl alcohol used to help laminate graphics onto cardboard. They may also prove useful in reducing the use of styrene butadiene latex, or SBR, which is used as a binder in paper coatings.

Corn Sweeteners

Corn syrup and dextrose provide the fermentation base for a number of products that serve as alternatives to products that are detrimental to the environment.

Acetic acid, which is a solvent in the chemical process industry, can be fermented from dextrose. Industrial acetate has traditionally been produced from petroleum sources. The environmental benefit of producing acetic acid from a renewable resource is significant, but there is more to the story.

Acetic acid can be transformed into an environment-friendly, noncorrosive highway deicer called calcium-magnesium acetate (CMA). CMA does not have the harmful environmental impacts of chloride salts, which include groundwater contamination and damage to highways, bridges, concrete structures, vehicles and roadside vegetation.

Indigo was once produced from the indigo plant, but most of the dye used in today's

Courtesy of Cargill, Incorporated

designer jeans is made via chemical synthesis. However, indigo can be made with corn syrup as the base. Indigo production via chemical synthesis uses and produces highly toxic chemicals. The process requires special precautions and facilities to protect workers and the environment. By contrast, the process of making indigo from corn syrup via a biocatalyst employs no harmful chemicals and produces only biomass and carbon dioxide in addition to the dye.

Corn syrup is showing promise as a key ingredient to make hydrogen for fuel cells. The vast majority of hydrogen is currently made from fossil fuels through a process called steam reforming. In this process, a mixture of steam and methane is heated to temperatures above 800 degrees Celsius, and then reacts with a catalyst to produce hydrogen and carbon monoxide. The process using corn syrup as a feedstock, developed by Virent Energy Systems, requires significantly lower operating temperatures (250°C) and is more efficient.

Corn Oil

Most are familiar with ethanol as an alternative fuel made from corn, but there is another alternative fuel that can be made from corn. Corn oil can be used as a feedstock to produce biodiesel, a clean burning alternative fuel that contains no petroleum. Biodiesel can be blended at any level with petroleum diesel to create a biodiesel blend, which can be used in diesel engines with little or no modifications. It is simple to use, biodegradable, nontoxic, and essentially free of sulfur and aromatics.

Another interesting, environmentally friendly use of corn oil is as a degreaser in the screen printing industry. Corn oil can be distilled into a fast drying surface cleaner for removing left-over cleaning solvents from screens.

Researchers at Iowa State University have developed plastics from corn oil. The materials show promise to produce new rubbers, elastomers and plastics that more readily biodegrade. The corn oil-based plastic demonstrates thermal, mechanical and physical properties not presently available in commercial plastics, such as good vibration damping and shape memory properties.

Corn Feed Byproducts

Corn gluten meal offers a non-toxic, yet effective alternative to traditional, chemical-based weed and feed products for weed control in gardens and lawns, paths and driveways, reducing the need for traditional herbicides that have environmental side effects. Corn gluten meal contains 10% nitrogen by weight and makes an excellent fertilizer. It can reduce crabgrass by up to 98% and suppresses many other weeds from germinating including dandelions, creeping bentgrass, smart weed, pigweed, purslane, lambsquarter, foxtail and Bermuda grass.

These are only a few examples of how refined corn products support a sustainable environment. With greater interest in reducing our use of non-renewable resources, research into carbohydrate-based alternatives to petroleum-based products is gaining momentum. Refined corn products have already demonstrated their value toward creating a sustainable environment and are key candidates for further growth in this area.

Corn for Grain: Yield and Production

State	AREA HARVESTED Thousand Acres			YIELD Bushel Per Acre			PRODUCTION Thousand Bushels		
	2003	2004	2005	2003	2004	2005	2003	2004	2005
AL	190	195	200	122	123	119	23,180	23,985	23,800
AZ	22	27	22	190	180	195	4,180	4,860	4,290
AR	350	305	230	140	140	131	49,000	42,700	30,130
CA	140	150	110	160	175	172	22,400	26,250	18,920
CO	890	1,040	950	135	135	148	120,150	140,400	140,600
DE	162	153	154	123	152	143	19,926	23,256	22,022
FL	39	32	28	82	90	94	3,198	2,880	2,632
GA	290	280	230	129	130	129	37,410	36,400	29,670
ID	50	75	60	140	170	170	7,000	12,750	10,200
IL	11,050	11,600	11,950	164	180	143	1,812,200	2,088,000	1,708,850
IN	5,390	5,530	5,770	146	168	154	786,940	929,040	888,580
IA	11,900	12,400	12,500	157	181	173	1,868,300	2,244,400	2,162,500
KS	2,500	2,880	3,450	120	150	135	300,000	432,000	465,750
KY	1,080	1,140	1,180	137	152	132	147,960	173,280	155,760
LA	500	410	330	134	135	136	67,000	55,350	44,880
MD	410	425	400	123	153	135	50,430	65,025	54,000
MI	2,030	1,920	2,020	128	134	143	259,840	257,280	288,860
MN	6,650	7,050	6,850	146	159	174	970,900	1,120,950	1,191,900
MS	530	440	365	135	136	129	71,550	59,840	47,085
MO	2,800	2,880	2,970	108	162	111	302,400	466,560	329,670
MT	17	15	17	140	143	148	2,380	2,145	2,516
NE	7,700	7,950	8,250	146	166	154	1,124,200	1,319,700	1,270,500
NJ	61	72	62	113	143	122	6,893	10,296	7,564
NM	48	58	55	180	180	175	8,640	10,440	9,625
NY	440	500	460	121	122	124	53,240	61,000	57,040
NC	680	740	700	106	117	120	72,080	86,580	84,000
ND	1,170	1,150	1,200	112	105	129	131,040	120,750	154,800
OH	3,070	3,110	3,250	156	158	143	478,920	491,380	464,750
OK	190	200	250	125	150	115	23,750	30,000	28,750
OR	30	28	25	170	170	160	5,100	4,760	4,000
PA	890	980	960	115	140	122	102,350	137,200	117,120
SC	215	295	285	105	100	116	22,575	29,500	33,060
SD	3,850	4,150	3,950	111	130	119	427,350	539,500	470,050
TN	620	615	595	131	140	130	81,220	86,100	77,350
TX	1,650	1,680	1,850	118	139	114	194,700	233,520	210,900
UT	13	12	12	155	155	163	2,015	1,860	1,956
VA	330	360	360	115	145	118	37,950	52,200	42,480
WA	70	105	80	195	200	205	13,650	21,000	16,400
WV	27	29	28	115	131	109	3,105	3,799	3,052
WI	2,850	2,600	2,900	129	136	148	367,650	353,600	429,200
WY	50	50	49	129	131	140	6,450	6,550	6,860
US	70,944	73,631	75,107	142.2	160.4	147.9	10,089,222	11,807,086	11,112,072

CT, ME, MA, NV, NH, RI, VT not estimated

Source: USDA - National Agricultural Statistics Service

The Next Generation of Corn

Ken McCauley
President
National Corn Growers Association

Biotechnology has revolutionized agriculture, increasing yields and creating a sustainable crop for generations to come.

But back in the mid-1990s when we incorporated biotechnology on our farm, we were not without questions. Will it work? How will it affect yields? How will it affect bottom lines?

Most farmers saw the promise of the future benefits of biotechnology, but there was a risk-reward approach. If we adopt biotechnology, how will export markets respond? Will there be a consumer backlash? Our customers in the corn refining, corn processing and grocery industry may have had similar concerns.

After 11 years, those concerns have mostly subsided. Biotechnology has worked and it is being accepted by more people every day. The National Corn Growers Association has worked as a bridge between the seed companies and the regulatory process to ensure all parties are informed and the technology is responsibly implemented.

As we move into the next generation of biotechnology crops, we will face new challenges of usage. An old adage has held true for hundreds of years: provide the market and farmers will provide the product. Corn refiners and processors have been a reliable corn customer for years. But corn growers need the industry to find new uses for the coming decades, ensuring demand keeps up with production.

Producing a sustainable crop

Biotechnology and the increased production capabilities of growers are allowing them to produce more corn on less land and meet demand for new markets, such as ethanol and the smaller, but growing market of biopolymers. Corn growers are adopting no-till and strip-till practices to conserve nutrients from corn stover and reduce soil erosion. Stewardship of the crop and the land are important to corn growers.

In 2006, more than 60 percent of all corn acres were planted with at least one biotech trait. Yields have risen sharply, from 126.5 bushels in 1996 to an estimate of 153.5 bushels per acre in 2006. Inputs have decreased, as farmers do not have to apply as much herbicide and pesticide to crops. With biotechnology bringing yields up and pushing inputs down, farmers' bottom lines have improved.

As a result, today corn growers excitedly ask about biotechnology, "What's next?" Thanks to the research and development arms of seed and biobased companies and the willingness of corn farmers to embrace biotechnology, there are many answers.

Corn growers have invested hundreds of thousands of checkoff dollars in several research projects over the years. Growers' trust in agriculture-related enterprises has helped to advance "bio" from a niche term to the mainstream.

Seed companies' pipelines have more corn traits in development by at least a three-to-one margin over soybeans, the next closest crop. Examples of corn traits include: high-oil; high-fermentable starch; drought-tolerant; and nitrogen fixation.

Such traits will help producers achieve even higher yields with fewer inputs, maintaining a sustainable environment. Drought-tolerant corn would save water and money for farmers who irrigate in the forms of less water to pump and longer-lasting sprayers because of reduced use. Nitrogen fixation traits allow a grower to cut back on nitrogen use and still harvest a large crop. Both of these traits reduce agriculture's use of petrochemicals and limited resources.

Producing for the markets

But higher yields mean little to the producer if he does not have a market for his corn. As we have produced more since the adoption of biotechnology, our traditional markets—food, feed, and exports—have not consumed a higher percentage of corn; they have remained relatively flat in terms of market share, reducing their percentage of total corn consumption.

One market has increased its share year after year: ethanol. Production has increased from 1.1 billion gallons of ethanol in 1996 to an estimated 5 billion gallons in 2006. At the time of publication, 106 plants are online capable of producing 5.8 billion gallons per year, and 45 plants are in the construction or expansion stage, which would add 3.4 billion gallons to capacity. When completed, these plants will produce 8.5 billion gallons of ethanol. In addition, 114 plants are proposed, which would add more than 7 billion gallons of ethanol.

Clearly, ethanol is currently the one market that holds the most potential for corn growers. As a result, ethanol is pushing the corn grower to continue to produce record yields.

Increased yields realized through biotechnology and the growing demand of ethanol are fueling NCGA's vision of 15 billion bushels of corn and 15 billion gallons of ethanol by 2015. NCGA believes corn growers can consistently achieve this goal beyond 2015—and still fulfill commitments to other markets—for a couple reasons: the corn traits on the market and those in the pipelines and an increased focus on improving efficiency in ethanol production.

Corn traits with high-fermentable starch will increase the ability to squeeze more ethanol

U.S. Per Capita Sweetener Deliveries* for Food and Beverage Use

Year	Refined Sugar	HFCS	Glucose	Dextrose	Total	Honey and Edible Syrups	Total Caloric Sweeteners
		Corn Sweeteners (dry basis)					
1970	101.8	0.5	10.7	4.6	15.9	1.5	119.1
1975	89.2	4.9	14.0	4.4	23.3	1.4	113.8
1980	83.6	19.0	12.9	3.5	35.3	1.3	120.2
1985	62.7	45.2	13.5	3.5	62.2	1.3	126.2
1990	64.4	49.6	13.6	3.6	66.8	1.2	132.4
1995	64.9	57.6	16.3	4.0	77.9	1.3	144.1
1996	65.1	57.8	16.4	4.0	78.2	1.4	144.7
1997	64.9	60.4	17.3	3.7	81.4	1.4	147.7
1998	64.9	61.9	17.1	3.6	82.7	1.4	149.0
1999	66.3	63.7	16.3	3.5	83.5	1.5	151.4
2000	65.5	62.7	15.8	3.4	81.8	1.5	148.9
2001	64.5	62.6	15.5	3.3	81.4	1.4	147.3
2002	63.3	62.9	15.5	3.3	81.6	1.5	146.5
2003	61.0	61.0	15.2	3.1	79.3	1.4	141.7
2004	61.7	59.9	15.6	3.3	78.9	1.3	141.9
2005	63.4	59.2	15.3	3.2	77.7	1.5	142.6

Units Measured in Pounds

Source: USDA—Economic Research Service

* Per capita deliveries of sweeteners by U.S. processors and refiners and direct-consumption imports to food manufacturers, retailers, and other end users represent the per capita supply of caloric sweeteners. Actual human intake of caloric sweeteners is lower because of uneaten food, spoilage, and other losses. Figures do not include deliveries to alcohol manufacturers.

Corn: Supply and Disappearance

	SUPPLY				DISAPPEARANCE						ENDING STOCKS
Year Beginning September 1	Beginning Stocks	Production	Imports	Total	Food, Alcohol and Industrial	Seed	Feed and Residual	Total	Exports	Total Disappearance	Total
1996/97	425.9	9,232.6	13.3	9,671.8	1,693.9	20.3	5,277.0	6,991.2	1,797.4	8,788.6	883.2
1997/98	883.2	9,206.8	8.8	10,098.8	1,784.4	20.4	5,481.8	7,286.6	1,504.4	8,791.0	1,307.8
1998/99	1,307.8	9,758.7	18.8	11,085.3	1,826.5	19.8	5,467.8	7,314.1	1,984.2	9,298.3	1,787.0
1999/00	1,787.0	9,430.6	14.7	11,232.3	1,893.0	20.3	5,664.9	7,578.2	1,936.6	9,514.8	1,717.5
2000/01	1,717.5	9,915.1	6.8	11,639.4	1,937.6	19.3	5,842.1	7,799.0	1,941.3	9,740.3	1,899.1
2001/02	1,899.1	9,502.6	10.1	11,411.8	2,026.3	20.1	5,864.2	7,910.6	1,904.8	9,815.4	1,596.4
2002/03	1,596.4	8,966.8	14.5	10,577.7	2,320.2	20.0	5,562.9	7,903.1	1,587.9	9,491.0	1,086.7
2003/04	1,086.7	10,089.2	14.1	11,190.0	2,516.7	20.5	5,794.9	8,332.1	1,899.8	10,231.9	958.1
2004/05	958.1	11,807.1	10.8	12,776.0	2,664.9	20.8	6,158.3	8,844.0	1,818.1	10,662.0	2,114.0
2005/06*	2,114.0	11,112.1	11.0	13,237.0	2,955.2	20.2	6,141.1	9,116.5	2,150.0	11,266.5	1,970.6
2006/07**	1,970.6	10,905.2	10.0	12,885.8	3,520.0	20.0	6,100.0	9,640.0	2,250.0	11,890.0	995.8

Million Bushels
Source: USDA – Economic Research Service
* Preliminary
** Projected

out of the kernel. A bushel of high-fermentable starch corn is likely to yield 3 to 5% more ethanol than a bushel of conventional corn. Uniform application of this technology across the industry would result in a dramatic increase in ethanol production without significantly altering corn acreage. The multiplying effect of increased ethanol conversion rates and increased corn yields results in a considerable gain in ethanol per acre.

While the ethanol market is currently seeing a rapid, sizeable increase, another market to reduce our dependence on petroleum shows promise: corn-based polymers. Polylactic acid (PLA) is the most developed corn-based plastic product. The PLA plant located in Blair, Nebraska, will use 14 million bushels of corn annually when it reaches production capacity of 300 million pounds.

The potential of corn-based polymers is evident in the investments being made to bring other types of biopolymers to the market. A new plant is being built in Loudon, Tennessee, that will produce 100 million pounds of Bio-PDO, or 1,3 propanediol, annually. Another plant is being built in Clinton, Iowa, that will produce more than 110 million pounds per year of polyhydroxyalkanoate (PHA). Both are corn-based polymers that will replace plastics made from fossil fuels.

All of these biopolymers are made by fermentation of sugars derived from corn starch, so corn traits with high-extractable starch are important to the production system. High-extractable starch is not a new corn trait, but is still being refined and improved. These hybrids mill more easily and provide greater starch recovery from the gluten fraction of the kernel.

And the great thing is that the corn-based polymers are compostable. Once a corn-based plastic container is disposed, it will compost within 45 days. Petroleum-based plastics take thousands of years to break down.

Corn growers are relying on biotechnology to help them reach high production levels and fulfill the needs of these burgeoning markets. Corn growers, the ethanol industry and refiners want corn traits that will make their industries become more efficient and profitable.

How do corn refiners benefit?

Corn refiners will benefit from biotechnology in more ways than improved starch recovery. Biotechnology is proving that corn can be tailored to what customers want. High-oil corn? We can do that. More protein in the kernel? Sure thing. To borrow a line from Roy Orbison: Anything you want, you got it. As with ethanol, if you can provide the market, the corn grower will supply it.

When NCGA's 15 billion bushel vision is realized, 5 billion bushels of corn will go toward ethanol production. That leaves 10 billion bushels of corn for other uses. With DDGs replacing corn in livestock and poultry rations, even more corn will be on the market. As mentioned above, corn growers need demand to keep up with production. Where will that demand come from? As corn production increases, corn refiners and processors will be challenged to find innovative uses to fulfill the demand.

Corn refiners and processors can be sure growers are dedicated to supplying every market. The future holds promise for our industry and yours. Through the potential of biotechnology and corn growers' dedication to sustainability, we're confident our successes will continue for years to come.

World Corn Production, Consumption and Stocks

PRODUCTION	2004/05	2005/06
Argentina	20,500	14,500
Brazil	35,000	41,000
Canada	8,840	9,461
China	130,290	139,365
Egypt	5,840	5,860
EU-25	53,478	48,318
India	14,180	15,090
Indonesia	7,200	6,900
Mexico	22,050	19,500
Nigeria	6,500	7,000
Philippines	5,050	5,900
Romania	12,000	10,300
Serbia & Montenegro	6,569	6,600
Republic of South Africa	11,716	7,000
Ukraine	8,800	7,150
Others	64,380	66,538
United States	299,914	282,260
TOTAL	712,307	692,742
CONSUMPTION		
Argentina	5,200	5,900
Brazil	38,500	39,000
Canada	10,314	10,812
China	131,000	137,000
Egypt	11,300	10,100
EU-25	51,700	48,700
India	13,900	14,600
Indonesia	7,900	8,100
Japan	16,500	16,700
Republic of Korea	8,666	8,900
Mexico	27,900	27,900
Nigeria	6,300	6,800
Philippines	5,150	5,800
Romania	9,500	9,700
Republic of South Africa	9,700	9,100
Others	105,764	108,526
United States	224,648	231,568
TOTAL	685,013	699,766
ENDING STOCKS		
Brazil	4,192	3,692
Canada	1,802	2,001
China	36,555	35,195
EU-25	7,518	10,036
Iran	1,413	1,313
Republic of Korea	1,466	1,429
Mexico	4,440	2,640
Others	19,443	18,186
United States	53,697	50,055
TOTAL	130,526	123,502

Source: USDA, Foreign Agricultural Service
Based on local marketing years in thousands of metric tons.

Going Green: Turning Corn into Plastics

Steve Mojo
Executive Director
Biodegradable Products Institute

As interest grows in renewable-based materials, corn becomes an even more valuable commodity to the U.S. economy. Ethanol, plastics and fibers are just three examples of value added, cost effective, more sustainable products being made from corn today.

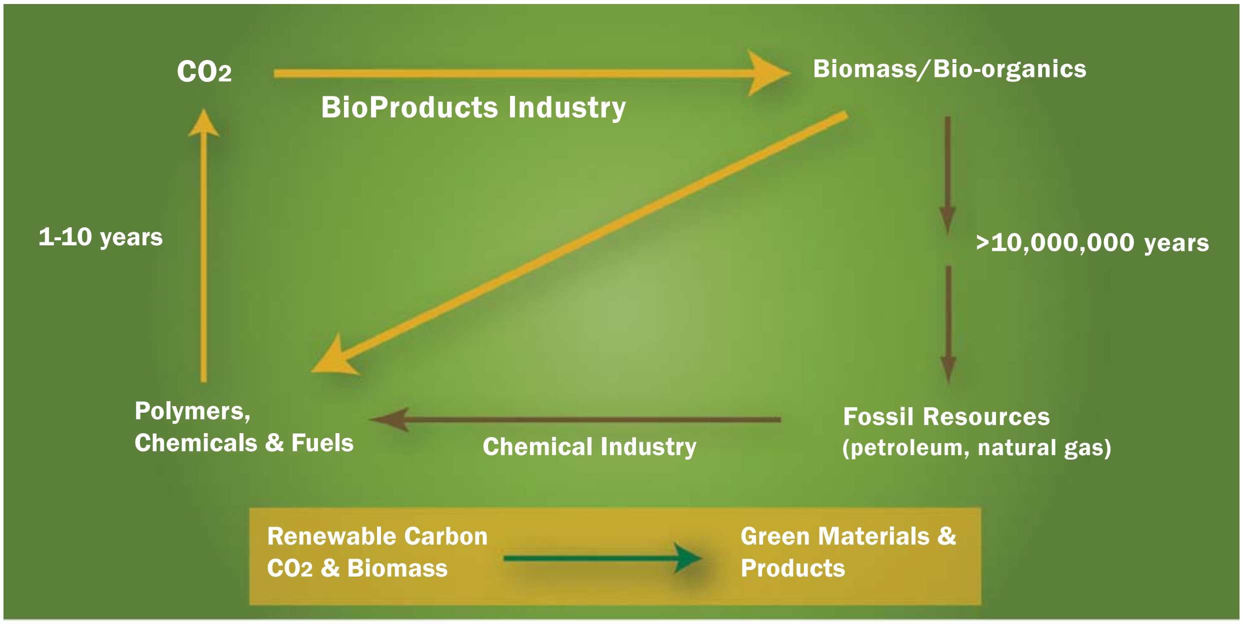
Corn: The Feedstock of Choice

Corn has long been recognized as the most cost effective carbohydrate source in the U.S. Farmers have consistently boosted yields and found ways to increase productivity, despite rising costs. In 2005, U.S. farmers grew 11,807 million bushels of corn, a 17% increase versus the prior year and the largest crop on record. On top of this fact, feedstocks based on corn offer producers price stability versus the volatility of the oil market.

Environmental benefits from renewable feedstocks, especially in greenhouse gas reductions and carbon cycling, are becoming more important. By replacing petroleum feedstocks with ones from annually renewable resources, manufacturers are able to reduce carbon emissions into the atmosphere.

According to Dr. Ramani Narayan, Professor of Chemical Engineering at Michigan State University and internationally recognized scholar on sustainable biotechnology, society can move closer to "carbon neutrality" by replacing petroleum feedstocks with annually renewable ones. Carbon found in petroleum has taken centuries to be transformed into a useful product and contributes to an overall "carbon imbalance" once it is released back into the atmosphere as carbon dioxide. By substituting relatively new carbon found in annually renewable resources, the bioproducts industry can help move closer to a more balanced use of carbon, as shown in the diagram below.

This concept looks good on paper, and even better in reality. The corn-derived polymer polylactic acid (PLA) produced by NatureWorks LLC provides a concrete example of the benefits of corn as a feedstock. By purchasing energy from renewable sources (primarily from wind), NatureWorks achieved the milestone of creating the first commercially available "green house gas neutral" material.



"Biobased & Biodegradable Polymer Materials: Rationale, Drivers, and Technology Exemplars," Presented at the National American Chemical Society, Division of Polymer Chemistry meeting, San Diego (2005)

The polymer can be used to achieve compliance with the Kyoto Protocol for reduction of greenhouse gases while being cost and functionally competitive with petroleum derived PET.

A Trio of Corn-Based Biopolymers

Today, there are three types of corn-based polymers either in commercial production or very close to it: PLA, polyhydroxyalkanoates (PHAs) and 1,3 propanediol (Bio-PDO).

NatureWorks LLC, a wholly owned subsidiary of Cargill, Incorporated, produces PLA and is one of the leaders in the field of biobased polymers. The NatureWorks facility located in Blair, Nebraska, started production in 2001 and is capable of producing 300 million pounds of PLA when running at full capacity. PLA production uses 68% less fossil fuel than comparable traditional plastics manufacturing and generates up to 55% fewer greenhouse gas emissions.

PLA can be formed on traditional plastics equipment into bottles, containers, trays and other packaging. It has excellent clarity, flavor and aroma barrier properties and printability. Today, PLA items are used in the operations of leading retailers, such as Wal-Mart and Wild Oats, often replacing PET or polystyrene applications. These products are compostable and play a critical role in the diversion of food scraps from landfills to composting facilities, further reducing green house gas production. In addition, PLA is made into fibers, sold under the trade name “Ingeo.” Today these natural fibers are used in clothing and fabrics, providing excellent wicking and “hand.”

Metabolix is the creator of PHAs from renewable resources. These polymers are very versatile as well as biodegradable in seawater, soil and composting facilities. Packaging applications will be the initial targets and will include caps, cups, paper coatings and agricultural mulch films. Started in 1992 by two professors at the Massachusetts Institute of Technology, the company announced a strategic alliance with Archer Daniels Midland Company in 2004 to build a 50,000 tons/year facility in Clinton, Iowa. Production from this facility of commercial quantities of PHAs are scheduled to start in 2008. Like PLA, production of corn-based PHAs results in significant energy savings over its traditional petroleum-based cousins.

DuPont, in conjunction with Tate & Lyle PLC, has created a unique fiber from renewable resources: 1,3 propanediol (Bio-PDO). This new material stems from DuPont’s long term commitment to develop new materials from renewable feedstocks and will use 30-40% less energy than petroleum-based PDO. Bio-PDO has a unique molecular structure that makes it an excellent choice for fabrics and carpeting. Bio-PDO has excellent stretch, stain resistance, resilience and holds color well. In 2005, DuPont and Tate & Lyle announced the development of a $100 million plant to manufacture Bio-PDO from corn via fermentation. The companies say that production of 100 million pounds of Bio-PDO will save the equivalent of 10 million gallons of gasoline per year.

Into the Marketplace

Clearly, the opportunity to replace petroleum-based plastics with corn-based ones has the potential to be very large. Last year, the U.S. used 100 billion pounds of plastic, ranging from everyday items like trash bags and water bottles to durable items like automobile components and fiber for clothing. In addition, the U.S. uses approximately half of the total global plastics production. Plastics are part of the daily lives of people around the world. Based on estimates from NatureWorks, one bushel of corn can make approximately 22 lbs of PLA. The NatureWorks plant in Blair, Nebraska, will use 13-14 million bushels of corn annually when running at full capacity. This is a small fraction of the total plastics market, yet it helps to dimensionalize the opportunity.

However, before corn-based plastics become widespread realities in everyday life, many hurdles need to be overcome, starting with performance and value. These new materials compete against well-entrenched commodity resins that utilize petroleum feedstocks. These

have been in production for decades and benefit from economies of scale and continual product improvements. For the most part, today's buyers are not willing to sacrifice performance and value in order to use biobased materials. This means that new materials must provide new features and benefits at a competitive price in order to gain a foothold in the market.

Yet this is being done, now. Brand owners, such as Wal-Mart, Wild Oats in the U.S. and Sainsbury in the UK, are making commitments to developing and using new applications based on materials derived from renewable feedstocks. These major retailers believe that applications such as "corn-tainers" will generate savings when viewed on a system basis or will create customer loyalty and higher sales as customers learn of the benefits of these new materials. However, the adoption and increasing use of new materials requires education throughout the value chain, starting with converters and going all the way through to end users. It takes time and resources to create end user awareness and pull through for biobased products.

Courtesy of NatureWorks LLC

The U.S. Department of Agriculture's "Federal Biobased Products Preferred Procurement Program" (FB4P) is one such initiative that is helping to stimulate the growth of these new materials. Created in 2002 as part of the Farm Security and Rural Investment Act (FSRIA), the program's goal is to identify and to increase the federal use of biobased products. Today, USDA has identified eight categories of biobased products that will receive preferential purchasing from Federal Agencies. The goal of the program is to identify over 1,500 different products, all containing significant amounts of renewable materials from agricultural feedstocks.

Infrastructure in the form of manufacturing facilities and personnel are another critical part of the development of this new industry. Today, Cargill, ADM and Tate & Lyle are three examples of companies making major investments in plants, and equipment to produce renewably-based plastics and polymers.

ADM, Cargill, DuPont, Metabolix, NatureWorks and Tate & Lyle have committed significant resources to develop the technology needed to produce materials, based on corn, which will compete effectively with petroleum-based polymers. All of these materials provide environmental benefits in terms of reduced energy usage and greenhouse gas emissions. However, these investments are just the start of a long process of development and education, not only in North America but also around the globe, if biobased alternatives to commodity plastics are going to gain widespread use and acceptance. But the knowledge that commercial production of corn-based biopolymers was just a dream less than 10 years ago leaves me optimistic that consumers everywhere will have the opportunity to reduce their environmental footprint by purchasing biobased plastics in the not too distant future.

Corn Refiners Association Member Company Products

	ARCHER DANIELS MIDLAND COMPANY	CARGILL, INCORPORATED	CORN PRODUCTS INTERNATIONAL, INC.	NATIONAL STARCH AND CHEMICAL COMPANY	PENFORD CORPORATION	ROQUETTE AMERICA, INC.	TATE & LYLE INGREDIENTS AMERICAS, INC.
STARCH PRODUCTS							
Unmodified, food	●	●	●	●	●	●	●
Unmodified, industrial	●	●	●	●	●	●	●
Modified, food		●	●	●	●	●	●
Modified, industrial	●	●	●	●	●	●	●
Dextrins	●	●	●	●	●	●	●
Cyclodextrins		●				●	
REFINERY PRODUCTS							
Glucose syrups	●	●	●		●	●	●
Maltodextrins	●	●	●		●	●	●
Dextrose monohydrate	●	●	●		●	●	●
Dextrose anhydrous		●	●			●	
HFCS-42	●	●	●			●	●
HFCS-55	●	●	●			●	●
Crystalline fructose	●						●
CO-PRODUCTS							
Crude Oil	●	●	●				
Refined Oil	●	●	●				
Corn gluten feed	●	●	●	●	●	●	●
Corn gluten meal	●	●	●	●	●	●	●
Corn germ or corn germ meal	●	●	●	●	●	●	●
Steepwater (CFCE)	●	●	●	●	●	●	●
Carbon dioxide	●						●
FERMENTATION AND OTHER CHEMICALS							
Citric acid	●	●					●
Lactic acid	●	●					
Lysine	●						
Threonine	●						
Xanthan gum	●	●					●
Erythritol		●					
Sorbitol	●	●	●			●	
Xylitol		●				●	
Mannitol	●	●				●	
Maltitol	●	●				●	
Hydrogenated starch hydrolysates						●	
Glucose hydrolysates						●	
OTHER							
Ethanol, fuel/industrial	●	●					●
Ethanol, beverage	●						

Product lists are accurate as of publication date, but may change with time.
Also available online at http://www.corn.org/memberproductlines.htm.

Corn Refiners Association Member Companies Domestic and International Plant Locations

Archer Daniels Midland Company
P.O. Box 1470
Decatur, Illinois 62525

Domestic Plants:

Cedar Rapids, Iowa 52404
Clinton, Iowa 52732
Columbus, Nebraska 68601
Decatur, Illinois 62525
Marshall, Minnesota 56258-2744

International Plant:

Guadalajara, Jalisco, Mexico

Cargill, Incorporated
P.O. Box 5662/MS62
Minneapolis, Minnesota 55440-5662

Domestic Plants:

Blair, Nebraska 68008-2649
Cedar Rapids, Iowa 52406-2638
Dayton, Ohio 45413-8001
Decatur, Alabama 35601
Eddyville, Iowa 52553-5000
Hammond, Indiana 46320-1094
Memphis, Tennessee 38113-0368
Wahpeton, North Dakota 58075

International Plants:

Uberlandia, Minas Gerais, Brazil
Shanghai, China
Song Yuan, China
Langholt, Nordjylland, Denmark
Haubourdin, Pas-de-Calais, France
Krefeld, Nordrhein-Westfalen, Germany
Magdeburg, Sachsen-Anhalt, Germany
Castelmassa, Veneto, Italy
Wroclaw, Dolnoslaskie, Poland
Martorell, Barcelona, Spain
Santo Domingo, Spain
Wadenswil, Zurich, Switzerland
Efremov, Tula, Russia
Bergen Op Zoom, Noord-Brabant, The Netherlands
Sas van Gent, Zeeland, The Netherlands
Istanbul, Turkey
Orhangasi, Bursa, Turkey
Vanikoy, Istanbul, Turkey
Manchester, England, United Kingdom

Corn Products International, Inc.
5 Westbrook Corporate Center
Westchester, Illinois 60154

Domestic Plants:

Bedford Park, Illinois 60501-1933
Stockton, California 95206-0129
Winston-Salem, North Carolina 27107

International Plants:

Cardinal, Ontario, Canada
London, Ontario, Canada
Port Colborne, Ontario, Canada
Guadalajara, Jalisco, Mexico (2 plants)
San Juan del Rio, Queretaro, Mexico
Tlalnepantla, Mexico State, Mexico
Baradero, Buenos Aires, Argentina
Chacabuco, Buenos Aires, Argentina
Balsa Nova, Parana, Brazil
Cabo, Pernambuco, Brazil
Mogi-Guacu, Sao Paulo, Brazil
Llay-Llay, Valparaiso, Chile
Cali, Valle del Cauca, Colombia
Eldoret, Rift Valley, Kenya
Icheon, Kyungigi-do, South Korea
Incheon, Bupyong-ku, South Korea
Faisalabad, Punjab, Pakistan
Cornwala, Punjab, Pakistan

National Starch and Chemical Company
10 Finderne Avenue
Bridgewater, New Jersey 08807-0500

Domestic Plants:

Indianapolis, Indiana 46221
North Kansas City, Missouri 64116

International Plants:

Trombudo Central, Brazil
Hamburg, Germany

Penford Products Co.
(A company of Penford Corporation)
P.O. Box 428
Cedar Rapids, Iowa 52406-0428

Domestic Plant:

Cedar Rapids, Iowa 52404-2175

International Plants:

Lane Cove, Sydney, Australia
Onehunga, Auckland, New Zealand

Roquette America, Inc.
1417 Exchange Street
P.O. Box 6647
Keokuk, Iowa 52632-6647

Domestic Plant:

Keokuk, Iowa 52632-6647

International Plants:

Lestrem, Pas-de-Calais, France
Beinheim, Bas-Rhin, France
Cassano Spinola, Alessandria, Italy
Benifayo, Valencia, Spain
Calafat, Dolj, Romania

Tate & Lyle Ingredients Americas, Inc.
(A subsidiary of Tate & Lyle, PLC)
P.O. Box 151
Decatur, Illinois 62525

Domestic Plants:

Decatur, Illinois 62521
Lafayette, Indiana 47902
Lafayette, Indiana 47905
Loudon, Tennessee 37774

International Plant:

Guadalajara, Jalisco, Mexico

CRA Staff

Audrae Erickson
President

Jennifer White Snyder
Senior Director of Regulatory Affairs

Pat Saks
Assistant Director for Food, Health and International Policy

Becky Marshall
Administrative Assistant

Corn Annual Editor/Designer
Shannon Shoesmith McNamara

Photo Credits
***Front cover**: Archer Daniels Midland Company, inset 2 and 3 NatureWorks LLC*
***Inside cover**: Scott Bauer, ARS/USDA*
***Page header**: Archer Daniels Midland Comapny*
***Statistics background**: Doug Wilson, ARS/USDA and Archer Daniels Midland Company*

Corn Refiners Association
1701 Pennsylvania Ave., N.W.
Suite 950
Washington, D.C. 20006-5805
tel. 202.331.1634
fax 202.331.2054
www.corn.org