CORN ANNUAL 2003

FOOD SAFETY IN THE UNITED STATES







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CORN INDUSTRY STATISTICS

Audrae Erickson
President

Over the past couple of years, food safety has gained considerable attention.

From the development of enhanced safety procedures to the discovery of new food threats, these issues have been a major focus of the **Corn Refiners Association, Inc**. (CRA) and the entire food supply chain. In this edition of the ***Corn Annual***, we look at the safety of the US food supply from several different points of view including regulators, food processors and corn refiners.

CRA is honored to feature an insightful overview by Secretary of Agriculture Ann Veneman that highlights the resources available to assure a dependable food safety system, and how they translate into market opportunities abroad. Thanks to the coordinated efforts of the Bush Administration and industry, the US has a strong ability to detect and determine the risk of contamination, regardless of whether it is intentional or unintentional.

Cooperation between the food industry and government to enhance the safety of the U.S. food supply is critical. National Food Processors Association President and CEO John R. Cady discusses the importance of this relationship and the role of the food processing industry in ensuring the safety of the foods we consume. An interesting, and valuable, component of this piece is how the industry approaches food security as the nation's awareness of potential terrorist threats has increased.

Corn refiners have had many safety features in place for a number of years to ensure the integrity of industry products. CRA member companies responded to customer and consumer food safety concerns by developing a series of white papers detailing measures the industry has taken to secure the safety of refined corn products. A review of these papers demonstrates the care with which corn refiners approach the issue of food safety.

I would like to take this opportunity to thank all the contributors to the ***2003 Corn Annual*** for helping us create an informative and interesting publication. Special appreciation is extended to CRA Chairman Pat Mohan for his perceptive observations of the past year and adept management of the challenges that face the refining industry.

I hope you will find the ***2003 Corn Annual*** a useful source of information about our industry.

J. Patrick Mohan
Chairman

President, Support Services
Tate & Lyle North America, Inc.

The United States has one of the safest food supplies in the world.

All Americans take this for granted and rarely stop to think what is involved or what it would be like to have to worry about the safety of the foods we consume. When considering the vast system that encompasses all aspects of food production, our level of comfort is an amazing accomplishment.

Bringing corn-based sweeteners and starches to market–just some of the thousands of ingredients used in the US food supply–involves more than 226,000 individuals and each one has a role in the safety and integrity of the final product. A large portion of those individuals is attributed to corn production. US corn farmers are the most productive and efficient in the world and they are a key component to the integrity of corn refined products. Corn refiners rely on the quality and quantity of US corn to economically produce ingredients that meet strict quality standards. Corn refiners used over 15 percent of the 9 billion bushels of corn produced by US farmers last year and the US Department of Agriculture (USDA) predicts the industry will use approximately 1.577 billion bushels of corn in the year ending September 2003, with ethanol accounting for nearly all of the increased bushels.

Overall shipments of corn-based products reported by the industry last year were on par with 2001. Total exports of products from corn in 2002 were slightly higher than 2001 figures. There was an interesting shift in products being exported including a significant decline in 55 percent high fructose corn syrup (HFCS 55) exports, due to the trade impasse with Mexico, and exports of partially refined corn oil. These declines were countered by increases in crude corn oil (suggesting that more importing countries are further refining the oil at domestic facilities), corn meal and co-products. Nearly 6.5 million metric tons of products produced from corn, worth $1.2 billion, were exported in 2002.

CONSOLIDATION

The industry experienced some consolidation during 2002. Cargill, Incorporated acquired Cerestar and Archer Daniels Midland acquired Minnesota Corn Processors, leaving the industry with eight competitors.

INTERNATIONAL TRADE

The corn wet milling industry supports the current round of global talks in agricultural trade and the vigor with which the Bush Administration is pursuing bilateral and regional trade agreements. Increased market access of US agricultural products into foreign markets throughout the world will improve the bottom lines of every aspect of our sector. However, resolution of the sweetener dispute with Mexico remains our top trade priority.

Despite the North American Free Trade Agreement's (NAFTA) promise of unfettered access for HFCS into Mexico, the dispute over that access to the Mexican sweetener market has been a trade restricting factor since 1997. The impact of Mexico's protectionist actions became more severe in 2002 with the imposition of a tax on soft drinks sweetened with HFCS. US exports of HFCS to Mexico have been shut down since January 2002. No other major US agricultural or non-agricultural exporting industry has

SHIPMENTS OF PRODUCTS OF THE CORN REFINING INDUSTRY – 2002

Starch Products (includes corn starch, modified starch and dextrins)	5,991,349,000
Refinery Products (includes glucose syrup, high fructose syrup, dextrose, corn syrup solids, maltodextrins)	33,074,166,000
High fructose corn syrup – 42%	10,203,802,000
High fructose corn syrup – 55%+	14,015,675,000
Total HFCS	24,219,477,000
Total – Domestic Basic Products	39,065,515,000
Total – Export Basic Products	1,226,629,000
Corn Oil (crude and refined)	1,210,582,000
Corn Gluten Feed and Corn Oil Meal	10,066,242,000
Corn Gluten Meal	2,700,664,000
Steepwater	1,244,488,000
TOTAL SHIPMENTS	55,514,120,000

Compiled for the Corn Refiners Association, Inc., 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.

had its top export market closed for this period of time. Our industry has idled capacity, lost jobs and experienced significant losses in profitability. The impact of the sweetener dispute filters through all industries associated with corn refining. With an estimated market potential of 2.0 million metric tons of HFCS exports to Mexico, US corn producers have lost market opportunities for more than 133 million bushels of corn, or more than 945 thousand acres of corn production annually. Sweetener consuming industries have been significantly harmed due to a loss of price competition in the marketplace. The coordinated efforts of the Corn Refiners Association, Inc. (CRA), National Corn Growers Association (NCGA), US Grains Council (USGC) and other organizations that represent apples, dry edible beans, pork, poultry and rice brought the sweetener dispute to the attention of many US lawmakers. While significant congressional support has been developed for reaching an agreement that will open the Mexican market to US HFCS exports, a negotiated solution to the dispute does not appear to be close at hand.

Despite the closure of the Mexican market to our HFCS exports, CRA continues to support trade negotiations, in particular the on-going negotiations on agriculture in the World Trade Organization (WTO). With numerous processing plants in all regions of the world, our industry faces trade barriers on a global level. The outcome of the negotiations will impact the competitiveness and profitability of US investment both domestically and internationally. CRA strongly supports the US WTO agriculture negotiating proposal calling for significant increases in market access, elimination of export subsidies and reductions in global domestic support programs. CRA continues to lead the efforts of the AgTrade Coalition in supporting the US proposal designed to level the playing field for US agrcultural producers and agribusiness.

BIOTECHNOLOGY

US farmers have expressed their vote of confidence in the science behind crop biotechnology by planting increased acreage of biotech varieties over the past several years. USDA reported that 34 percent of the 2002 corn crop was planted to biotech varieties. CRA recognizes the value of crop biotechnology and participates in the Alliance for Better Foods to disseminate factual information about its benefits.

At the same time, the corn refining industry must respect the regulations and controls under which our international customers must operate and provide our customers the products they need and want.

The EU has been working on new regulations since July 2001 on traceability and labeling of foods derived from biotechnology, which could be completed by early 2004. CRA opposes the EU biotech proposals and organized a unified food and agriculture coalition effort to inform European and US government officials of their negative impact on trade if implemented. CRA participates in the AgBiotech Planning Committee and the CSC (corn, soybean, cotton) Biotechnology Committee to monitor and comment on development of rules on a national and international level.

BIOTERRORISM

The corn refining industry has always taken a proactive approach to plant security and product integrity, but these practices have become increasingly important since the terrorist attacks of 2001 and more recent threats against the nation. A safe food supply is an integral part of the nation's security system. Last summer, President Bush signed legislation aimed at both prevention of and preparedness for bioterrorism attacks that requires promulgation of regulations on the registration of food and animal feed facilities and prior notice of imported food shipments by the end of this year, as well as regulations for the establishment and maintenance of records and product detention. CRA participates in the Alliance for Food Security as part of our efforts to maintain a safe food supply and comply with government guidance and regulations.

OBESITY

Sweeteners and starch products in the American diet are gaining attention in the fight against obesity as fat is no longer the target in the "good food, bad food" debate. CRA supports science-based solutions that address the fundamental need to improve the nutritional intake in our diets, encourage a balanced diet and moderate consumption of all foods and beverages and support increased physical activity. CRA opposes any ban on foods in schools or other public places. Learning balance and moderation in eating habits is not accomplished through elimination of choices, but through education. Through the American Council for Fitness and Nutrition (AFCN), CRA is working with our nation's leaders, school officials and concerned parents to derive the best possible solutions for addressing this important health issue. CRA is also working with the National Soft Drink Association (NSDA) and NCGA to ensure that soft drinks are not specifically targeted in the reauthorization of the school lunch program now under discussion.

ENVIRONMENT

Corn refiners have been long-time proponents of environmental responsibility through development of environmentally sound products, energy efficient technologies and compliance with environmental regulations. Our industry has long led the development of renewable fuels to help mitigate our nation's energy dependency during times of global conflict and provide a cleaner, and abundantly renewable, source of energy for our nation's future.

As part of the industry's efforts to improve energy performance, CRA is participating in Energy Star®. Energy Star is a voluntary program sponsored by the Environmental Protection Agency (EPA) and the Department of Energy (DOE) that enables organizations of all types to achieve their best energy performance and reduce emissions of carbon dioxide and other pollutants from fossil fuel combustion. CRA is actively engaged with EPA to develop regulations that maintain environmental responsibility while promoting

EXPORTS OF REFINED PRODUCTS FROM CORN

PRODUCT	2002	UNITS	VALUE
Corn Meal	159,427,448	Kilograms	$41,482,516
Corn Starch	104,104,615	Kilograms	$39,848,007
Corn Oil, Crude	309,609,674	Kilograms	$155,932,293
Corn Oil, Once Refined	2,341,261	Kilograms	$2,286,129
Corn Oil, Fully Refined	221,316,442	Kilograms	$127,163,880
Glucose (Dextrose)	75,093,624	Kilograms	$32,019,051
Glucose Syrup not containing fructose or containing in the dry state less than 20% Fructose	148,404,923	Kilograms	$49,376,500
Glucose Syrup with 20–50% Fructose	22,393,791	Kilograms	$6,611,605
Chemically Pure Fructose	41,713,806	Kilograms	$28,013,563
Fructose Syrup with 50%+ Fructose	79,186,429	Kilograms	$28,050,643
Fructose Solids containing more than 50% Fructose	16,464,664	Kilograms	$28,003,082
Bran, Sharps and other Residues	123,573	Metric Tons	$11,156,515
Corn Gluten Feed	4,209,700	Metric Tons	$314,219,703
Corn Gluten Meal	810,994	Metric Tons	$240,459,590
Other Residues of Starch Manufacturing	13,739	Metric Tons	$1,947,455
Corn Oil Cake	8,480,505	Kilograms	$781,314
Dextrins	14,149,146	Kilograms	$10,515,940
Modified Starches Derived from Corn Starch	85,321,988	Kilograms	$59,781,954

Source: US Department of Commerce

sound economic and industrial growth. Last year, these efforts focused on New Source Performance Standards, Commercial and Industrial Solid Waste Incinerators, Total Maximum Daily Load provisions of the Clean Water Act, the Agency's High Production Volume (HPV) Chemical Challenge Program and the dioxin reassessment.

CORN UTILIZATION AND TECHNOLOGY CONFERENCE

Last summer, CRA and NCGA jointly sponsored the third Corn Utilization & Technology Conference (CUTC), which focused on sustaining the environment through research, production and refinement. Researchers and industry professionals from 12 nations joined nearly 500 attendees to discuss developments in biotechnology, supply management, resource conservation, operations technologies and new and developing uses for corn.

THE ASSOCIATION

Last year, CRA gained an important asset toward ensuring the success of the industry's future when Audrae Erickson became the Association's new president. The Association has already felt the benefits of Audrae's expertise in agricultural trade issues and proven leadership abilities. She takes the reins during a time when our industry faces several difficult challenges. We look forward to her leadership in guiding the Association toward an even more productive future. CRA

CORN FOR GRAIN: YIELD AND PRODUCTION

STATE	AREA HARVESTED [Thousand Acres]			YIELD [Bushel Per Acres]			PRODUCTION [Thousand Bushels]		
	2000	2001	2002	2000	2001	2002	2000	2001	2002
AL	165	150	180	65.0	107.0	88.0	10,725	16,050	15,840
AZ	33	28	28	196.0	208.0	185.0	6,468	5,824	5,180
AR	175	185	260	130.0	145.0	134.0	22,750	26,825	34,840
CA	205	160	150	170.0	170.0	170.0	34,850	27,200	25,500
CO	1,150	1,070	720	126.0	140.0	156.0	144,900	149,800	112,320
DE	155	162	167	162.0	146.0	83.0	25,110	23,652	13,861
FL	25	26	34	75.0	87.0	96.0	1,875	2,262	3,264
GA	240	220	290	107.0	134.0	115.0	25,680	29,480	33,350
ID	57	45	50	160.0	150.0	160.0	9,120	6,750	8,000
IL	11,050	10,850	11,000	151.0	152.0	136.0	1,668,550	1,649,200	1,496,000
IN	5,550	5,670	5,220	146.0	156.0	121.0	810,300	884,520	631,620
IA	12,000	11,400	11,900	144.0	146.0	165.0	1,728,000	1,664,400	1,963,500
KS	3,170	3,050	2,500	130.0	127.0	116.0	412,100	387,350	290,000
KY	1,230	1,100	1,040	130.0	142.0	102.0	159,900	156,200	106,080
LA	370	307	560	116.0	148.0	122.0	42,920	45,436	68,320
MD	405	410	425	155.0	136.0	76.0	62,775	55,760	32,300
MI	1,950	1,900	2,020	124.0	105.0	115.0	241,800	199,500	232,300
MN	6,650	6,200	6,700	145.0	130.0	157.0	964,250	806,000	1,051,900
MS	365	385	530	100.0	130.0	125.0	36,500	50,050	66,250
MO	2,770	2,600	2,700	143.0	133.0	105.0	396,110	345,800	283,500
MT	16	13	13	140.0	148.0	140.0	2,240	1,924	1,820
NE	8,050	7,750	7,350	126.0	147.0	128.0	1,014,300	1,139,250	940,800
NJ	75	66	70	134.0	112.0	58.0	10,050	7,392	4,060
NM	66	46	49	160.0	180.0	180.0	10,560	8,280	8,820
NY	450	540	450	98.0	105.0	97.0	44,100	56,700	43,650
NC	640	625	700	116.0	125.0	83.0	74,240	78,125	58,100
ND	930	705	995	112.0	115.0	115.0	104,160	81,075	114,425
OH	3,300	3,170	2,870	147.0	138.0	88.0	485,100	437,460	252,560
OK	240	210	190	140.0	125.0	130.0	33,600	26,250	24,700
OR	27	18	27	180.0	140.0	115.0	4,860	2,520	3,105
PA	1,080	990	870	127.0	98.0	68.0	137,160	97,020	59,160
SC	280	240	260	65.0	108.0	46.0	18,200	25,920	11,960
SD	3,800	3,400	3,200	112.0	109.0	95.0	425,600	370,600	304,000
TN	580	620	620	114.0	132.0	107.0	66,120	81,840	66,340
TX	1,900	1,420	1,820	124.0	118.0	113.0	235,600	167,560	205,660
UT	18	15	14	144.0	142.0	145.0	2,592	2,130	2,030
VA	330	330	305	146.0	123.0	66.0	48,180	40,590	20,130
WA	100	55	70	185.0	190.0	190.0	18,500	10,450	13,300
WV	35	26	30	130.0	120.0	105.0	4,550	3,120	3,150
WI	2,750	2,600	2,900	132.0	127.0	135.0	363,000	330,200	391,500
WY	58	51	36	132.0	125.0	124.0	7,656	6,375	4,464
US	72,440	68,808	69,313	136.9	138.2	130.0	9,915,051	9,506,840	9,007,659

CT, ME, MA, NV, NH, RI, VT Not estimated. Source: USDA – National Agricultural Statistics Service

Ann M. Veneman
Secretary, US Department of Agriculture

Safety of the US Food Supply a Top Priority for Administration

I want to thank the Corn Refiners Association, Inc. for the opportunity to contribute to the ***2003 Corn Annual***. As value-added processors of America's most abundant crop, corn refiners are an important link in our food chain, providing a wide variety of products that have become indispensable to our daily lives. The corn refining industry represents the best of American agriculture's ingenuity.

I also appreciate being able to share vital information with your membership and readers about the role we can all play to help ensure the safety of the food supply and public health. These efforts are crucial not only in helping secure our homeland by reducing the risk of intentional or unintentional threats to our food supply, but also in strengthening the integrity of our food industry and promoting additional trade opportunities abroad.

FOOD SAFETY

Prior to September 11, 2001, our food safety protection systems were focused largely on the unintentional introduction of pathogens or adulterants into the food supply.

But the brutal terrorist attacks inflicted on our nation on that date lent new urgency to homeland security and protecting Americans from deliberate acts that are meant to kill or do harm. While many of the basic approaches to protecting the food supply and the public health are the same whether you are guarding against intentionally or accidentally introduced pathogens, the US Department of Agriculture (USDA) is working with the entire farm-to-table continuum to take additional steps to protect the security of our homeland.

USDA will continue to take all appropriate actions to protect food and agriculture systems. Since September 11, 2001, we have worked aggressively with federal, state and local agencies to strengthen our infrastructure, better prepare for emergencies and improve coordination and response mechanisms. Our accomplishments include the following:

- USDA has hired 20 new Import Surveillance Liaison (ISL) inspectors, specifically focused on food security, to be deployed at strategic points of entry to re-inspect imported meat and poultry products;
- We have increased resources for research on priority threat agents;
- We are strengthening our network of accredited laboratories for detection, identification and diagnosis and are increasing research programs related to various biological agents and technology that could be utilized for early detection. This includes providing additional resources to states and Land Grant universities. Our experts have provided security guidelines for producers, processors and food providers in order to strengthen the system at the local level; and
- USDA has worked with other federal agencies in conducting various interagency, intergovernmental exercises to further test our systems.

In addition to the transfer of the border inspection force of USDA's Animal and Plant Health Inspection Service (APHIS) to the new Department of Homeland Security (DHS), USDA has forged a strong partnership with DHS to coordinate the many vital roles in supporting our shared public health and food safety goals.

SAFETY OF THE US FOOD SUPPLY A TOP PRIORITY FOR ADMINISTRATION

At various times of increased threat of terrorism DHS, in consultation with the Homeland Security Council, has raised the nation's threat-advisory status to a higher state of alert. During such times, USDA has taken aggressive steps to assure that employees and representatives throughout the food and agriculture chain are alerted and aware of the need for extra precautions.

We have alerted industry and producer organizations of the threat status and urged them to implement additional security measures, and have informed producers about best practices guidelines that they can help implement in their own operations.

Many of the steps industry can take during periods of heightened alert are common sense, but they bear repeating:

- Be alert and aware of suspicious activities, and report them to law enforcement;
- Update your local emergency telephone numbers, and keep them handy;
- Inspect all vehicles entering your facilities and operations, and increase surveillance around facilities; and
- Consider restricting public access, such as tours and lectures.

USDA also has taken numerous precautions within our own department and agencies during periods of higher threat, such as alerting employees to additional security measures; placing USDA law enforcement officers and agents on alert status; coordinating with law enforcement agencies, military and Coast Guard to protect our facilities; and increasing security perimeters and restricting access at our facilities.

While our food supply is the safest, most abundant and most reliable in the world, USDA continually assesses the need for additional steps and remains committed to using all available resources necessary to protect the food supply.

Thanks to a range of efforts from farm to table, the incidence of all bacterial foodborne illnesses has dropped 23 percent between 1996 and 2002, and those trends continue downward. But there is more that we all can do.

USDA is working to modernize our inspection systems through our existing authorities, regulations and programs – and exploring the need for new enforcement authorities and incentives. We are enhancing our food safety research, developing more risk-based programs, improving accessibility to technology and strengthening our training and education programs.

This Administration has made food safety a top priority. President Bush has proposed and achieved record funding for food safety programs in his first two years in office, with record budget requests again for 2004.

His budget would support a strong inspection workforce of 7,680 inspectors. It would enhance research and provide specialized training and education for the inspection workforce. And it would increase microbiological testing and sampling, and strengthen foreign surveillance programs.

INTERNATIONAL TRADE

Confidence in the integrity of America's food supply is vital not only to public health, but also to the economic health of our agricultural and food industries domestically and in markets abroad.

We must always do all we can to protect our homeland security and public health, but neither the United States nor other countries should take advantage of these mandates to establish trade barriers under the guise of ensuring the safety of our populations.

Some nations, including those of the European Union, have pursued policies, especially in the area of biotechnology, that are designed more to protect their domestic markets than to meet their public health obligations.

USDA continues its efforts to ensure that the health and safety regulations of our trading partners are science-based, transparent and predictable. As we seek to expand and maintain markets and the confidence of consumers worldwide, we must be constantly attentive to the need to address legitimate food safety concerns without erecting unnecessary barriers to trade.

New market opportunities are essential to the future of agriculture. Consider that our farm sector capacity to produce grows an average 2 percent per year, while aggregate food consumption in the United States grows only 0.8 percent per year. We are expanding capacity much more quickly than our domestic use, and we clearly need foreign markets to utilize that capacity.

Agriculture is a global enterprise, as our overall exports have grown from 10 percent of all agriculture sales 50 years ago to 25 percent today. Total agricultural exports for the year 2003 are forecast to be $57 billion, up from $53 billion the previous year.

INNOVATION

Corn farmers and refiners have been in the vanguard of innovation and technologies that help create new demand and new markets for their products, while also ensuring their own competitiveness. For instance, just five years ago we were using about 500 million bushels of corn for ethanol. This year that number is projected to double to one billion bushels, almost 10 percent of our total corn use.

The Administration continues to strongly support a renewable fuels standard that will create additional opportunities for environmentally friendly biofuels. Such a standard will help reduce our dependence on foreign oil, thereby increasing our national security, while also improving the environment and the farm economy.

Last year I visited a biorefinery in Nebraska that uses dextrose to produce textile fibers and plastics. This amazing fabric is now being commercially produced from corn and has better dye-holding properties and other characteristics than traditional synthetic fibers.

New technologies will be central to the agenda at the Ministerial Conference and Expo on Agricultural Science and Technology, which USDA will host June 23 to 25, 2003, in Sacramento.

We are facing enormous challenges of growth in the world population, along with issues of the sustainability of our resource base. In the next 50 years, it is projected that the world population could number as many as 11 billion people, with the fastest growth occurring in the least developed countries.

Technology will play a major role in improving productivity, while also mitigating environmental impacts as we make use of our natural resources.

This Administration's ongoing efforts to encourage new technologies, and to promote homeland security and food safety have far-reaching effects that benefit consumers and the entire food chain. These efforts represent a continuing process, not a destination.

I want to commend the Corn Refiners Association for their support of these missions, and for the valuable contributions they make every day to American farmers, our economy and our nation as a whole. USDA

MEMBER COMPANY PRODUCTS

	ARCHER DANIELS MIDLAND COMPANY	CARGILL, INCORPORATED	CORN PRODUCTS INTERNATIONAL, INC.	NATIONAL STARCH & CHEMICAL COMPANY	PENFORD CORPORATION	ROQUETTE AMERICA, INC.	A.E. STALEY MANUFACTURING CO.
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	•	•					
Tryptophan	•						
Xanthan Gum	•						
Erythritol		•					
Sorbitol	•	•	•			•	
Xylitol		•				•	
Mannitol	•	•	•			•	
Maltitol	•	•	•			•	
Hydrogenated Starch Hydrolysates		•				•	
Glucose Hydrolysates		•				•	
OTHERS							
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/web/membprod.htm

Food Processing: A Critical Element in the Safety of the US Food Supply

John R. Cady
President and CEO, National Food Processors Association

Food safety is "job one" for the food processing industry – this year and every year.

It bears repeating that the first and foremost reason that foods are processed is to enhance their safety. Of course, processed foods offer consumers an enormous variety of food choices, and a range of attributes from better taste to convenience of preparation. But whether they are frozen, canned, dried, bottled or irradiated, food processing makes and helps keep foods safe. Food processors know that they are not just in the business of providing appealing, nutritious and affordable foods to consumers – they also are in the business of providing their customers with safe products.

The results of the food processing industry's commitment to food safety are clear. American consumers, and consumers of US food products exported around the world, have an extremely high level of confidence in the safety of foods produced in this country.

This outstanding record of food safety didn't just happen; it reflects the strong cooperative efforts among all stakeholders – growers, suppliers, processors, retailers and government regulatory agencies – to take those measures needed to enhance the safety of the food supply.

THE US FOOD SAFETY SYSTEM: EVOLVING TO MEET THE CHALLENGES

Our current food safety system not only works, but works well. This system has evolved successfully to meet new challenges and growing responsibilities. It is no accident that our nation's food safety regulatory system has evolved from a single food safety agency in 1907 – the Bureau of Chemistry within the Department of Agriculture – into the system we have today.

There continues to be strong evidence that America's food safety regulatory system, and the food safety programs utilized by food processors, ensure that the food products that consumers purchase in their neighborhood grocery stores or that are delivered to their local restaurants are safe. This year, the Centers for Disease Control and Prevention (CDC) reported a decreasing trend across the United States in illness due to several common food pathogens.

Industry spends many millions of dollars to ensure the safety of food products, and we continue to look for ways to improve safety where needed. Increasingly, risk assessment is used to better target our food safety resources. Industry is taking a more proactive approach to preventing food safety problems before they occur, through the use of Hazard Analysis Critical Control Point (HACCP) and other food safety systems. Our industry also conducts cutting-edge food safety research and supports consumer education efforts.

Encouragingly, research findings indicate that there have been significant improvements in recent years in food safety-related consumer behaviors. For example, fewer people are eating risky raw foods and more people are washing hands and cutting boards to prevent dangerous cross-contamination between foods. Certainly, stronger food industry efforts to get across science-based information to consumers on safe food handling, preparation and storage have helped consumers to better understand their role in keeping foods safe.

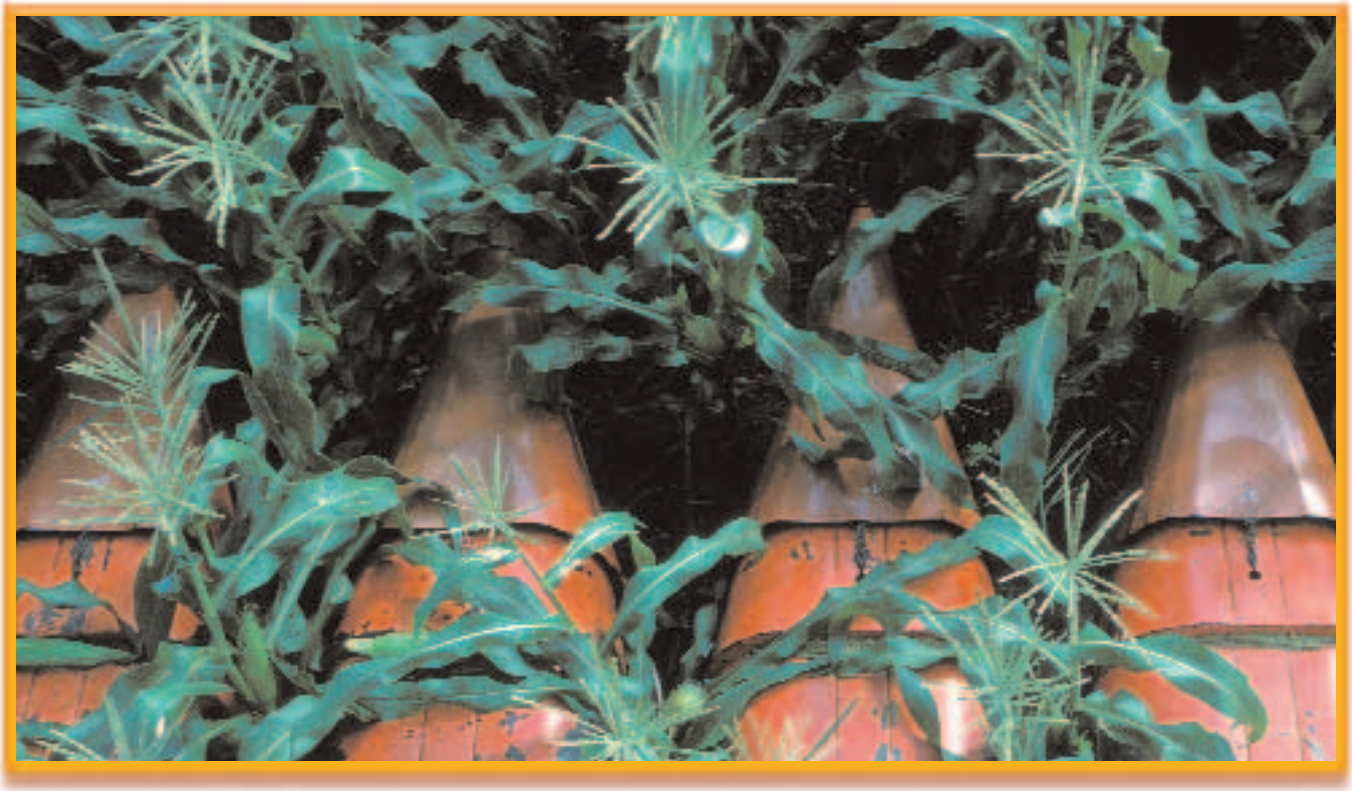
Clearly, suppliers to the food processing industry play a key role in helping to ensure the safety of the end product to consumers. That's why food processors are "picky" about their suppliers, and about the standards they use to ensure the safety of various ingredients. Recently, NFPA launched its "Supplier Audits for Food Excellence" program, NFPA-SAFE. This program allows suppliers to satisfy multiple customers with a standardized audit carried out by SAFE-certified, third party auditors and bring efficiency to the process while keeping the focus on food safety. Innovative programs such as this are helping to keep foods and ingredients safe at all points along the food chain.

Americans deserve to know that the food industry and federal agencies have fought long and hard to ensure that our products are free from contamination. We must continue to communicate steps that we are taking to further enhance food safety and to communicate that food safety is everyone's responsibility.

FOOD SECURITY: A NEW PRIORITY FOR THE FOOD INDUSTRY

In the aftermath of the terrorist attacks on our country in 2001, and the resulting increased focus on national security, the food industry's new priority is to work with the regulatory agencies – including the newly created Department of Homeland Security – to ensure the strength and effectiveness of our nation's food security systems.

The food industry has had a long history of dealing with threats to food safety, from foodborne disease outbreaks and inadvertent contaminations to isolated incidents of product tampering. However, now, we are dealing with what heretofore



was unthinkable: the intentional, widespread contamination of the food supply. Hope and complacency are not an option and, in fact, the food industry has stepped up to the plate to address this critical issue.

It is important to note that *food security* and *food safety* are not the same thing. The basic distinction is that food safety deals with accidents, such as cross contamination and process failure during production. Food security, on the other hand, is a broader issue dealing with intentional threats. These are immensely important distinctions to the food processing industry, particularly as they relate to our management and prevention practices. However, both food safety and food security activities have a common goal, which is to prevent problems to protect the safety of the end product to consumers.

The food industry has been extraordinarily active in reviewing existing food security programs and implementing, as appropriate, new preventive practices and effective controls. We are redoubling our commitment and increasing our vigilance to ensure that systems are in place to minimize and, to the extent possible, eliminate the threat of intentional contamination of the food supply.

Throughout this process, we have tried to keep one underlying principle in sight: although security is critical to our business, ensuring security cannot be allowed to result in business paralysis. So, any changes to either industry security activities or to the regulations governing food security must be both realistic and workable.

Within days after the attacks on the World Trade Center and the Pentagon, NFPA helped launch the *Alliance for Food Security*, of which the Corn Refiners Association, Inc. is a member and active participant. This government/industry alliance – which now has more than 130 participating organizations – helps to facilitate coordination and communication among all stakeholders, to minimize all threats to our nation's food security.

NFPA is the largest US food trade association, representing the $500 billion food processing industry on scientific and public policy issues involving food safety, food security, nutrition, technical and regulatory matters and consumer affairs. NFPA's three scientific centers, its scientists, government affairs experts and professional staff represent food industry interests on government and regulatory affairs and provide research, technical services, education, communications and crisis management support for the association's US and international members.

CORN: FOOD AND INDUSTRIAL USES

YEAR	HFCS	GLUCOSE & DEXTROSE	STARCH	FUEL ALCOHOL	BEVERAGE ALCOHOL	CEREALS & OTHER PRODUCTS	TOTAL
1987	358	173	226	279	77	113	1,226
1988	361	182	223	287	107	114	1,274
1989	368	193	230	321	109	115	1,336
1990	379	200	232	349	80	114	1,354
1991	392	210	237	398	81	116	1,434
1992	414	214	238	426	83	117	1,493
1993	442	223	244	458	83	118	1,568
1994	465	231	226	533	100	118	1,672
1995	482	237	219	396	125	133	1,592
1996	504	246	229	429	130	135	1,672
1997	513	229	246	481	133	182	1,784
1998	531	219	240	526	127	184	1,827
1999	540	222	251	566	130	185	1,894
2000	530	218	247	628	130	185	1,938
2001	541	217	246	714	131	186	2,034
2002	545	212	250	920	131	187	2,245

In Million Bushels

Source: USDA – Economic Research Service. Year beginning September 1.

FOOD PROCESSING: A CRITICAL ELEMENT IN THE SAFETY OF THE US FOOD SUPPLY

Currently, the US Food and Drug Administration (FDA) is in the process of proposing and then finalizing new regulations to implement the bioterrorism legislation signed into law in 2002. Some of the proposed regulatory changes are appropriate; others are not, and would result in needless burden to the food industry and FDA.

Proposed regulations go well beyond Congressional legislative intent, and provide FDA with new authorities not directly connected with food security. These include requirements for prior notice of food imports and food facility registration that would be costly and, in many cases, technically difficult with which to comply.

NFPA and others in the food industry are working diligently to urge needed revisions to these proposed regulations, so that they do what they are intended to do: enhance our nation's food security, not add onerous new requirements that could make food more expensive for consumers, or act as a barrier to the free international trade in US food products.

With newfound awareness of potential terrorist threats, it is important that any actions we take do not lessen public confidence in food safety. Food security is vitally important, but so is consumer confidence in the safety of the food supply.

CONTINUING A STRONG COMMITMENT TO FOOD SAFETY

This year, and in the years ahead, the food processing industry will continue its strong commitment to providing US consumers with the enormous variety of nutritious, convenient and affordable foods they seek. And we will also continue to provide them with the high level of food safety and food security that they have come to expect and, in fact, take for granted.

The food processing industry constantly is exploring new approaches to food safety, including new food safety technologies and new ways to enhance existing process controls. We also continue to refine our food security systems, to ensure that they help prevent any dangers or disruptions to our food supply. And improved information sharing and coordination among the regulatory agencies is resulting in demonstrable improvements and a greater level of food safety.

Working together, growers, suppliers, food processors, retailers and the US Government can help to make our food safety system even more effective and our nation's food security even stronger – and keep consumers happy, as well. NFPA

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	GOVERNMENT OWNED	PRIVATELY OWNED	TOTAL
1987/88	4,881.7	7,131.3	3.4	12,016.4	1,234.4	17.2	4,789.2	6,040.9	1,716.4	7,757.3	835.0	3,424.1	4,259.1
1988/89	4,259.1	4,928.7	2.8	9,190.6	1,279.4	18.4	3,936.0	5,234.4	2,025.8	7,260.1	362.5	1,567.9	1,930.4
1989/90	1,930.4	7,532.0	1.9	9,464.3	1,351.1	18.9	4,381.6	5,751.6	2,368.2	8,119.8	233.0	1,111.5	1,344.5
1990/91	1,344.5	7,934.0	3.4	9,281.9	1,405.8	19.3	4,610.9	6,036.1	1,724.6	7,760.7	371.1	1,150.1	1,521.2
1991/92	1,521.2	7,474.8	19.6	9,015.6	1,513.3	20.2	4,797.7	6,331.2	1,584.1	7,915.3	112.5	987.8	1,100.3
1992/93	1,100.3	9,476.7	7.1	10,584.1	1,537.1	18.7	5,252.1	6,807.8	1,663.3	8,471.1	55.5	2,057.5	2,113.0
1993/94	2,113.0	6,337.7	20.8	8,471.5	1,588.5	20.1	4,684.4	6,293.1	1,328.3	7,621.4	44.8	805.3	850.1
1994/95	850.1	10,050.5	9.6	10,910.2	1,696.9	18.3	5,459.7	7,174.9	2,177.5	9,352.4	42.3	1,515.5	1,557.8
1995/96	1,557.8	7,400.1	16.5	8,974.4	1,608.0	20.1	4,692.5	6,320.6	2,227.8	8,548.4	30.4	395.5	425.9
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	2.1	881.1	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	4.3	1,303.5	1,307.8
1998/99	1,307.8	9,758.7	18.8	11,085.3	1,826.4	19.8	5,467.9	7,314.1	1,984.2	9,298.3	11.6	1,775.4	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	14.7	1,702.8	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	7.7	1,891.4	1,899.1
2001/02*	1,899.1	9,506.8	10.1	11,416.1	2,034.1	20.1	5,876.6	7,930.8	1,888.9	9,819.7	6.4	1,590.0	1,596.4
2002/03**	1,596.4	9,007.7	15.0	10,619.1	2,264.9	20.1	5,650.0	7,935.0	1,675.0	9,610.0	5.0	1,004.1	1,009.1

Million Bushels
Source: USDA * Preliminary ** Projected

With the increasing awareness of threats against the nation, many US consumers have sought reassurance that our food supply remains safe. For members of the Corn Refiners Association, Inc. (CRA), ensuring the safety of corn wet-milled products has always been an integral part of our success.

Ensuring the Integrity of Corn Refined Products

The corn wet milling process has evolved considerably since the conversion of the first wheat starch plant to corn starch processing nearly a century-and-a-half ago. In the intervening years, products made by the corn refining industry have grown to include numerous food and industrial starches, dextrins, cyclodextrins and maltodextrins; corn sweeteners like corn syrups, dextrose, high fructose corn syrup and crystalline fructose; corn oil and animal feed products; and most recently, bio-fermentation products like ethanol, citric and lactic acids, amino acids and polyols.

As the demand for corn refined ingredients has grown, so has our understanding of the manufacturing process. Today, the corn wet milling process–illustrated in Figure 1–is one of the most productive and well understood industrial food processes in the world.

This review of the many safety measures in place throughout the corn wet milling process is based on information provided in the Food Safety Information Paper series developed by members of the Corn Refiners Association, Inc. For more detailed information on measures in place to assure that refined corn food ingredients are safe, please see http://www.corn.org/web/foodsafety.htm.

PLANT SECURITY

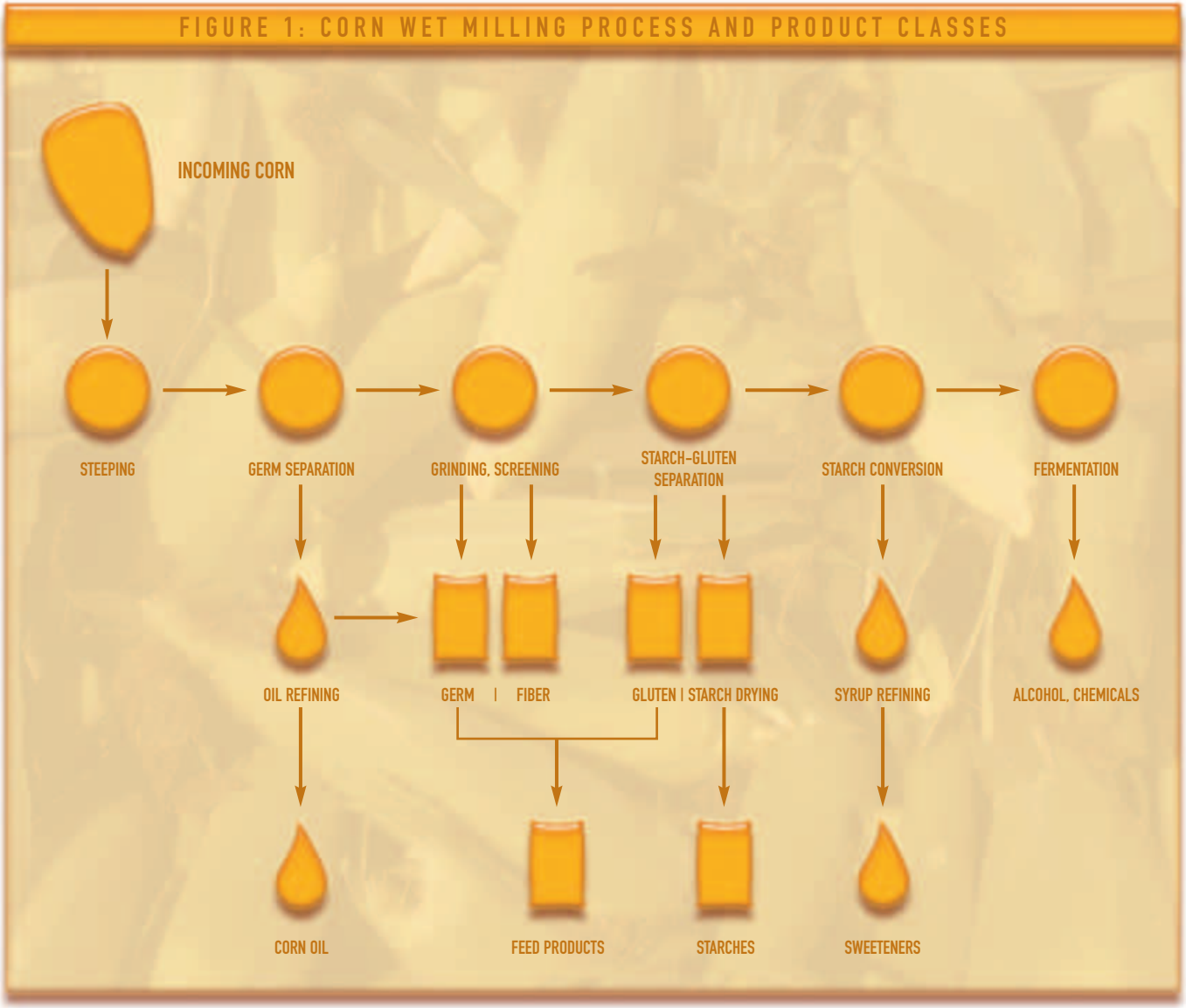
The safety of corn wet milled products begins with plant security. On-site security is a crucial component of the physical safety of a corn wet milling facility, including a combination of fencing, security guards and security cameras. Personnel at the facility are subjected to reference checks prior to employment. Additionally, every employee or visitor to the facilities must show photo identification and check-in at a controlled access point.

One of the best deterrents to tampering of any kind is that corn wet milling is essentially a closed process. This means that processing equipment, reactors and tanks are enclosed wherever possible to prevent foreign matter from entering. Ducts, pipes and fixtures are located to avoid food contamination from drips, condensate and falling dust and debris. Most wet milling plants enforce a no glass policy; bulbs, fixtures and skylights located above food processes are protected to prevent contamination in case of breakage. Buildings, structures, processing equipment and utensils are carefully maintained and sanitized.

RAW MATERIALS

Each day the equivalent of 33,000 acres of harvested corn arrives at corn wet milling facilities for conversion into food, industrial and feed products. Corn used for wet milling is purchased according to US Grading Standards established by the US Department of Agriculture (USDA). These standards specify permissible amounts of damaged kernels, broken corn and foreign material. Incoming corn must be thoroughly inspected and cleaned to remove cob, dust, chaff and foreign matter. Stones and metal are removed from incoming corn by screening through devices such as coarse wire mesh and passage through ferrous magnets.

FIGURE 1: CORN WET MILLING PROCESS AND PRODUCT CLASSES



Mycotoxins

Incoming corn is also checked thoroughly for the presence of mycotoxins. Mycotoxins are naturally occurring carcinogens that result from fungal growth on grains either in the field or during harvest and storage. CRA member companies take seriously their responsibility to minimize consumer exposure to mycotoxins and there are a number of measures in place for mycotoxin management. Since less than one-fifth of the annual corn crop is used by corn refiners for production of food ingredients, they can exercise considerable control over specific lots of corn accepted for processing. Those with unacceptable levels of mycotoxins are rejected.

Mycotoxin-producing fungi appear only under specific and well-characterized weather conditions. Corn processors monitor weather conditions and survey crop conditions to determine when increased surveillance and testing for mycotoxins may be necessary. Mycotoxin testing occurs on the farm and at country elevators after harvest using a variety of analytical methods. Further testing and sampling programs are in place at the sub-terminal and terminal elevator levels before the grain ever reaches corn refining facilities. Corn refiners employ a number of sophisticated tests to screen incoming corn for the presence of mycotoxins to ensure compliance with standards for human consumption set by the Food and Drug Administration (FDA). CRA member companies monitor in-process streams and outbound feed products when there is reason to believe mycotoxins may be present in the grain supply. Critical locations for sampling and testing may include inbound unloading, steep water and feed product streams.

Low levels of mycotoxins that may enter corn wet milling plants can be removed from food ingredient products through the normal processing steps used in their manufacture. Studies conducted on the fate of aflatoxin, deoxynivalenol, fumonisin, T-2 toxin and zearalenone in the wet milling process show that the mycotoxins tend to

concentrate in the steepwater and feed products, while the levels found in products for human consumption are reduced. FDA acknowledges that wet milling is an effective process for removing mycotoxins like aflatoxin and fumonisin from corn starch, high fructose corn syrup and corn oil.

PROCESS SECURITY

CRA member companies continuously seek ways to reduce the likelihood of incidental product contamination by implementing Good Manufacturing Practices (GMP) and quality management systems to complement existing finished product testing. Corn refiners practice continuous in-process and finished product analysis to ensure that corn wet-milled ingredients do not contribute harmful chemical residues, pathogens or other foreign matter to food products.

Pathogens

An inhospitable environment created by low product pH, low water activity, high percentage dry substance and high processing temperature is the first line of defense against microbial pathogens in the corn wet milling process. Additionally, liquid and dry corn syrups, sweeteners, starches and acidulents demonstrate the ability to inhibit growth and destroy contaminating pathogens during transportation and storage. For years, CRA member companies have had in place analytical procedures for detecting microbial levels in finished products. Thorough microbial testing and rigorous specifications are designed to minimize the risk of pathogens. Critical control points in the manufacturing process are identified, controlled and routinely monitored to restrict the growth of pathogenic microorganisms.

Foreign Matter

There are numerous screening and filtration unit processes during manufacture to remove foreign matter from finished products that infringe FDA's particle size guidelines. Wet mill starch is the raw material for production of starches, sweeteners and a variety of fermentation products. Starch products typically pass through a series of washing, filtering, slurrying, dewatering, screening and drying unit processes. Corn sweeteners and fermentation products receive additional refining, including enzyme and carbon treatment and ion exchange. These unit processes are arranged as packed beds, thereby functioning as supplementary filtration steps. Most liquid products conclude with a final filtration step. Dried products commonly pass through a rare earth magnet during packaging as a final precaution against foreign matter contamination.

Chemical Residues

Chemicals are used throughout corn wet milling as processing aids, making possible the manufacture of a wide variety of unique and highly functional food ingredients. CRA members combine modern processing and refining methods with continuous in-process and finished product analysis to ensure that refined corn ingredients do not contribute harmful chemical residues to food products. Many of the same processing steps that protect against foreign matter contamination are effective measures to address chemical residues. Process steps including washing, drying, evaporation and ion exchange effectively reduce chemical residues in starch products to government-approved levels. Chemical residues can be removed from syrups through a series of refining steps that include filtration, centrifugation, ion exchange, carbon treatment and evaporation. Carbon treatment, distillation, drying processes, evaporation, ion exchange and membrane separation are processes that reduce chemical residues in fermentation products. Many of these processes are also designed to be effective in reducing residual pesticides to non-detectible levels in finished products.

TRANSPORTATION

Concern over the safety of finished products does not end with manufacturing. Many years ago, CRA member companies developed stringent product transportation guidelines, designed to ensure that refined corn products reach food and beverage manufacturers safely, unadulterated and with clear evidence of any attempt at tampering in transit.

Since many corn ingredients readily absorb residual flavors and odors, they are transported only in committed food containers. Each container's interior is visually inspected to confirm that no abnormal conditions exist. After the interior surface is sanitized by continuous washing with 180°F water for 15 minutes, the container is allowed to cool for final visual confirmation that the tanker is clean and drained. Tamper evident seals are properly applied to access points immediately after washing and inspecting and prior to moving if the container is outside the control of the manufacturer. If washed containers are not loaded within 24 hours of washing, the container is re-inspected and rewashed if necessary before loading. Once containers are loaded, they are closed and sealed immediately. In addition, all bulk ingredients and full loads are transported with numbered seals, which can be verified upon receipt to ascertain that no product tampering has occurred. Any full shipments with broken seals are rejected.

EMERGENCY RESPONSE

Despite these extensive measures, the corn wet milling industry has a number of contingency plans in place in the unlikely event of tampering, or other emergencies. Product recall and retrieval systems are in place to facilitate the rapid removal of potentially contaminated products from the marketplace, which rely on lot traceability. Many companies train on-site with emergency management teams, fire and rescue, police and other security firms.

CONCLUSION

While existing security measures ensure that the corn wet milling process is one of the safest in world, the industry is always finding safer and more efficient ways to protect the integrity of its product lines. Food safety is of the utmost importance to the corn refining industry. CRA

WORLD CORN PRODUCTION, CONSUMPTION & STOCKS

PRODUCTION	2001/02	2002/03
Argentina	14,400	14,500
Brazil	35,501	37,000
Canada	8,389	9,065
China	114,088	125,000
Egypt	6,160	6,200
Hungary	7,858	6,080
India	13,510	10,570
Indonesia	6,000	6,100
Mexico	20,400	19,000
Nigeria	5,000	5,200
Philippines	4,505	4,300
Romania	7,000	7,500
Serbia	6,200	5,400
South Africa	9,700	9,000
Thailand	4,500	3,900
Ukraine	3,641	4,200
EU	39,685	39,440
Others	50,703	52,692
United States	241,485	228,805
TOTAL	598,725	593,952
CONSUMPTION		
Brazil	34,500	35,700
Canada	11,965	12,521
China	120,000	122,000
Egypt	11,050	11,400
Hungary	4,600	4,300
India	13,050	11,900
Indonesia	7,150	7,200
Japan	16,300	16,200
Korea, South	8,735	8,960
Malaysia	2,485	2,485
Mexico	24,500	25,500
Nigeria	5,030	5,250
Romania	6,800	7,200
Serbia	6,175	5,100
South Africa	8,800	9,000
Others	137,553	135,220
United States	201,453	199,780
TOTAL	620,146	619,716
ENDING STOCKS		
Brazil	1,074	774
China	68,654	59,754
Japan	1,393	1,194
Mexico	2,042	2,027
South Africa	990	540
EU	4,671	4,811
Others	13,114	12,120
United States	40,551	25,505
TOTAL	132,489	106,725

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

US PER CAPITA SWEETENER DELIVERIES* FOR FOOD AND BEVERAGE USE

YEAR	REFINED SUGARS	CORN SWEETENERS – DRY BASIS				HONEY and EDIBLE SYRUPS	TOTAL CALORIC SWEETENERS
		HFCS	GLUCOSE	DEXTROSE	TOTAL		
1986	60.0	45.7	13.6	3.6	62.8	1.4	124.3
1987	62.4	47.7	13.8	3.6	65.2	1.3	128.8
1988	62.1	49.0	14.3	3.7	66.9	1.2	130.2
1989	62.8	48.2	12.8	3.5	64.6	1.2	128.5
1990	64.4	49.6	13.6	3.6	66.8	1.2	132.4
1991	63.6	50.3	14.0	3.7	68.0	1.3	132.9
1992	64.2	51.8	15.1	3.6	70.5	1.4	136.1
1993	63.8	54.5	15.8	3.7	73.9	1.4	139.1
1994	64.3	56.2	15.9	3.8	75.9	1.3	141.5
1995	64.7	57.6	16.3	4.0	77.9	1.3	143.8
1996	65.5	57.8	16.4	4.0	78.2	1.3	145.0
1997	65.3	60.4	17.3	3.7	81.5	1.3	148.1
1998	65.1	61.9	17.1	3.6	82.7	1.3	149.1
1999	66.3	63.7	16.3	3.5	83.5	1.4	151.3
2000	65.6	62.7	15.8	3.4	81.9	1.5	148.9
2001	64.6	62.6	15.7	3.3	81.6	1.3	147.4

Units Measured in Pounds.
Source: USDA – Economic Research Service
Note: 2002 data not available at time of publication.

* 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 Refiners Association, Inc. 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
Dimmitt, Texas 79027
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
Tilbury, 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
Medellin, Antioquia, Columbia
Eldoret, Rift Valley, Kenya
Icheon, Chungcheongbuk, South Korea
Ichon, Kyeonggi, South Korea
Faisalabad, 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

Collingwood, Ontario, Canada
Trombudo Central, Brazil
Hamburg, Germany

Penford Products Co.

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

Domestic Plants

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 Plants

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

A.E. Staley Manufacturing Company

(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 Plants

Guadalajara, Jalisco, Mexico

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