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Global and U.S. Wheat Gluten Industries: Structure, Competition, and Trade

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Introduction

Approximately 80 percent of U.S. spring wheat is produced in Montana, North Dakota, and South Dakota. In Montana, about 3.5 million acres of spring wheat (other than durum) are planted annually. This represents about 60 percent of total wheat plantings. Montana's semi-arid climate encourages the production of high protein levels in spring wheat. Wheat protein contains gluten which is necessary for producing high-quality baked products. Historically, protein premiums have been available in years when the overall U.S. wheat crop has contained relatively low protein levels.

Wheat gluten is included in baked goods either through the use of high-protein wheat in flour production or as an additive during dough production. Thus, wheat gluten additives are substitutes for high protein wheat. Wheat gluten additives are produced from wet wheat milling processes. The competitiveness of the wheat gluten industry has changed in recent years. In addition, the industry has been the subject of international trade rulings which have altered competitive strategies of U.S. producers. Thus, understanding the wheat gluten industry is important for hard spring wheat producers because wheat gluten is a substitute for their products. This Briefing describes the global and U.S. wheat gluten industries by considering industry structure, competitive forces, and trade issues.

The Wheat Gluten Industry

U.S. vital wheat gluten imports from 1996-2004 are shown in Figure 1. Overall, imports have increased since 2001. Domestic consumption is not reported by the U.S. Department of Commerce. Historically, vital wheat gluten prices are relatively low (high) when supplies of high protein U.S. wheat are high (low). However, low protein contents within the domestic wheat crop means that domestic vital wheat gluten production is also low. This increases demand for vital wheat gluten manufactured in other countries.

The main exporters to the United States are Australia, Canada, Netherlands, France, Germany, and Poland. Poland has emerged as a large trading partner only since 2002. The average annual percentage of total U.S. gluten imports from major supplying countries over the past 10 years is shown in Figure 2.

Figure 1. Total Quantity and Unit Value of U.S. Vital Wheat Gluten Imports, 1996 to 2004

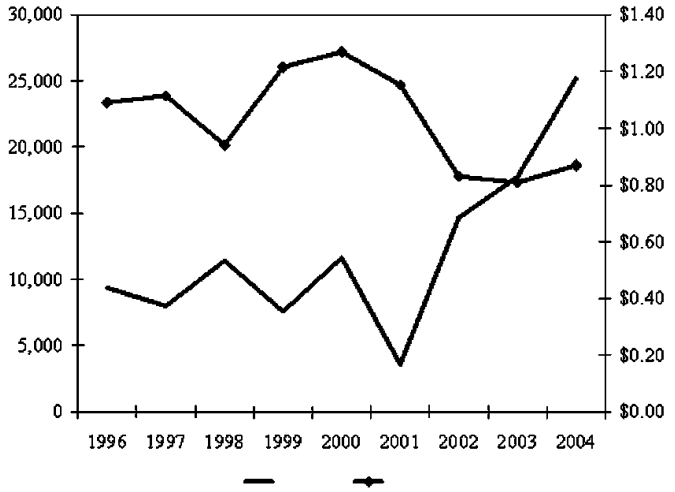
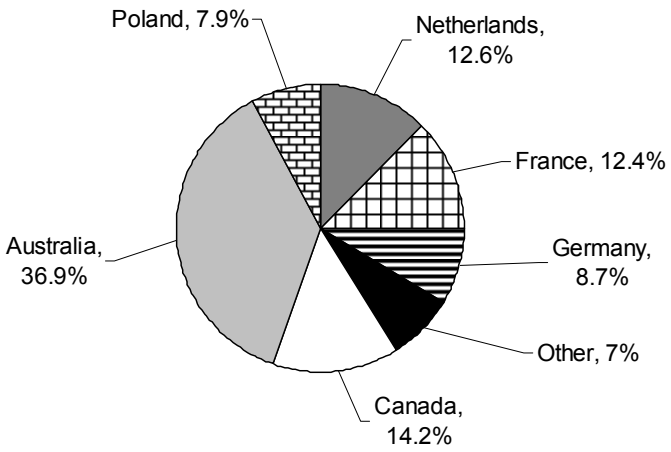


Figure 2. Ten-Year Average Annual Percentage of Imports By the United States From Major



Producers of Wheat Gluten

The U.S. domestic vital wheat gluten industry consists of three manufacturers: Manildra Milling, ADM, and Midwest Grain Products (Boland, Domine, and Steigert; Holcomb). Imports from Canada, Australia, the EU, and others compete with U.S. production. An alliance of five producer-owned cooperatives (Farmland Industries and several local marketing cooperatives) formed Heartland Wheat Growers in Russell, Kansas in the mid 1990s. After construction, the Russell plant operated at less than full capacity because of poor market conditions and closed in June 2001.

Manildra

The Manildra Group is a leading supplier of raw ingredients to world food, beverage, confectionery, and paper industries. Located in Sydney, Australia, Manildra is the world's largest wheat gluten manufacturer. Manildra Milling has wheat wet milling plants in Minneapolis, Minnesota and Hamburg, Iowa. By the late-1990s, it was the largest supplier of wheat gluten to food processors in the United States. Manildra has a large research program in Australia that develops wheat proteins and starch technologies. It has constructed a modified starch operation near its Hamburg, Iowa plant.

ADM

ADM operates a wheat wet milling plant in Shawnee Mission, Kansas. A second plant in Arkansas City, Kansas was recently refitted for wheat flour production. Wheat wet milling is a small portion of ADM's total business enterprises which primarily consist of corn and oilseed processing. Nonetheless, ADM is the second largest flour miller in the United States.

MGP Ingredients

Midwest Grain Products, Inc. (now called MGP Ingredients) is headquartered in Atchison, Kansas. It was one of the early producers of vital wheat gluten in 1955 (Boland, Domine, and Stiegert). MGP Ingredients operates plants in Atchison, Kansas and Pekin, Illinois (U.S. Securities and Exchange Commission). The Atchison, Kansas facility consists of a flour mill, gluten and starch processing facilities, warehouse, distillery, and corporate offices. The Pekin, Illinois plant consists of a gluten and starch processing facility, warehouse, and distillery. MGP Ingredients became a vertically integrated flour and wheat wet milling firm with their 1987 purchase of a flour mill in Atchison, Kansas. In 1995, the company completed a three-year expansion and modernization project which included a new distillery at Pekin, Illinois. As a result, MGP Ingredients' vital wheat gluten is a high-quality product because it mills wheat to obtain a 0.70 percent ash extraction with an 80 percent endosperm extraction. The industry average is 0.52 percent ash and 76 percent endosperm extractions.

EU Firms

Wet wheat milling is a relatively large industry in the EU. The EU has domestic markets for its starch production but not for all of its gluten. Therefore, the EU is a net exporter of vital wheat gluten, whereas the U.S. is a net importer. U.S. imports of vital wheat gluten from the EU have expanded significantly since the late 1980s. While total U.S. imports from all sources increased from 9.3 million metric tons in 1996 to just over 25 million metric tons in 2004 (figure 1), 65 percent of this increase (10 million metric tons) was attributable to the EU.

Recent Events in the Global Wheat Wet Milling Industry

Two major events in the 1990s affected the profitability of firms within this industry. Both events contributed to a change in the competitiveness of this industry. The first event was the large increase in U.S. domestic wheat wet milling capacity. The second event was a trade ruling by the United States with regard to EU exports of vital wheat gluten.

Capacity

New entrants into the U.S. wet willing industry increased capacity in the 1990s. U.S. plant gluten production capacity grew from approximately 163 million pounds in 1993 to 275 million pounds in 1997 -- a 28 percent increase in 1994 and a 22 percent increase in 1995. Manildra and Heartland Wheat Growers were the major sources of this new capacity. But, market conditions caused domestic capacity utilization to decline to only 42 percent in 1996 as wheat gluten inventories increased to 11.5 million pounds.

Trade Ruling

Wheat gluten imports are important sources of supply for U.S. food and feed companies. Australia, Canada, and the EU are the primary sources of these imports. Imports from Canada and other countries have generally been constant over time. Over the past 15 years, the EU has increased its U.S. market share from almost zero in 1985 to nearly 50 percent in 1996. Over this same time period, Australia's market share declined from 59 percent to 38 percent, and Canada's market share declined from 28 percent to 9 percent (Balzer and Steigert; Steigert and Balzer).

In recent years, EU firms increased capacity and operated at or near full capacity while U.S. plants operated below capacity. The processing technology for wheat wet milling is the same across firms and gluten is a relatively homogeneous product. Consequently, processing costs are likely to be similar. Price differences typically reflect wheat and transportation costs. U.S. producers questioned why EU imports were increasing rapidly and displacing U.S. production. Evidently, economic or other incentives enabled EU firms to be more price competitive than U.S. firms.

On March 18, 1998, the U.S. International Trade Commission (USITC) determined that imports of wheat gluten had caused substantial injury to the U.S. domestic industry (Steigert and Balzer). The USITC recommended that a quota be placed on wheat gluten imports. As a result, President Clinton issued Proclamation 7103 pursuant to Section 203 of the 1974 Trade Act on May 30, 1998. The Proclamation imposed annual quantity limits for three years on imports of wheat gluten from the EU and other foreign exporters equal to the total average imports of wheat gluten shipped into the U.S. by foreign exporters during the three crop years ending on June 30, 1995.

In 2001, the International Trade Commission recommended that import relief be extended to 2003 at which time the program ended (Milling and Baking News, 2001a, 2001b).

MGP Ingredients Responses to World Events

MGP Ingredients' financial performance began to decline in 1994. Its net income was negative for several years. There were several reasons for this decline. First, because of more competitive vital wheat gluten imports and new entrants, MGP Ingredients faced lower gluten prices. These lower prices had important implications for MGP because gluten represented the largest per unit contribution to overall gross profits, even though gluten represented only 20 percent of total sales. Second, wheat prices increased in 1995 and 1996. Third, MGP Ingredients was unable to operate its plants at full capacity because of increased gluten imports. This mitigated potential cost advantages from the company's vertically integrated business structure.

Although MGP Ingredients had historically been the low-cost industry leader, Manildra was able to enter the vital wheat gluten market as a lower cost competitor. Consequently, MGP Ingredients decided to use financial assistance offered by the 1998 trade relief to alter their business strategy from that of a low-cost producer to that of a producer of differentiated products. The goal was to transform MGP Ingredients into the only vertically integrated, full-line supplier of wheat-protein specialty products. The company budgeted approximately $30 million for new product research and development, and their efforts resulted in the production of specialty wheat proteins and starches for food and nonfood applications. MGP Ingredients received more than $26 million in government payments to help them transition from relying on vital wheat gluten sales to specialty wheat protein sales. In 2001, MGP Ingredients purchased a building in Kansas City, Missouri to produce specialty wheat proteins.

MGP Ingredients patented a technology that separates gliadin and glutenin. Gliadin is used to strengthen the texture of noodles, confectionary items, dry mixes, food coatings and binders, cookies, crackers, and other foods. Glutenin is used to strengthen frozen bread dough. Wheat protein can be used as a meat substitute. One product line, the Wheatex™ Series, consists of texturized wheat proteins for use

as meat, fish, and poultry substitutes. Textured wheat proteins can replace textured soy proteins in vegetarian foods and processed meat products. The products retain water and generate flavors similar to natural meat juices.

Other products were developed for a variety of food applications including improving shelf life of baked goods, enhancing flavor in various products, and increasing tolerance of foods to overcooking. Midsol FP™ Series is a line of products that can: (1) be substituted for whole eggs and egg whites to improve the texture and strength of pasta products, (2) serve as a binder for meat and vegetarian products, (3) enhance food crispness by forming a barrier against moisture and fat in fried products and reduce stickiness in cooking various food products. Finally, MGP Ingredients developed a wheat protein that could be used as an ingredient in high protein snack bars and beverages.

Wheat proteins have two main nonfood applications – as substitutes for animal proteins in cosmetics and personal care products, and biodegradable wheat-based resins. The demand for final products that could be labeled as being produced from only natural ingredients has increased in recent years. Foam Pro™ was developed as a foam booster to naturally enhance detergent systems such as shampoos, liquid hand soaps, and bath and shower gels. Aqua Pro™ II WAA is a solution of amino acids produced from natural wheat proteins that helped provide moisturizing and film-forming properties in both hair and skin systems. Aqua Pro™ II WP is an additive in shampoo, Aqua Pro™ QWL enhances the functionality of hair conditioners, and Aqua Pro™ II WG is a gliadin formulation used in hair and skin cleansers and conditioners.

Biodegradable resins from wheat gluten and modified wheat starch are substitutes for petroleum-based products. Polytriticum™ 200 is molded into housewares/cutleries, golf tees, plastic forks and spoons, credit cards, ski lift tickets, and dog chews. It is biodegradable and improves product performance.

Modified wheat starches replace starches obtained from corn, waxy maize, potato, and tapioca. These starches are used in food, paper, adhesives, and building products. Although a number of specialty wheat proteins are currently marketed, others are in the test-marketing or development stage.

Specialty wheat proteins account for an increasing share of MGP Ingredients' total net sales -- from 1 percent in 1998 to 31.5 percent in 2004. Growth is expected to continue because of increased marketing efforts and customer recognition of the advantages of these unique products.

Summary

U.S. imports of EU wheat gluten represent approximately one-half of U.S. consumption. While in place, vital wheat gluten import quotas and financial assistance helped U.S. processors adjust to competitive pressures. U.S. domestic wheat gluten processors developed new strategies in response to foreign competition. For example, MGP Ingredients has adopted a differentiation strategy of manufacturing specialty wheat proteins and other products rather than relying heavily on vital wheat gluten sales.

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