



USDEC News

New Life for Doha Talks

By Tom Suber, President, U.S. Dairy Export Council, Arlington, VA, USA

Trade talks, says U.S. Trade Representative Susan Schwab, are like rappelling down a steep mountain.

“There is a leap of faith associated with trade liberalization,” she explained a few days after the Doha round was indefinitely shelved last summer following five years of negotiation. “The challenge, when it comes to market opening and market liberalization and free trade, in general, is that there is the moment when you step off the cliff ... and it is that moment in time that scares everybody.”

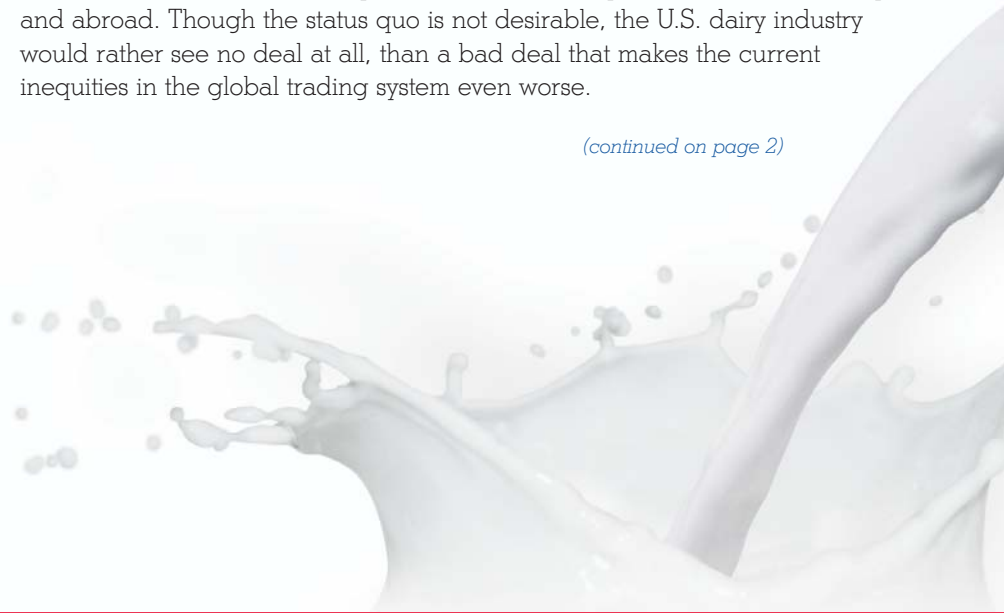
WTO members currently appear to be deeply engaged in attempts to gather up their courage in time to take the plunge in the next few months.

Since talks fell apart last summer, the major players have repeatedly been saying – publicly at least – that they want the World Trade Organization (WTO) round to succeed. But talk is one thing and action is another.

Following the United States’ October 2005 proposal to aggressively cut domestic support, the European Union, India and others failed to step forward with commensurate offers on market access. With its trading partners unwilling to move off their entrenched positions, “the United States cannot, and will not, negotiate with itself,” as Schwab had long declared. Lately it appears that other countries have finally begun to realize that she actually meant that and detailed discussions on how to move forward have been taking place for the last few months.

Throughout this stalemate and the more recent inching forward, the U.S. dairy industry position has remained unchanged. It still wants elimination of export subsidies and greater harmonization of market access. It also wants to ensure that Geographic Indications (GIs) are not included in the final agreement because of the harm they could cause for dairy sales both domestically and abroad. Though the status quo is not desirable, the U.S. dairy industry would rather see no deal at all, than a bad deal that makes the current inequities in the global trading system even worse.

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Recent 'Progress'

Informal dialogue picked up between key WTO members such as the U.S., EU, India, Brazil and others after U.S. mid-term elections in November. Following a series of meetings between several WTO countries in January, trade officials hailed progress in bridging gaps. Talks on the sidelines of the World Economic Forum in Davos, Switzerland, were encouraging enough for WTO director-general Pascal Lamy to call for the official restart of the round on January 31.

For now, talks are focused on tackling the technical details – each country weighing offers product-by-product and line-by-line – rather than merely debating broad outlines as previously had been the case. For instance, European trade commissioner Peter Mandelson had long hinted that the EU could make deeper cuts to its agriculture tariffs, but trading partners want to understand exactly what that would mean for a variety of products, including specific treatment of the “sensitive” products excluded from general tariff formula cuts.

The clock, however, is ticking loudly.

President Bush's Trade Promotion Authority (TPA) expires July 1, 2007, so for all practical purposes, it's too late to

pass a WTO agreement under the current TPA framework. Therefore, the administration has asked Congress to extend its negotiating authority.

The current thinking is that the best chance for a TPA extension is if Ambassador Schwab can show Congress the outline of a Doha agreement that would include specific, quantifiable benefits for U.S. exporters. If such an understanding is reached by May or June, it could provide the impetus to a brief extension of TPA. That would likely give countries until the end of 2007 to negotiate specific concessions and work on technical issues, before submitting the final agreement for passage by their home legislatures in the first portion of 2008.

Renegotiation of U.S. farm policy adds another factor to the mix.

The Farm Bill, which expires this fall, will be the subject of great debate throughout the spring and summer. On January 31, the U.S. Department of Agriculture (USDA) unveiled its proposal for U.S. agricultural policy for the next five years. Like all Farm Bills, the 2007 Farm Bill covers a wide variety of nutrition, environmental and farm programs. In fact, only a fraction of the overall

spending authorized in the Farm Bill actually goes to farmers.

The proposal called for spending approximately \$10 billion less across the Bill's various areas than was spent under the current Farm Bill's direction over the past five years. Under the plan, the U.S. would take certain steps towards providing support in a less trade-distorting manner without making sweeping changes to the structure of its programs before a WTO deal is reached that could impact those spending levels. As important as the Administration's proposals are, it is Congress, not the Administration that writes the Farm Bill, and many in Congress have expressed a strong reluctance to make major cuts to farm subsidies without assurances that the Doha round will deliver new market access abroad.

That lends further importance and urgency to the ongoing detailed discussions between WTO members. Governments now have only a few short months to decide if they have the political will to complete the Doha agreement. It remains to be seen if they can make the necessary leap of faith.

USDEC News is published by the U.S. Dairy Export Council (USDEC) and is designed to provide up to date information about the U.S. dairy industry for the benefits of our international partners.

USDEC was formed by Dairy Management Inc. in 1995 to enhance the U.S. dairy industry's ability to serve international markets. USDEC is an independent non-profit membership organization representing dairy processors, exporters, milk producers and industry suppliers.

USDEC supports international buyers of dairy products by providing information about U.S. suppliers, their products and capabilities. We bring buyers and sellers together through conferences, trade missions and trade shows. USDEC furnishes application and usage ideas for U.S. dairy ingredients through seminars, one-on-one consultations and technical publications. We assist with foodservice promotions, menu development and education. We also work with local authorities to resolve market access issues that ensure reliable delivery for customers and importers. When you work with USDEC and its members, you are partnering with companies that manufacture and export more than 85% of all U.S. dairy products.

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2006 U.S. Dairy Exports: \$1.89 Billion

U.S. exporters enjoyed another record year in 2006, led by large gains in shipments of whey, cheese and lactose. Total export value reached \$1.89 billion, up 13.7% from the prior year, according to U.S. Dairy Export Council (USDEC) data. U.S. suppliers stepped up to capitalize on strong global dairy demand – led by solid growth in China, Southeast Asia and Russia – coupled with a cutback in exportable surplus from Europe and Oceania.

Mexico, Southeast Asia and Canada remain the largest destinations for U.S. dairy products, with 2006 sales of \$444 million, \$353 million and \$263 million, respectively, says the U.S. Department of Agriculture. The fastest growing markets were China (+\$55 million vs. 2005), the Philippines (+\$32 million), Egypt (+\$28 million) and Indonesia (+\$28 million).

By value, the major U.S. dairy exports were skim milk powder (SMP), \$601 million; whey proteins, \$380 million; cheese, \$245 million; and lactose, \$163 million. These four categories made up nearly three-quarters of total U.S. exports, says USDEC.

U.S. **SMP** exports reached 292,424 metric tons (MT) in 2006, up slightly from the prior year. 97% of the exports were unsubsidized, commercial sales.

Shipments to Mexico, our largest market, plunged 38% in 2006 due to a slowdown in purchases by Liconsa, the government social-services agency, as well as inventory build-ups from the prior year. But this was offset by large gains to other major customers like Indonesia (+55%), the Philippines (+48%), Malaysia (+34%), Egypt (+354%), Algeria (+38%) and China/Hong Kong (+180%).

Last year was a record year for U.S. **whey** exports, with combined shipments of 347,554 MT, up 26% from a year ago. Exporters continued to push higher-value whey proteins: sales of whey protein concentrate (WPC) and other modified whey products jumped 44% to 97,149 MT and exports of whey protein isolates (WPI) gained 59% to 11,280 MT.

Meanwhile, exports of sweet whey increased 19% to 226,798 MT.

Exports of sweet whey to China/Hong Kong, our largest single market, were flat, but this was offset by increases in shipments to Southeast Asia (+26%), South Korea (+22%) and Canada (+32%).

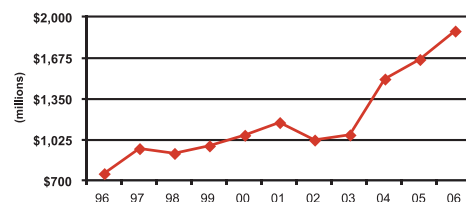
The bulk of the gains in exports of WPC went to Mexico, now our largest market with 35,884 MT (+131%). On WPI, exports to Canada and Mexico dropped 3%, but new sales were picked up to China, South Korea, Thailand, Denmark and the Netherlands (+341% combined.)

U.S. **cheese** exports hit a record high 71,089 MT in 2006, up 23% from the prior year, according to the Export Council. Shipments to Mexico, our largest market, increased 40%, while exports to the Caribbean and Central America were up 39% and exports to South Korea were up 13%. Though starting from small bases, exports to Saudi Arabia (+121%) and China/Hong Kong (+72%) posted significant growth.

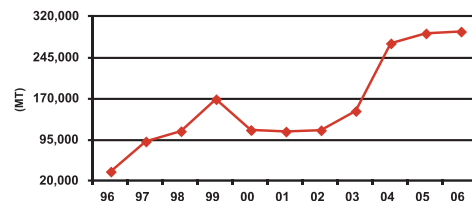
Lactose exports increased 29% to 237,867 MT in 2006. Shipments to our four major markets, Japan, China, Mexico and Vietnam, which make up more than half our exports, increased 12%. In addition, exporters were successful in targeting new markets for growth. The next 10 largest customers – South Korea, Indonesia, the Philippines, Brazil, Thailand, Canada, Australia, Singapore, Malaysia and New Zealand – boosted purchases by 57%.

Among other key products, exports of **ice cream** were up 2%, to 26,518 MT, exports of **fluid milk and cream** were up 5%, to 24.4 million liters, and exports of **butterfat** were up 26% to 10,778 MT. On ice cream, exports to Mexico, our major market, increased 12%. On fluid milk and cream, sales to Mexico increased 52%, but this was offset by a 36% plunge in shipments to Canada. On butterfat, new sales to Morocco, Turkey and Honduras were key, as well as a 60% increase in sales of butter to Mexico.

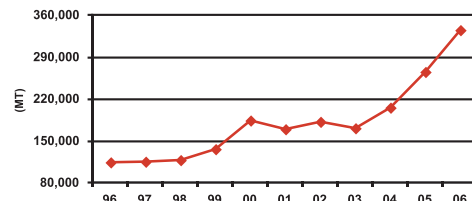
Value of U.S. Dairy Exports



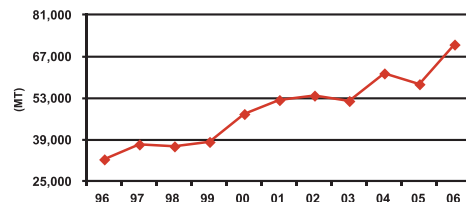
U.S. Skim Milk Powder Exports



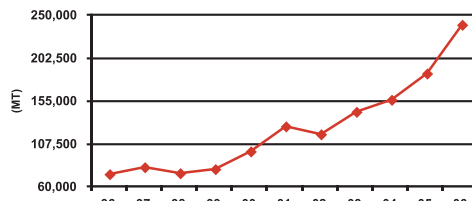
U.S. Sweet Whey, WPC and WPI Exports



U.S. Cheese Exports



U.S. Lactose Exports



In the News...

New Plants and Upgrade

- **Brewster Dairy**, the nation's largest producer of swiss cheese, bought Kraft Foods' plant in Rupert, Idaho, just days before Kraft was due to close it. Brewster will install new equipment and expects to begin production in Idaho by November.
- **Dreyer's Grand Ice Cream** completed a \$210 million expansion of its North Laurel, Maryland, ice cream factory. The expansion tripled production capacity and added at least 700 jobs. The project added five new ice cream manufacturing lines to the six it had previously, and added capacity for nine future lines, plus a curing facility. The company expects to produce nearly 219 million liters of packaged ice cream and more than 4.4 billion frozen snacks a year. North Laurel is now the largest of Dreyer's six U.S. manufacturing plants.
- **Marathon Cheese** opened its new Mountain Home, Idaho, cheese cut-and-wrap operation. The plant is strategically sited for proximity to Glanbia, Davigo and Kraft cheese plants.
- **Vermont Milk Co.** acquired a 930 square meters processing facility in Hardwick, Vermont, from which it will produce bottled milk and ice cream sourced 100% from Vermont farms. The company expects to process 4.4 million liters of milk in the next 12 months, and 13 million liters in its second year.
- **Winona Foods** completed a \$3 million expansion of its Green Bay, Wis., plant. The expansion adds 3,716 square meters to the plant, including 3,252 square meters of warehouse space and 465 square meters for production of portion control products. A new packaging line also was added to increase capacity for aerosol products. Winona also introduced certified organic cheese sauce.

Acquisitions and Merger

- **Saputo Cheese USA** will acquire Land O'Lakes' (LOL) West Coast

industrial cheese business for \$216 million. The deal includes a Tulare, California, plant that handles 2.4 million liters of milk per day and produces mozzarella and provolone. The operation, doing business as Cheese and Protein International, posted sales of \$415 million last year. As part of the deal, LOL will be the exclusive, long-term milk supplier to the facility.

- **Dreyer's Grand Ice Cream** purchased the Eskimo Pie, Chipwich and Real Fruit business of CoolBrands International. Dreyer's is a subsidiary of Nestlé SA.
- **Healthy Food Holdings**, Boulder, Colorado, acquired CoolBrands Dairy, North Lawrence, N.Y. The company, which is a unit of CoolBrands International, makes Breyer's brand yogurt. Healthy Food Holdings also owns Yofarm Co., makers of YoCrunch brand yogurt.
- **Lactalis American Group Inc.** will buy fresh-mozzarella maker Mozzarella Fresca Inc., Concord, California. The business will be spun off into a third U.S. subsidiary, separate from Sorrento Lactalis Inc. and Lactalis USA.

Moves and Consolidations

- **Altria Group** will spin off its Kraft Foods subsidiary at the end of March. The spin-off allows Kraft to accelerate growth plans by using its stock for acquisitions and to access capital markets. Kraft CEO Irene Rosenfeld, who took over the company in June 2006, is expected to release a new strategic plan at an analysts' conference on February 20.
- **DCI Cheese Co.** will close its Mayville, Wisconsin, cheese cut-and-wrap operation in first quarter 2007 and consolidate the business at its Suamico, Wisconsin, plant north of Green Bay.
- **Dean Foods** will close its Reiter dairy plant in Akron, Ohio, in February 2007 and consolidate production at other facilities in Ohio and

Pennsylvania. Meanwhile, Dean will invest \$1 million to build a new distribution center in Akron.

- **Kellogg Co.** will close its Fremont, Ohio, cheese processing plant in mid-2008, and shift production to Brewster Dairy's new plant in Rupert, Idaho. Rising demand for Kellogg's Cheez-It crackers prompted the company to seek increased capacity in Rupert.
- Cass-Clay Creamery will merge with its Upper-Midwest neighbor, **Associated Milk Producers Inc. (AMPI)**. Cass-Clay's 200 farmer-members produce about 132 million liters of milk annually. AMPI's 3,700 members produce 2.3 billion liters of milk annually. The deal, which makes Cass-Clay a division of AMPI, is expected to be completed by April 1.
- **NexCen Brands**, a New York investment firm, will acquire Marble Slab Creamery and Maggie Moo's International, the number 2 and 3 players in the hand-mixed premium ice cream category, for \$37 million. The two chains have 520 units and \$10 million in combined annual sales.

Awards and Recognition

- John Jeter, the president/CEO of **Hilmar Cheese Company**, received the National Cheese Institute's highest honor in 2007, the NCI Laureate Award. The award recognizes individuals who have made significant contributions to the development and growth of the U.S. cheese industry.
- **Cabot Clothbound Cheddar**, a cooperative venture of Cabot Creamery and Jasper Hill Farm, was named "Best of Show" at the 23rd Annual Conference and Competition of the American Cheese Society (ACS). In 2006 this cheese was also a finalist for "Outstanding Cheese or Dairy Product" at the Products Awards of the International Fancy Food Show in New York; and received a silver medal at the World Cheese Awards.

American Original Cheeses

Long before the United States officially became a nation, our European ancestors had already begun making cheese in North America. Cheese was a cherished food of our ancestors, and as soon as they had a surplus of fresh milk, they started making cheese in their new homeland. Even if they tried to make cheeses identical to those of their homelands, different milk, geography, climate and equipment yielded new and unique cheeses. These first American original cheeses marked the beginning of cheese making traditions that continue today. For centuries our regional food traditions and cheese making innovations have combined to produce hundreds of unique American original cheeses. Here is a profile of some of the most traditional and popular cheeses.

Baby Swiss

Amish dairy farmers in two different regions of the country, Pennsylvania and Ohio, are credited with producing the first baby swiss sometime between 1890 and 1900. Originally made popular in the Amish communities and enjoyed on the farm, its popularity quickly spread when it was sold in local markets and others tasted the unique creamy cheese. While most other types of swiss cheese are made from part-skim milk yielding a

firm cheese, baby swiss is typically made with whole milk yielding mild, buttery flavors and a soft, creamy texture. The name “baby swiss” was chosen because this cheese is made in smaller sizes than traditional swiss, it is aged for less time, and has smaller holes or eyes than traditional swiss. One version called lacey swiss is made from part-skim milk and has very tiny random holes that form a lace pattern.

Retail and foodservice trends and applications

Baby swiss is popular for snacking, entertaining, and on cold and hot sandwiches. One of the most popular sandwiches people make at home is ham and cheese, and baby swiss is one of their favorite cheeses to use. Made with whole milk, baby swiss melts well making it perfect for a wide variety of cooking applications.

Originally made in small wheels that weighed 6lb. (2.7kg), baby swiss is also produced in loaves which make ideal slicing cheeses, popular in delis everywhere. Some of the most popular deli sandwiches feature baby swiss. Its creamy texture and mild flavors are suitable for cold and hot sandwiches and wraps and its melting ability makes it perfect for hot deli sandwiches, like the classic Reuben sandwich, which combines baby swiss and corn beef.

Colby

Colby was first produced in the town of Colby, Wisconsin in 1874. Similar in flavor to cheddar, colby has a higher moisture content yielding a firm, elastic, open texture with tiny holes throughout. Typically enjoyed young, its flavors are mild and creamy with a slight tanginess. Its unique, mild flavors are popular with children and adults alike. Colby is tradi-



Photo courtesy of Wisconsin Milk Marketing Board, Inc.

tionally made in 13lb. (5.9kg) cylinders known as longhorns.

Retail and foodservice trends and applications

Found in the dairy and deli departments of retail stores nationwide, colby is used for snacking, hot and cold sandwiches, and a topping for many traditional Mexican recipes. Colby “longhorn” cylinders are traditionally cut in half lengthwise and then cut into smaller retail pieces yielding cuts that are easily recognizable for their half-round shapes known as half-moons.

Colby is most popular sliced and used as a topping for hot and cold sandwiches, and cheeseburgers.

Cream Cheese

Cream cheese is an American original, unique for its firm, creamy, spreadable texture, and rich, creamy, buttery flavors. The first cream cheese in the U.S. was made popular in Louisiana by French immigrants and Creoles from Nova Scotia. They made a cheese similar to the French Neufchâtel and sold it at local markets. These soft, fresh, cheeses were



Photo courtesy of Wisconsin Milk Marketing Board, Inc.

made in baskets, turned out for display, and then topped with spoonfuls of fresh cream. Locals started to call this cheese "cream cheese" and the name stuck. At the time, due to its perishability and lack of refrigeration, cream cheese was only available in certain regions of the country. One region where cream cheese became extremely popular was New York City where traditional Jewish delicatessens and bakeries used cream cheese in a number of ways. One of the most popular uses for cream cheese was spread on hot, fresh bagels. New York delis also used cream cheese to make one of the most famous and popular desserts ever, New York Style Cheesecake.

In the early 1900s cheese makers in New York began to package cream cheese tightly wrapped and sealed in a new material called tin foil. This packaging innovation helped protect the cheese, maintain its quality, and greatly increase its shelf life. This allowed cream cheese to be distributed nationally. U.S. cream cheese became so popular that by 1950 it was distributed internationally.

Retail and foodservice trends and applications

Bagels spread with cream cheese were one of the first convenient breakfast food, "to go" and are still popular today. They make for an easy breakfast at home, at work, or on the run. Reduced-fat and no-fat varieties have also become popular. Cream cheese carries others flavors well and has become very popular in a host of flavors both sweet and savory. Fruit and sweet versions are most popular at breakfast spread on toast, muffins or bagels. Savory varieties like Garlic & Herb are equally popular as snacks, appetizers, when entertaining, or spread on wraps and sandwiches.



Photo courtesy of Wisconsin Milk Marketing Board, Inc.

Cheesecake still holds the title as one of the most popular desserts for people dining out. Available in all types of restaurants and a huge array of flavors, cheesecake still accounts for a large portion of cream cheese usage at food-service. Plain and flavored cream cheeses are also frequently used on bagels, hot and cold appetizers, sandwiches and wraps.

Monterey Jack

Scottish immigrant and dairy owner David Jacks first made monterey jack cheese in 1865 near Monterey, California. Jacks followed a Swiss method of cheese making and used whole milk, creating a cheese with rich, creamy, buttery flavors and a smooth, semi-soft texture. Monterey jack quickly became popular with locals, especially with Hispanic and Mexican immigrants who lived and worked in the area. The creamy texture and buttery flavors pair well with a host of traditional Mexican foods, including queso fundido, enchiladas and tacos. Monterey jack quickly became one of the most

popular cheeses in California, and its popularity has continued to spread across the rest of the country until today.

Retail and foodservice trends and applications

Monterey jack is enjoyed for snacking, entertaining, sandwiches, and a wide variety of recipes and hot applications. With its creamy texture and buttery flavors, monterey jack carries others flavors well and is available in a wide selection of flavors. Popular flavors include plain, hot peppers including jalapeno, habanero, and chipotle, various garlic and herb combinations, and pesto.

Reduced-fat versions are also available.

Monterey jack compliments a wide range of foods with its rich, creamy and buttery flavors. Made with whole milk, it melts well and is widely used on cheeseburgers, hot sandwiches, pizza, and a host of other hot applications. Monterey jack is also a key ingredient in many Mexican and Hispanic foods, which are the second most popular ethnic food in the U.S. Variations also include Southwest and Texas-Mexican foods known in the U.S. as "Tex-Mex."

Monterey Dry Jack

A variation of monterey jack known as dry jack is another popular American



Photo courtesy of Wisconsin Milk Marketing Board, Inc.



Photo courtesy of Wisconsin Milk Marketing Board, Inc.

original cheese. Monterey dry jack is a hard cheese made with whole milk, yielding buttery and nutty flavors. It was first made in the 1930s and during World War II it became popular as a substitute for parmesan. It is easily recognized with a dark brown rind and buttery, nutty interior. The brown coating used on the surface during curing is inert cocoa powder.

Low-Moisture Mozzarella

Low-moisture mozzarella represents an American cheese making innovation that changed the world of cheese as we know it today. Driven in large part by the popularity of pizza, mozzarella has become one of the most popular cheeses in the U.S. and the world, second only to cheddar in volume of production. Originally made in Italy from the milk of Water Buffalos, mozzarella was soft, fresh, and packed in a brine solution. However, it was so perishable that it could not survive the long boat ride to the United States. During World War II many American soldiers were stationed in Italy, and when they returned to the U.S., they craved the delicious dish they had tried in Italy called pizza. Pizza quickly became popular in the U.S. and one of Americans' favorite foods. American cheese makers developed low-moisture mozzarella to provide a longer shelf life. The trend continued internationally with low-moisture mozzarella becoming the

principal cheese used on pizza around the world.

Retail and foodservice trends and applications

Italian food is the most popular ethnic food in the U.S., and a host of Italian foods utilize mozzarella, including Italian sandwiches, lasagna, pizza, and pasta. Low-moisture mozzarella is made in many styles including whole milk, part-skim milk, and other reduced-fat styles. A unique form of low-moisture mozzarella known as "string cheese" has become incredibly popular, especially with kids, as snacks and in lunch boxes.

Pizza remains the top use for mozzarella at foodservice, but the popularity of Italian foods has restaurants of all types using mozzarella in many traditional Italian dishes. Mozzarella is also a key ingredient in breaded fried cheese sticks, one of the most popular appetizers of all time, which appears on menus at fast food, family style and casual theme restaurants nationwide. The way cheese is used in pizza changes constantly as do cheese making innovations. In addition to mozzarella on the top of a pizza, one extremely popular trend is to place mozzarella string cheese around the outside edge of a pizza and roll the cheese into the crust. After baking, the crust contains a tunnel of melted mozzarella, making it one of the most fun parts of the pizza to enjoy.



Renaissance of Specialty American Original Cheeses

Many American original cheeses that were once available regionally became so popular that they came to be distributed nationally. As their popularity grew so did the size of cheese factories producing them. Parallel to this, a cheese making renaissance occurred in the U.S. with hundreds of small cheese makers producing specialty, artisan and farmstead cheeses in regions all around the country. Specialty cheeses are produced in smaller quantities, and artisan refers to cheeses that are largely made by hand with little mechanical production. Farmstead cheeses are made on the farm, using only the milk from their own herds. Like the first American original cheeses, many of these new cheeses are more limited in their production and only available regionally, close to where they are produced.

This trend has continued for several decades and today a new breed of American cheese makers is producing over a thousand unique American original cheeses. It is not the number of cheeses they produce that is important, but their quality. American cheese makers consistently win top awards for these specialty cheeses in national and international competitions.

For more information about U.S. cheeses, see the **"Information About Cheese Products"** section of our website. Link address: <http://www.usdec.org/Products/Cheese.cfm?navItemNumber=1214>.

And stay tuned for further details about U.S. Specialty Cheeses in our next issue!

Lactose, the Forgotten Sugar

By Robert Boutin,
Knechtel, Inc., Skokie, Illinois, USA

As demand for specialized ingredients and products increases, possibly the time has come to re-evaluate the value of lactose in various confectionery, nutraceutical and bakery applications.

The Way Forward?

Recent research has shown that the unique characteristics associated with lactose can be beneficial to a product's formulation, in addition to being cost-effective. Although the issue of lactose intolerance needs to be taken into account, in many formulations its usage level is below accepted (published) consumer threshold levels.**

In fact, the unique solubility and crystallization characteristics of lactose may have a positive effect if used correctly. For example:

- Lactose has limited sweetness. It is approximately 25% as sweet as sucrose in solutions. Its use at various concentrations can be beneficial in reducing the overall sweetness profile of confectionery or it can be used in other products with low sweetness and bulk solids.



- Nutritionally, it is a very important sugar and is used in numerous infant foods and nutritional products. It is used primarily because of its ability to promote the assimilation of calcium

- and phosphorus. Other findings indicate that it is a source of sugar matter in brain tissue.
- Lactose is a reducing sugar, thereby enhancing color and flavor generation in many bakery or confectionery formulations (Maillard reaction).

Lactose and Milk

Recent studies have shown that lactose and various dairy powders such as whey protein concentrate (WPC), skim milk powder (SMP), whole milk powder (WMP), etc. have a synergistic effect on milky flavors. For example, the combination of lactose with WPC enhances the milky flavor characteristic of a formula, allowing for lower usage levels and possible further cost savings. This is especially valuable in milk chocolate products, caramels and milk toffees.

Table 1: Lactose Substitution in Milk Chocolate Compound Coatings

Ingredient	Control	Substitute #1	Substitute #2
Chocolate liquor	25.40	25.40	25.40
Cocoa butter	14.39	14.39	14.39
WPC 34	16.80	16.80	12.70
Butterfat	7.20	7.20	7.20
Sucrose	36.00	26.00	31.00
Lactose	-	10.00	9.10
Lecithin	0.20	0.20	0.20
Vanillin	0.01	0.01	0.01
Total	100.00%	100.00%	100.00%

**"The amount of ingested lactose required to produce symptoms is usually about 12-18 grams of lactose." - American Family Physician, May 2002. A typical milk chocolate bar (1.5 ounces or 42.5 grams) contains approximately 12% dry whole milk, which would yield 2.8 grams of lactose. So a consumer would have to eat 4+ bars before any symptoms would be seen.

Introduction to Lactose

Lactose, or milk sugar, is the most important carbohydrate of milk and, by weight, the most abundant of the milk solids. Lactose is a disaccharide composed of two monosaccharides: galactose and glucose. Bovine milk contains 45 to 50 grams of lactose per liter. Lactose is a reducing sugar that can, in some circumstances, react freely with amino groups in proteins. Lactose is a useful source of dietary energy and it plays a role in calcium absorption.

Lactose is a ubiquitous product used by the pharmaceutical, food and chemical industries. Lactose is one of the most widely used excipients in the pharmaceutical industry. It is used in dry powder inhalers, tablets, capsules and sachets. Lactose can be found in infant formulas, confectioneries, baked goods, and processed, frozen and prepared foods. Chemists use it as a base for producing lactulose and lactobionic acid. And, last but not least, lactose is used in animal feeds in the world of agriculture.

Industrially, lactose is produced from cheese whey (or more specifically whey permeate). In 2006 the U.S. produced 317,000 metric tons of lactose; 75% of the production was exported. Several types and grades of lactose products exist, to meet the needs of various end-users. Please consult USDEC or your U.S. supplier for additional information.

Table 1 demonstrates the potential uses of lactose in milk chocolate and compound coating formulations where:

- Control: Sucrose reduction
- Substitute #1: 25% of the WPC 34 is replaced by lactose
- Substitute #2: 25% of the WPC 34 and 14% of the sucrose are replaced by lactose

It should be noted that the use of lactose in Substitute #2 provided a two-fold benefit: enhancing the milk flavor and operating as a low-cost sugar substitute. Similar benefits can be seen in dark and white chocolate coatings or formulations (Table 2).

Table 2: Synergy with Lactose Formulations for Various Chocolate Confections

Ingredient	Whole Milk	Dark	White
Chocolate liquor	25.00	33.00	-
Cocoa butter	14.00	19.79	24.79
WPC 34	12.59	-	26.00
Butterfat	7.20	-	8.00
Sucrose	36.00	42.00	36.00
Lactose	5.00*	5.00*	5.00*
Lecithin	0.20	0.20	0.20
Vanillin	0.01	0.01	0.01
Total	100.00%	100.00%	100.00%

*Where higher levels are possible

Lactose in Cooked Products

As mentioned previously, the use of lactose can be beneficial to cooked products. For example, its use in caramels, even at low levels, can frequently improve color and flavor build-up while reducing cook time and increasing production efficiencies.

In regular sucrose/glucose high-boiled hard candies, I now frequently recommend adding some lactose to the formulation at 1-3% levels to assist in reducing the candy's hygroscopicity and adherence to the wrapper.

Even in sugar fondants or confectionery creams, lactose use (at various levels) helps retard sucrose crystal growth and its associated negative gritti-



Photo courtesy of Wisconsin Milk Marketing Board, Inc.

ness. It also results in a product that has a smooth, creamy texture and possesses a longer shelf life.

Other Potential Uses

Are there other potential uses for lactose in confectionery? Table 3 provides some insight and guidance on concentration levels:

Table 3: Lactose Limits as Sucrose Replacements in Confections

Confection type	Lactose usage level (%)
Pectin jellies	10
Licorice	5-10
Wine gums	<10
Starch-based pastilles	10
Marshmallows	10
Ungrained nougat	15-20
Pulled chews	10-15
Chewing gum	15
Fondants	20
Marzipan	25
Fudge	25
Tableted lozenges	35

NOTE: Because of lactose's solubility, extreme care should be taken in all formulations to ensure total solubility or that the correct particle size of lactose is used in crystalline systems.

Concluding Remarks

I will leave it to the scientists to explain the reasoning behind the positive aspects of lactose. Because, for most of us, what matters most is that its usage can make better products.

Lactose is a very interesting sugar/ingredient and, if used correctly, many formulations can benefit from its use. However, as with other ingredients, it is important to be aware of its characteristics and to design formulations and procedures with these in mind.

For more information about U.S. lactose please consult the U.S. Whey and Lactose Manual available on our website at: <http://www.usdec.org/publications/PubDetail.cfm?ItemNumber=587>

To read more about the use of whey products and lactose in confectioneries please see our monograph covering that topic at: <http://www.usdec.org/publications/monographs.cfm?navItemNumber=1210>

Whey Protein-Fortified Noodles

Noodles are an important part of the daily diet in many parts of the world. Dried noodles are shelf-stable, inexpensive and relatively nutritious. Noodles can be made from the flour of many grains or vegetables, although, depending on the protein content of that flour, it may require supplementation with protein-containing substances or gums, for structure and stability. Noodles made from wheat contain complex carbohydrates, protein, fiber, vitamins and minerals, but are not considered a balanced food because the protein is lacking some of the essential amino acids. Rice noodles, especially those using white rice flour, have low protein, fat and fiber. Incorporating whey protein into noodles provides an excellent opportunity to increase the protein level a to provide and more nutritional food.

USDEC recently conducted a project to identify the parameters and benefit of using whey proteins in wheat and rice noodles. The objective was to determine the highest amount of whey protein that could be incorporated into noodles, while maintaining the quality of the finished noodle and minimizing processing issues. The trial was done using whey protein concentrates with 80% protein (WPC 80) and whey protein isolates (WPI)(containing at least 90% protein).

Results

Satisfactory noodles could be made by replacing as much as 20% of the flour with WPC 80 and WPI. However, as the whey levels increased, the dough became sticky and difficult to manipulate, and noodles stuck together when stored fresh. Most of the work focused on noodles without egg, although noodles made with egg, whether rice or wheat, had a good overall quality and mouthfeel.

Our best recipes, balancing overall quality, nutrition and ease of processing, are presented thereafter.

A high quality wheat noodle could be produced which contained 17.5g of protein per 100g noodle of which 10.5g was whey protein. This represents a



50% protein increase over that found in a typical wheat noodle.

A high quality rice noodle could be produced containing 17.5g of protein per 100g noodle of which, 16g was whey protein. This represents a 80% protein increase from a typical rice noodle.

The processing issues for either rice or wheat fortified noodle were minimal. Additional observations can be made on flavor, color, texture and cook times.

The flavor of cooked rice or wheat noodles containing WPC 80 or WPI was typically bland. Above 15% added WPC 80, a slight flavor change could be detected, although it was not considered objectionable.

Noodles with higher levels of whey protein had a slightly firmer and chewier texture. The fortified noodles took longer to cook than the regular noodle. The color of the noodle changed from creamy white (unfortified noodle) to a darker yellow color as more whey was added. WPI yielded a lighter color noodle than WPC 80.

In summary, the addition of WPC 80 and WPI to noodles is an excellent way to add whey protein to the diet.

Whey Protein Fortified Wheat Noodle

Ingredients	Wheat noodles with WPC	Wheat noodles with WPI
	Usage level (%)	
Semolina flour	57	59
Water	26	26
WPC 80	13	-
WPI	-	11
Vegetable oil	3	3
Salt	1	1
Total	100	100
Nutritional information per 100g of cooked noodles		
Calories	290	280
Fat	4.5	4
Carbohydrate	43	43
Dietary fiber	2	2
Protein	17.5	17.5
Whey protein	10.5	10.2

Whey Protein Fortified Rice Noodle

Ingredients	Rice noodles with WPC	Rice noodles with WPI
	Usage level (%)	
Water	25	25
Rice Flour	25	27
WPC 80	20	-
WPI	-	18
Cornstarch	13	13
Potato Starch	13	13
Vegetable Oil	3	3
Salt	1	1
Total	100	100
Nutritional information per 100g of cooked noodles		
Calories	290	280
Fat	4.5	4
Carbohydrate	43	43
Dietary fiber	<1	<1
Protein	17.5	18
Whey protein	16	16

The functional and nutritional benefits of whey protein have been explained in several publications. For more information please refer to U.S. Whey and Lactose Manual available on our website at: <http://www.usdec.org/publications/PubDetail.cfm?ItemNumber=587>

Major Scientific Advances with Dairy Foods in Nutrition and Health

By P. J. Huth, D. B. DiRienzo and G. D. Miller of the National Dairy Council, Rosemont, Illinois, USA

A large body of scientific evidence collected in recent decades demonstrates that an adequate intake of calcium and other nutrients from dairy foods reduces the risk of osteoporosis by increasing bone acquisition during growth, slowing age-related bone loss, and reducing osteoporotic fractures. These results have culminated in the new (2005) Dietary Guidelines for Americans that now recommend 3 servings of milk products per day to reduce the risk of low bone mass and contribute important amounts of many nutrients that may have additional health attributes beyond bone health.

A number of animal, observational, and clinical studies have shown that dairy food consumption can help reduce the risk of hypertension. Clinical trials indicate that the consumption of recommended levels of dairy products, as part of a healthy diet, can contribute to lower blood pressure in individuals with normal and elevated blood pressure. Emerging data also indicate that specific peptides associated with casein and whey proteins can significantly lower blood pressure.



Photo courtesy of Wisconsin Milk Marketing Board, Inc.

In addition, a growing body of evidence has provided support for a beneficial effect of dairy foods on body weight and fat loss. Clinical studies have demonstrated that during caloric restriction, body weight and body fat loss occurs when adequate calcium is provided by supplements and that this effect is further augmented by an equivalent amount of calcium supplied from dairy foods.

Several studies support a role for calcium, vitamin D, and dairy foods against colon cancer. Additionally,

conjugated linoleic acid, a fatty acid found naturally in dairy fat, confers a wide range of anticarcinogenic benefits in experimental animal models and is especially consistent for protection against breast cancer.

USDEC would like to express its gratitude to Drs. Huth, DiRienzo and Miller and the Journal of Dairy Science for agreeing to share the above information. The full article can be found in: Journal of Dairy Science 2006 Apr;89(4):1207-21.

Agri-Mark, Inc.

Dairy cooperative Agri-Mark is one of the largest North American manufacturers of premium quality white cheddar cheese, whey protein concentrate (WPC) and high-lactose whey. It produces up to 15% of the U.S. high-lactose whey powder supply.

Agri-Mark processes close to 562 million liters of fresh milk annually at its four plants: three cheese factories and one butter/skim milk powder facility. The cooperative manufactures annually 55,000 MT of cheese, mostly white cheddar, at its factories in Middlebury, and Cabot, Vermont and in Chateaugay, New York. Agri-Mark facilities are USDA-approved, EU-conforming and hold Kosher and Halal certification.

Agri-Mark's whey processing plant in Middlebury, Vermont utilizes exclusively whey from the cooperative's three cheese factories. The liquid whey is processed into dry powder within eight hours of cheese manufacturing. This results in consistent light-colored whey powder products. The facility's annual production averages 21,000 MT of high-lactose whey, 3,800 MT of WPC 80 and WPC 85 and an additional 6,500 MT of other whey products.

With sales totaling over \$950 million annually, the Methuen, Massachusetts-based cooperative self-distributes to a customer base spanning more than 30 countries in Asia, Central and South America, the former Soviet Union, the Middle East, North America and Northern Africa. On a monthly basis, Agri-Mark exports 80-plus containers of its WPC 80 and WPC 85 and high-lactose whey (also called modified whey, food grade whey permeate or dairy product solids).

Agri-Mark in Action

"WPC is now being positioned and accepted by nutritionists as an excellent source of protein for every age bracket.

It is not just for babies and premier athletes," says Peter Gutierrez, Agri-Mark's international sales director. "It's a lot of fun to help our global customers tap into whey protein's potential."

Global juice manufacturers interested in tapping into a growing category without additional processing and distribution investments should consider the growing dairy protein-fortified beverage category, Gutierrez says.

"Juice companies can do a product launch with a variety of marketing angles: an athletic pre-work out or recovery drink, a satiety-inducing weight-control drink or a protein fortified beverage for the elderly to combat sarcopenia".

Agri-Mark's protein-juice concept is a natural line extension for juice makers all over the globe, he says. "Protein fortification can utilize existing processing, packaging and distribution capabilities. "If the juice companies want to get into this business, they've got everything but the protein to add," Gutierrez says. A number of U.S. companies are currently testing marketing prototypes.

- **Whey Protein Concentrate:** Agri-Mark WPC 80 and WPC 85 are homogeneous, free flowing protein powders manufactured from fresh sweet whey. The highly undenatured WPCs have outstanding flavor and color characteristics. Applications include infant formulas, sports nutrition, medical/specialized nutrition, use in dairy foods, processed meats and as an egg albumin replacer in bakery products and mayonnaise. Available in 20 kg bags and 454 kg super bags.
- **High-Lactose Whey Powder:** Agri-Mark high-lactose whey is a high-quality, economical alternative to sweet whey powder (when carbohydrate content is more important than the protein content). The free flowing,



light-colored, non-hygroscopic (non-water-absorbing) whey powder contains 9% minerals and has 3-4% protein, and 82-84% lactose. It provides functional advantages in chocolates, caramels, bakery, cookie and ice cream applications (soft serve and novelties) and is an energy source for enzyme production. Other applications include cookie fillings, snack food spice blends, hot chocolate beverages and animal feed starter formulas. Available in 25 kg bags or 908 kg super bags.

- **Other Products:** Sweet whey powder is available in a range of 11-12% protein and 70-75% lactose. Applications are similar to the high-lactose whey; for use in products where lower lactose content is preferred. Agri-Mark also exports limited quantities of specialty cheese products and dairy commodities such as bulk packaged parmesan cheese.

Contact Information

For more about Agri-Mark, visit www.agrimarkwheyproteins.com

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Hilmar Ingredients

As part of the world's largest single-site cheese and whey products manufacturing operation, California-based Hilmar Ingredients has a guaranteed and steady source of high-quality premium sweet whey. The global dairy exporter's capabilities and efficiencies will grow in 2007 and beyond as a new facility in Dalhart, Texas, comes online. (See USDEC News December 2006 – In the News section)

Hilmar Ingredients was created in 2004 following parent company, Hilmar Cheese Company's, acquisition of Proliant Dairy Ingredients. Today, Hilmar Ingredients serves customers on six continents.

Applications for its products are as wide as its export reach. For instance, Hilmar whey protein is in mayonnaise (egg replacement) in Russia and Eastern Europe, and is a nutritional element in dry mix beverages in Brazil and Latin America.

For streamlined customer service and logistics, Hilmar Ingredients' experienced in-house export and documentation specialists handle all order entry and shipping coordination. In addition to its U.S.-based staff, the company has carefully vetted in-country distributor representatives in 40-plus international markets. Hilmar Ingredients also supports international markets with technical, processing and formulation expertise.

With access to an abundant, high-quality milk supply, Hilmar's central California facility processes more than 5.1 million liters of milk daily. The location also offers access to world markets via the port of Oakland, one of the United States' four largest ports.

"Hilmar Ingredients is serious about doing business globally, and the company is careful to ensure its products adhere to the most stringent industry standards," says Gwen Bargetzi, Hilmar Ingredients' director of marketing.

Hilmar facilities and services are ISO 9001:2000 certified. All products are Kosher- and Halal-approved, GMO-free and EU-conforming.

Product Power

Hilmar Ingredients' 8000 series of whey proteins features 80% protein whey protein concentrate (WPC) and hydrolysates, and the 9000 series includes +90% isolates. Both Hilmar™ 8000 and 9000 include instantized versions. The whey protein isolates (WPI) are manufactured by a cross-flow filtration process and isolated via patented fractionation. New varieties of both WPI and instantized WPI will debut in June 2007. Hilmar Ingredients added an alpha-lactalbumin-enriched WPC 80 for the infant formula market in 2006.

- **Whey Protein Concentrate:** Hilmar™ 8000, 8010, 8200, 8500, 8600, and 8610 are a range of functional 80% WPCs. Ideal for a variety of food and nutritional applications, the range includes instantized versions, heat-stable, acid-stable, gelling and water-binding whey proteins. Hilmar™ 8500 is lactose-free.
- **Whey Protein Hydrolysate:** Hilmar™ 8350, 8360, 8370 and 8390 offer enhanced nutritional and functional benefits through peptides and free amino acids. Easy digestibility, protein quality and palatability make them ideal for infant formula, medical diet products and strength and endurance products for athletes. Hilmar™ 8370 maintains food bars' soft texture and extends shelf life.
- **Whey Protein Isolate:** Hilmar™ 9400 and 9410 are highly functional WPIs with a mineral profile and functionality similar to ion-exchange WPI. Hilmar™ 9410, instantized WPI, allows spoon-stirtable dispersion and quick solubility for applications including protein waters, juice fortifiers, food bars, powdered mixes, and performance/endurance products.



We deliver the promise of dairy.

Hilmar Ingredients' 5000 series of lactose includes high-purity grades of edible, refined-edible and pharmaceutical lactose. The company exports about 90% of the lactose it produces.

- **Edible Lactose:** A single crystallization process creates Hilmar™ 5000, 5020 and 5030 edible grade lactose monohydrates. Consistent quality and purity makes them suitable for applications like wet mix infant formula, confectionery and baked products. Supplied as native crystal or milled, 200 and 325 mesh grades.
- **Refined Edible Lactose:** Hilmar™ 5120 and 5220 are double crystallized products with lower ash and protein content than edible grades. Suitable for high-quality dry mix infant formula and lactose derivatives. Supplied as milled 100 and 200 mesh grades.
- **Pharmaceutical (USP) Lactose:** A proprietary purification process creates Hilmar™ 5310 and 5320. Available in 100 and 200 mesh grades, they are most suited for wet granulation tablets and meet all major pharmacopoeia requirements.

Contact Information

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For more information about Hilmar Ingredients' products and a drop-down list of distributors by country (under 'contact us' menu), visit www.hilmaringredients.com

P S International, Ltd.

International trading company P S International, Ltd. ships products from U.S. dairy companies and cooperatives to clients around the world.

Founded in 1971, Chapel Hill, North Carolina-based P S International serves more than 20 international markets and has overseas offices in Mexico, Guatemala, China, Haiti, France, Korea and Argentina. "We are confident that our dairy traders will meet customers' dairy importing needs using the many resources we have available," says Scott Fields, P S International dairy department head.

P S International's seasoned trade professionals staff both corporate and international offices. The 30-plus staff members have combined fluency in nine languages. "Our traders are often natives of the countries where P S International has established business relationships, which helps us serve the specific needs of each client and country," Fields says.

P S International buys dairy products – whey powder, skim and whole milk powders, salted and unsalted butter, evaporated milk and cheese – directly from U.S. processors and cooperatives.

The export trading company handles U.S. dairy product sourcing, containerized ocean freight to appropriate ports and overland delivery to customers from destination ports. "We accomplish these objectives in a manner that is most efficient with respect to price, time and service," says David Kuntarich, vice president of operations at P S International.

Ingredient Options

Dairy products available through P S International include:

- Skim milk powder and instant skim milk powder
- Whole milk powder, dry buttermilk,
- Dry whey (sweet and acid type)
- Reduced lactose whey, reduced minerals whey
- Whey protein concentrate 34% and 80% protein (both heat stable and non-heat stable)

- Whey protein isolate
- Lactose (milk sugar)
- Dairy product solids
- Dairy ingredients blends
- Cheese meal, cheese fines
- Butter (salted & unsalted)

P S International's private label of blended dairy ingredients offers global cheese makers additional options. Dairy Blend 9010 is a 90% milk powder, 10% sodium caseinate mix. It carries higher protein content than milk powder alone, and allows processors to maximize cheese production. A lower protein level and cost-effective alternative is Dairy Blend 9307, 93% milk powder, 7% maltodextrin.

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Schreiber Foods, Inc.

Headquartered in the heart of America's Dairyland, Green Bay, Wisconsin-based Schreiber Foods provides a wide array of consumer and industrial dairy products to foodservice, retail, manufacturing and chain restaurant sectors. Known as the world's largest producer of private label cheese, the \$3 billion enterprise is also a global leader in dairy ingredient innovation.

Founded with a single cheese-processing plant in 1945, Schreiber's operations have grown to include 19 U.S. and five global manufacturing facilities. In addition to cheese products, Schreiber provides custom-designed, high-value products and services to meet the diverse needs of its export customers.

"Every category is impacted by people, but some more directly touch on the quality of Schreiber's people and the depth of its corporate culture," says Bret Drake, export team leader for Schreiber International.

Schreiber's vast network enables it to serve as a one-stop cheese source for customers looking for a diverse product offering. "Our industry-leading strategies drive value to customers' bottom lines; we focus on the needs of each customer and its marketplace," Drake says.

Support from Schreiber's industry experts is designed to help grow customers' profits, and includes category management, risk management, vendor-managed inventory, supply chain management and other value-added services. As a research and development leader, Schreiber additionally uses its expertise to build solid partnerships with customers.

Products

Along with a traditional cheese export lineup in the natural, process and analog (cheese powder) categories, Schreiber is a leader in the production of string cheese and cream cheese. Specialty cheese is the fastest-growing segment of the cheese industry, and Schreiber carries a wide range of specialty cheeses from U.S. artisan cheesemakers.

Another rapidly growing aspect of Schreiber's export business is dairy ingredient sales to food manufacturers. Schreiber offers the following U.S.-produced ingredients:

- Milk powders: skim milk powder (SMP) spray dried extra grade; whole milk powder (WMP) spray dried extra grade; instant SMP and WMP are also available.
- Whey powders and derivatives: sweet whey powder; demineralized whey powders (40% and higher); delactosed whey powder; acid whey powder; whey permeate/deproteinized whey powder; whey protein concentrates (34% protein and higher); and lactose.
- Milk proteins: milk protein concentrates (42% protein and higher).

Schreiber's packaging division, Capri Packaging, offers a variety of flexible film structures, design services and packaging solutions for products and applications within the dairy industry. Convenient access to freight carriers and close proximity to raw material suppliers allows Capri to service a wide variety of customers with quick turn-around capabilities. "Capri's strength is providing customers with short-run volume requirements for private-label products that demand lightening speed to the marketplace," Drake says.

Contact Information

On the Web: www.schreiberfoods.com

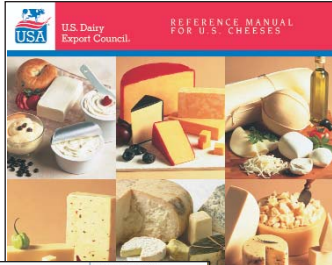
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More from USDEC



Reference Manual for U.S. Cheeses

A new handbook designed to guide and educate international buyers and users on purchasing and using U.S. cheeses. Information provided includes a description of the U.S. cheese industry and varieties produced, descriptions of the processes used to produce and handle cheese, as well as properly merchandize it at the retail and foodservice levels, discussions of the functional and nutritional properties of cheese as well as menu applications. Available in English.



Whey Products in Ice Cream and Frozen Dairy Desserts

A monograph designed to educate users of whey products in ice cream applications. Includes complete information on: the functional benefits of whey in ice cream and related products, the manufacturing of frozen dairy desserts with whey ingredients, formulations with whey products and recommendations for the use of whey products in frozen dairy desserts; also includes a Q&A section. Available in English.



Gut Health and Whey Proteins Monograph

A monograph designed to present the value of whey protein and its derivatives in the maintenance of gut health. Providing a comprehensive review of the latest research, it discusses whey's benefits to the main functions of the intestine and its efficacy in the treatment and prevention of disease. It also explores the impact of whey, lactose and other dairy minerals on several gut health factors such as barrier function, microbial activity, physico-chemical conditions, enzyme activity and nutrient absorption. Available in English.



Dairy Market Outlook

DMO will now be available on our website. This monthly publication details world dairy commodity trade, Dairy Export Incentive Program (DEIP) and Cooperatives Working Together (CWT) program activity.