U.S. Dairy Export Council®

INSIDE:

March 2009

USDEC News

U.S. Dairy Exports Up for Sixth Straight Year

U.S. dairy exports reached $3.822 billion in 2008, up 25% from the prior year, according to the U.S. Dairy Export Council (USDEC) analysis of U.S. Department of Agriculture (USDA) data. However, the success was tempered by volume and price declines that started in mid-2008 and accelerated in the fourth quarter. Sales were up 52% in the first three quarters of the year but dropped off 29% in the last quarter.

Global demand began to soften last summer, when food and fuel inflation cut into consumers' purchasing power, particularly in the developing world. The global economic and financial crisis played a major role in the deterioration of demand in the fourth quarter. At the same time, suppliers in Oceania and Europe boosted production and, for the first time in two years, began to build inventory. As a result, world dairy markets ended the year down significantly from where they started, falling 40–60% through 2008.

The largest destinations for U.S. dairy products were Mexico ($929 million export value in 2008), Southeast Asia ($741 million), the Middle East/North Africa ($447 million) and Canada ($430 million), says USDA. The largest-growing markets were the Middle East/North Africa (+$218 million), the Caribbean (+$73 million), Indonesia (+$73 million), Mexico (+$71 million) and Canada (+$70 million).

By value, the major U.S. dairy exports were skimmed milk powder ($1.380 billion), whey proteins ($610 million), cheese ($570 million) and butterfat ($272 million). These four categories made up nearly three-quarters of total U.S. exports.

(continued on page 2)

U.S. Dairy Export Council
2101 Wilson Blvd. Suite 400
Arlington, VA 22201 USA
Telephone 703-528-3049
Fax 703-528-3705
E-mail: info@usdec.org
Website: www.usdec.org

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Shipments of skimmed milk powder (SMP), cheese and butterfat were all significantly higher in 2008.

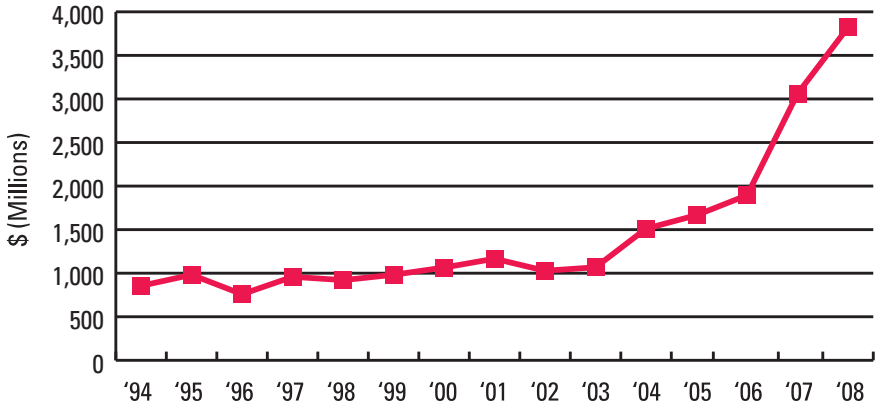
U.S. **SMP** exports were 391,364 metric tons (MT) in 2008, up 52% from the prior year. Increases were evident in virtually all markets. Shipments to Mexico, our largest single market, were up 58% in 2008. Exports to Southeast Asia increased 33%, with strong gains in sales to the Philippines and Indonesia. Significant increases in export volumes were also noted to North Africa (primarily Algeria and Egypt), South America, Japan, China, the Caribbean and Central America.

Exports of **cheese** hit a record high 131,434 MT in 2008, up 32% from the prior year, says USDA. Shipments to Mexico, the number-one market for U.S. cheese, increased 10%. Exporters also broadened their sales to other markets, posting gains in the Middle East/North Africa (+145%), Southeast Asia (+78%), South Korea (+56%) and the Caribbean and Central America (+40%).

Shipments of **butterfat** more than doubled (+125%) to 89,361 MT. This was the highest figure since 1994, when the majority of U.S. exports were through government programs. Of this total, more than one-third of the shipments went to the Middle East/North Africa, primarily Morocco, Saudi Arabia and Egypt. The biggest single markets in 2008 were Russia, where U.S. exports increased more than fivefold, and Japan, where butterfat purchases went from virtually nothing in 2007 to 12,694 MT last year. Mexico and Canada remained key markets, as well. Meanwhile, butterfat shipments to the European Union dropped 70%.

U.S. exports of **whey ingredients** in 2008 were 334,246 MT, down 20% from the year before. High prices compared to 2007 had a severe negative impact on global demand. Food formulators in the bakery, confectionery and food processing sectors switched to less expensive vegetable oils and proteins, and livestock operators also switched to lower-cost alternatives. Sales were down across all cat-

Value of U.S. Dairy Exports



2008 U.S. Dairy Export Value by Country

Country	$ (Millions)	Percent of Total
Mexico	$925	24.2%
Southeast Asia	$741	19.5%
Canada	$487	12.7%
Middle East/N. Africa	$447	11.7%
Japan	$208	5.4%
China	$180	4.7%
Caribbean	$163	4.3%
European Union	$133	3.5%
South America	$110	2.9%
South Korea	$101	2.6%
Central America	$81	2.1%
Oceania	$51	1.3%
Other	$195	5.1%
Total	$3,822	100%

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.

egories. Exports of sweet whey decreased 24% to 201,282 MT. Sales of whey protein concentrate (WPC) and other modified whey proteins dropped 13% to 120,998 MT, and exports of whey protein isolate (WPI) fell 14% to 11,967 MT.

Shipments of whey ingredients to China, now our largest market, increased 23% last year. This gain was driven by a strong increase in exports of WPC and WPI to China, which nearly doubled from the prior year. Exports to Southeast Asia, the next largest market, dropped just 3%. However, exporters lost significant sales to Canada and Mexico, which were down 44% combined. Among other key markets, whey protein exports to Japan were down 19%, while South Korea was down 51%.

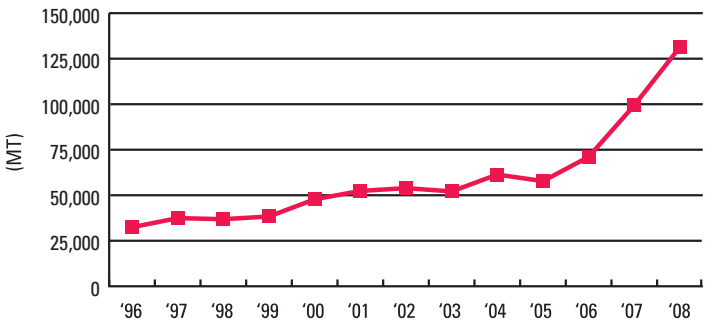
U.S. **lactose** exports were 185,717 MT in 2008, up 2% from a year earlier. Major markets remain Southeast Asia, Japan, China and Mexico.

Withstanding a large drop-off in the second half of the year, exports of **fluid milk** increased 8% in 2008, to 50.1 million liters. Shipments to Canada jumped 55%, while sales to Mexico dropped 23%, putting the two countries at about the same level.

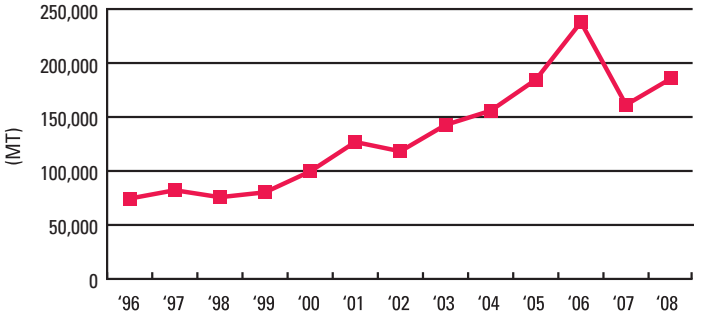
Ice cream exports dropped 2% to 25,354 MT. Exports to Mexico, our primary market, decreased by 1%.

Exports of **food preparations** decreased 1% to 78,073 MT. More than one-third of our sales went to Canada, which boosted purchases by 6%.

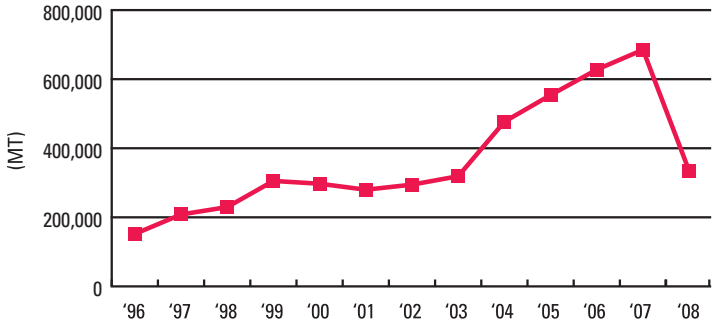
U.S. Cheese Exports



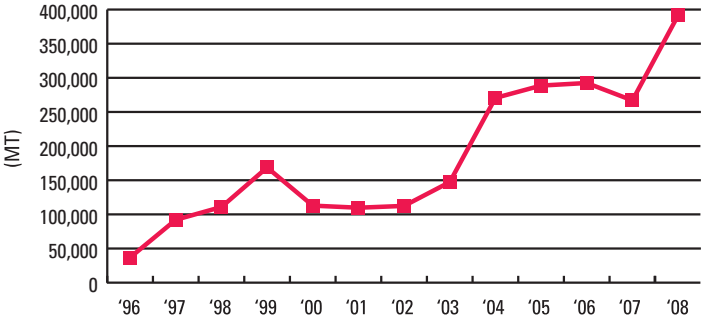
U.S. Lactose Exports



U.S. Sweet Whey, WPC and WPI Exports



U.S. Skimmed Milk Powder Exports



In the News…

New USDEC Members

- USDEC welcomes six new companies to the membership: **Associated Milk Producers Inc. (AMPI)**, a dairy cooperative and manufacturer based in New Ulm, Minnesota; **CME Group Inc.**, a Chicago, Illinois-based futures and options exchange; **Ecoval Dairy Trading**, a global dairy trading company based in Wayne, Pennsylvania; **International Dairy Ingredients**, a Camp Hill, Pennsylvania-based manufacturer and trader; **Milk Specialties Global**, a supplier of customized dairy ingredients based in Eden Prairie, Minnesota; and **Sargento Foods**, a cheese processor, packager and marketer based in Plymouth, Wisconsin.

New Plants and Upgrades

- **American Food Resources** will invest $3 million and add 70 jobs over the next three years at its Nashville, North Carolina, cheese converting and distribution plant.
- **Green Meadows Foods** opened a cheese plant in Hull, Iowa. The plant expects to hit full capacity of 1.1 million liters of milk per day this spring, producing about 36,000 metric tons (MT) of cheese per year and about 21,000 MT of whey proteins. Green Meadows has a milk-supply contract with **Land O'Lakes**, and all its cheese is marketed by **Masters Gallery**. The company plans to double capacity by the end of 2010.
- **Idaho Milk Producers**' (IMP) new dry ingredient plant in Jerome, Idaho, is expected to open March 1, 2009. The $100-million plant will produce 42,000 MT of milk protein concentrate and milk lactose permeate annually for domestic and export markets. IMP is owned by three local dairymen who milk 100,000 cows on 18 farms.
- **Pacific Cheese** started a cheese shredding and packaging operation at Amarillo, Texas, in late November 2008. The plant processes cheddar blocks from **Hilmar's** Dalhart, Texas, plant for distribution to Taco Bell and other wholesale customers.
- **Protient**, a unit of **ABF Ingredients**, opened a research and applications center in Eagan, Minnesota. The 770-square-meter facility, designed to provide specific applications support to customers, is developing a buttermilk powder substitute made from whey protein.

Moves and Consolidations

- **Dreyer's Grand Ice Cream** will discontinue production at its Houston, Texas, plant by early April and shift production to Bakersfield and Tulare, California; Laurel, Maryland; and Ft. Wayne, Indiana.
- Tayt and Trevor Wuethrich, part of the family that owns **Grassland Creamery**, one of the nation's largest butter manufacturers, bought **Graf Creamery**, Zachow, Wisconsin. The previous owners, the Bleick family, will continue to run the 83-year-old facility. The acquisition is separate from Grassland, according to the Wuethrichs.
- **Guggisberg Cheese**, Millersburg, Ohio, purchased **Deutsch Kase Haus**, Middlebury, Indiana. Deutsch Kase Haus had been part of **Trega Foods**, itself a subsidiary of Canadian cooperative **Agropur**. The Middlebury plant has the capacity to produce about 9,000 MT of cheese per year.
- **Prairie Farms** closed its **Pevely Dairy** unit, a fixture in St. Louis, Missouri, for nearly 120 years. Production has been shifted to Prairie Farms' newer plant in Hazelwood, Missouri, which it purchased in July 2007.
- Specialty cheese maker **Roth Käse USA Ltd**, Monroe, Wisconsin, was purchased by Swiss cheese giant **Emmi**. Emmi acquired a minority stake in Roth Käse in 2006. The award-winning Roth Käse, known for its traditionally made gruyere and other European specialties, has sales of about $90 million per year. Founders Steve McKeon and Fermo Jaeckle will continue to manage the business and both will remain on the company's advisory board.
- **Schroeder Company**, a Maplewood, Minnesota-based independent dairy processor, was purchased by **Agropur**, one of Canada's largest dairy cooperatives. CEO Bob Kirchoff and various family members will continue to run the business. Schroeder, a 124-year-old company, lists annual sales of $210 million.
- **Swiss Valley Farms** will not reopen its Cedar Rapids, Iowa, plant that was damaged by massive flooding in June 2008. Current economic conditions, as well as the city's potential designation of the property as a flood zone, led to the decision to close.

ESL Milk: A New Opportunity for Dairy Exports

Consumers today want fresh, high quality dairy products but don't have the opportunity to shop on a daily basis. At the same time, dairy plants are consolidating which means fewer plants and longer supply chains. This dynamic has forced milk processors to identify and invest in new manufacturing technologies. For fresh fluid milk, extended shelf life (ESL) processing may address some of the current challenges and open new opportunities for the export of dairy products.

ESL is a system that extends the shelf life of chilled milk and value added products, such as flavored milk, organic milk, fermented products, cream, iced tea and juices. Superior hygiene throughout the manufacturing process is the foundation of the system. Microbial counts must be carefully monitored and controlled at each step to prevent re-contamination.

Most of the U.S. manufacturers producing ESL milk, also called ultra-pasteurized milk, are processing milk beyond the regular standards of HTST pasteurization (See Table 1) and then packaging the product under sanitary conditions. The combination of optimal plant sanitation, operational control and high temperature heat treatment is important. Together these factors make ESL processing successful, but what does success mean?

This treatment method gives ESL milk a shelf life longer than the typical 1 – 3 weeks achieved with the more traditional HTST method. When stored at refrigerated temperatures below 6°C, ESL milk typically has a shelf life of up to 90 days. The product will also retain a high quality flavor. ESL milk can be stored at higher temperatures; however, this will reduce the shelf life.

Another method used to extend shelf life is ultra high temperature heat treatment, or UHT. This type of processing uses high heat treatment and aseptic packaging to produce a sterile product that is shelf stable for three to nine months at room temperature. While UHT milk has never been highly popular in the U.S., many international consumers value its convenience and extended product shelf life.

UHT milk has the disadvantage of being prone to quality defects traditionally associated with high-heat-processed dairy products, such as a pronounced cooked flavor and discoloration. A major advantage of the ESL process for dairy products versus UHT processing is that the lower heat treatment significantly reduces any impact on the flavor profile, meaning less cooked flavors. In consumer taste panels ESL milk is consistently preferred over UHT milk.

ESL milk offers dairy processors numerous advantages, including longer distribution times and expanded sales channels. The longer shelf life makes it possible to ship products farther, hence widening their market. For example, processors could sell ESL products to smaller stores where product turnover might be slower, or export to more distant geographic areas.

Retailers also have much to gain from longer shelf life products like ESL milk. They help create supply chain efficiencies, improve profitability and decrease out-of-stock situations.

In a world where consumers demand high quality milk that they can enjoy for longer periods, with great taste and less waste, there is opportunity for ESL milk.

To find a supplier of U.S. ESL milk, please refer to the U.S. Dairy Export Council's supplier directory at http://www.usdec.org/Suppliers and select "Milk - Extended Shelf" from the product list.

Table 1: Comparison of U.S. Heat Treatments

Type of Treatment	Treatment Standards	Shelf Life
High Temperature, Short Time Pasteurization (HTST)	72-75°C for 15 seconds	1 – 3 weeks refrigerated
Extended Shelf Life Heat Treatment (ESL)	138°C for 2 seconds	Up to 3 months refrigerated
Ultra-Heat Treatment (UHT)	145°C for 3 seconds	3 – 6 months room temperature

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4. Achieving ESL in Fluid Milk: Creating Hurdles for Spoilage Factors, *Innovations in Dairy*, October 2001, Dairy Management Inc.™
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Use of Whey Ingredients in Yogurt Formulations

Steven Young, Ph.D.
STEVEN YOUNG WORLDWIDE

Whey protein ingredients including sweet whey, whey protein concentrates (WPCs) and whey protein isolates (WPIs) can be used successfully in refrigerated cup yogurts, yogurt beverages and other cultured beverages.

In general, in refrigerated cup yogurt, up to 50% of milk casein can be replaced with a properly selected whey protein ingredient. Yogurt beverages, depending on the desired viscosity and other sensory properties, can be made with a greater percentage of whey protein and less milk casein. Other functionality needs include total dairy protein, ratio of casein to total dairy protein and lactose levels. Quality improvement, cost reduction and avoidance opportunities are also possible.

Key desirable attributes found in whey ingredients and directly applicable to yogurt and yogurt beverages are:

- Emulsification
- Heat setting or gelation
- Dispersibility
- Solubility
- Water binding
- Viscosity
- Bulking
- Heat and acid stability
- Direct and indirect effect on flavor and color
- Provider of macronutrients: protein, fat, calories, etc.
- Provider of micronutrients: vitamins, minerals, etc.
- Provider of novel nutraceuticals and minor nutrients: lactoferrin, etc.

Not all functionalities are applicable or desirable in all applications. Therefore, it is necessary to properly select and use whey protein ingredients to match formulations, manufacturing, packaging and shelf life needs and achieve the desirable eating characteristics of the specific finished food. Local regulations also need to be considered.

The utility of whey ingredients in refrigerated cup yogurts is based on the capability of whey proteins to provide nutrition, functionality, flavor and economic incentive to manufacturers.

Guidelines

It is important to understand that the casein naturally found in milk or milk powders is essential in creating the white coagulum we know as "yogurt". The reason is that casein coagulates with acidity while whey protein does not. In general, it is desirable to retain 50% of all milk protein as native casein in any given formula. So, although whey has the ability to bind water, gel and create viscosity, it cannot totally replace casein to create a

typical yogurt coagulum in terms of color, body (chew or bite) and texture (smoothness). Having said this, whey ingredients of all types can be used to replace up to 50% of the native casein found in the more expensive ingredients, e.g., fresh milks, concentrated milks or milk proteins and milk powders. Whey ingredients with utility include sweet whey, WPCs (34-85% whey protein) and WPIs (90% plus whey protein).

Whey ingredients are also a source of milkfat although the amounts will vary by product type. This adds to the economic benefits achieved with the use of whey ingredients.

When considering high protein whey ingredients it is important to understand their effect on the fermentation rates. For example, WPC 80 is made by a process that removes the lactose and salts and concentrates the protein. Therefore, adding this ingredient to milk will modify the mix by reducing the buffering capacity. When the buffering capacities are decreased, final culture mix pH's are achieved in shorter periods of time. If the faster fermentation retains all the desired qualities in the finished yogurt, more can be made in any given unit of time. This effectively increases manufacturing yields, further reducing costs per unit (kg) of yogurt made. Thus, economies go beyond simple ingredient cost savings.

The following considerations need to be understood in a yogurt formula:

- Ingredient availability
- Desired eating quality (viscosity)
- Culture availability (amount, type)
- Stabilizer requirements
- Flavor and color needs
- Packaging
- Shelf life goals
- Sweetness
- Where, when to add sweetener(s)
- Total solids and effect on osmotic pressure
- Thermal processing before/after culturing
- Ingredient costs
- Yields (speed of fermentation)

Flavor

Flavor is critical to overall product acceptability. Flavor can be added from the ingredient mix, the amount and type of starter culture, or from the amount and type of acids (which may be added to be compatible with specific flavor or fruit and/or lactic acid produced during culturing). Or, the flavor can be from natural

or artificial added ingredients such as fine flavors (e.g. vanilla and fruit flavors) and/or fruit preparations.

Yogurt Beverages

The popularity of yogurt-based beverages provides more application opportunities for whey protein ingredients.

Yogurt beverages can be made by a variety of approaches. Most typically, a yogurt base is made using similar techniques to those for making refrigerated cup yogurt.

Yogurt beverages may be produced from a single base which is cultured and processed. Although this a more direct approach to making yogurt drinks, it also results in reduced yields and more yogurt flavor. Yogurt flavor created during culturing can be highly variable, making quality control difficult. In addition, less yogurt flavor versus more is often desirable.

A two-based approach can be used to manufacture yogurt beverages when it is important to control flavor, color, sweetness and other sensory attributes or to produce more yogurt per unit time. Each unit of culture mix will produce more finished yogurt beverage and it will be easier to control the yogurt flavor as needed. In addition, more than one style of yogurt beverage could conceptually be made from one type of culture mix. For these reasons, a two-based approach is widely popular.

More or less cultured yogurt ingredients may be used in the final beverage depending on the type of beverage desired. A thicker beverage for more nutritional applications may require added "yogurt" solids and less sweetness whereas a more refreshing beverage will typically require lower solids, less viscosity and more sweetness.

Culture mixes may or may not have an added stabilizer or sweetener(s). Milkfat contents are typically less than for refrigerated cup yogurts. The basic rules governing casein replacement for refrigerated cup yogurts also apply in all types of yogurt beverages. However, in some instances additional whey protein could be considered depending on finished beverage needs relative to color, flavor and viscosity. Since viscosity is also related to the percentage of casein in culture mixes, desired beverage viscosities determine the most appropriate whey ingredient and usage rate. No one rule applies to all situations.

Sweetness, flavor, color, fruit, stabilizing agents, etc. are frequently added after culturing. When this is done, a pasteurized base must be prepared before any additions are made to the culture mix. This pasteurized base can be formulated so that in any given ratio of culture mix to sugar/stabilizer mix, the appropriate composition, sweetness, flavor, viscosity, etc. can be achieved. Several combinations of whey ingredients can be used as well. Further, by changing the ratio of culture mix to the sugar/stabilizer mix, differing beverages (i.e. of different composition, thickness, sweetness, flavor, etc.) can be made from the same culture mix. Also, by modifying formulas accordingly, more efficiency can be achieved to drive incremental cost savings.

Before the final yogurt beverage mix is packaged or thermally processed, re-homogenization will assure a smooth, uniform mix with a low viscosity. Final mixes can be blended and pasteurized for refrigerated distribution or blended and re-pasteurized for aseptic fill or extended shelf life (ESL) distribution.

Again, when properly selected a wide variety of whey protein ingredients can be successfully incorporated into refrigerated cup yogurts and yogurt beverages. The amount and type of product use will depend on factors specific to each manufacturer.

Additional information on the use of whey ingredients in yogurt and other types of food formulations is available at www.usdec.org.

Advantages of Using Whey Ingredients in Refrigerated Cup Yogurts

- ☑ Improved Flavor
- ☑ Water Binding and Gel Formation
- ☑ Reduced Syneresis ("watering off")
- ☑ Nutritional Enhancement
- ☑ Nutraceutical Benefits
- ☑ Ingredient Cost Savings
- ☑ Yield Improvements

Yogurt Starting Formulas

The following starting formulas for cup yogurt and beverage yogurt are for the coagulum portion only. In the final formula sweeteners, flavors and stabilizers may also be added.

Cup Yogurt Starting Formula

Ingredients	Control	A	B	C
Whole Milk	57.1%	57.1%	57.1%	57.1%
SMP	6.0%	5.0%	3.0%	2.0%
Sweet Whey	—	2.0%	—	—
WPC 34	—	—	3.0%	—
WPC 80	—	—	—	1.5%
Total Solids (%)	13.1	14.1	12.1	10.6
Total Milk Protein (%)	3.78	3.77	3.84	3.63
% Casein	3.02	2.80	2.18	1.94
Dairy Cost per 100 kg ($)*	0.512	0.495	0.459	0.449
Savings per 100 kg mix ($)		0.017	0.053	0.063
% Savings		3.3	10.4	12.3

Beverage Yogurt Starting Formula

Ingredients	Control	A	B	C
Whole Milk	57.1%	57.1%	57.1%	57.1%
SMP	6.0%	5.0%	3.0%	2.0%
Sweet Whey	—	1.0%	—	—
WPC 34	—	—	2.0%	—
WPC 80	—	—	—	1.0%
Total Solids (%)	13.1	13.1	12.1	10.1
Total Milk Protein (%)	3.78	3.64	3.51	3.23
% Casein	3.02	2.80	2.22	2.18
Dairy Cost per 100 kg ($)*	0.512	0.488	0.445	0.428
Savings per 100 kg mix ($)		0.024	0.067	0.084
% Savings		4.7	13.1	16.4

*Ingredients Cost per kg

SMP	$3.20
Sweet Whey	$0.77
WPC 34	$1.45
WPC 80	$4.40

Note: Please check with your dairy ingredient supplier for current pricing.

Benefits of Lactose in Poultry Diets

Dustin Dean, Ph.D. and
Kevin Halpin, Ph.D.
International Ingredient Corporation

Poultry do not have the endogenous enzyme lactase that is required to digest lactose in the small intestine. However, the use of lactose as a prebiotic at low concentrations in diets for poultry has been shown to be effective in improving performance. This appears to be a result of shifts in the intestinal microbial population allowing for more microbial fermentation and lactic acid production in the hindgut. The lowered intestinal pH that results from feeding lactose to avian species results in inhibition of pathogenic bacteria and conversion of ammonia to nonvolatile ammonium ions. The improved health from decreased enteric disturbance and reduced ammonia in the air space has the potential to improve growth performance.

Initially, the interest in the prebiotic effect of lactose was focused on reducing *Salmonella* colonization in the ceca.[1,2,3,4] However, more recent research has evaluated the potential for lactose to improve the rate and efficiency of growth.

In 2003, it was demonstrated that including galactose or lactose at 2% or 4% of the diet increased cumulative gain from day 0 to 21 post-hatch in male broiler chicks.[5] Interestingly, this response was observed in apparently healthy chicks reared in battery cages and being fed diets containing bacitracin, a growth-promoting antibiotic.

In 2006, lactose levels from 0% to 8% were evaluated in diets for growing turkeys and demonstrated fairly dramatic improvements in body weight after a six-week feeding period.[6] The response to lactose appeared to be optimized at an inclusion level of 2%; however, significant weight gains were observed at lactose levels as low as 0.5%.

In a second experiment conducted by the same researchers an improvement in body weight was also observed with the highest final body weight being attained with 2% lactose. Although the results of fecal pH were highly variable, the authors concluded that fecal pH generally decreased as lactose increased in the diet.

Fecal nitrogen data from these experiments clearly demonstrated an increase in the amount of nitrogen in the feces with lactose inclusion and was presumed by the authors to be a result of the lower fecal pH when feeding lactose and conversion of volatile ammonia into non-volatile ammonium ions. No antibiotics were fed in these experiments and lactose had no significant effect on whole body composition.

In an experiment designed to evaluate lactose and lactic acid bacteria under commercial conditions, 0.1% lactose with or without a probiotic was fed to 10-day-old hybrid turkey hen poults in a commercial house for 26 days. The effect of the probiotic appeared to be minimal in the absence of lactose; however, lactose alone improved body weight by 17% after 28 days. At the end of the experiment, 93-day-old hen poults that had been fed both lactose and the probiotic were 436 g heavier at market weight. Diet information was not presented; however, the study report contained no mention of growth-promoting antibiotics. Feed disappearance measurements were not possible due to the design of the experiments in a commercial house, therefore feed efficiency values could not be determined. The authors concluded that lactose offers a good alternative to improve poultry production when used as a prebiotic.[7]

Another recent study reported that providing lactose at 0.1% of the diet with a probiotic for 14 days improved body weight by 10.5% and feed conversion (efficiency in converting feed mass into increased body mass) by 9.4% on average of two trials when hen turkey poults were challenged with *Salmonella*.[8]

In a 2007 study, scientists evaluated the effects of dietary lactose levels ranging from 0% to 4.5% on the control of necrotic enteritis in broiler chicks. All of the control birds (100%) challenged with *C. perfringens* had clinical intesti-

nal lesions compared to only 30% of birds fed 2.5% lactose. The mean intestinal lesion score for birds fed 2.5% lactose was 0.22 compared to a mean lesion score of 1.90 for the control birds. The authors concluded that lactose provides the poultry industry with an alternative that has the potential to promote better animal health and decrease monetary losses due to necrotic enteritis.[9]

The optimal dietary inclusion of lactose is not perfectly clear and may be flock dependent, but it appears that lactose levels near 2% of the diet maximize the rate of gain for broilers and turkeys and protect against *Salmonella* and necrotic enteritis. Lactose levels as low as 0.1% also improved the performance of turkeys. The growth performance response to lactose appears to be a result of increases in feed intake with either some improvement or no change in feed efficiency. Prevention of both *Salmonella* colonization and development of necrotic enteritis has been demonstrated and is likely due to the increased lactic acid production in the hindgut that results from lactose feeding.

One report strongly suggests that feeding lactose increases fecal nitrogen due to a reduction in volatilization of ammonia which likely leads to improvements in barn air quality. Also, in the studies where lactose was less than 5% of the diet no incidence of diarrhea was reported.

In summary, there are multiple research reports that indicate providing lactose to poultry at low inclusion levels to serve as a prebiotic has a positive effect on bird health and performance.

The addition of lactose to poultry diets has never been more economical, especially in light of today's higher feed costs. Whey permeate (80% lactose) prices are at record lows, $0.22/kg or lower. Assuming $0.22/kg for an 80% lactose product, the addition of 0.1% lactose to the diet adds $0.27 per metric ton (MT) of feed. With positive performance responses observed at lactose levels as low as 0.1 to 0.5%, the added cost of feed is $0.25 to $1.25 per MT or possibly less when accounting for the feed cost displaced by the lactose addition.

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More from USDEC

USDEC Has a New Publication

U.S. Whey Ingredients In Bakery Products

A new monograph designed to educate users of whey ingredients in bakery product applications. New opportunities, both functional and nutritional, for the use of whey ingredients in bakery products include egg replacement, moisture control, fat and carbohydrate reduction and protein fortification, among others. The monograph is available in English at http://usdec.files.cms-plus.com/PDFs/2008Monographs/Bakery%20Monograph%202008.pdf

Agri-Dairy Products, Inc.

Making an export sale is one thing. Nurturing a partnership that benefits all the parties involved in a transaction is an entirely different business proposition.

To Agri-Dairy Products, Inc., Purchase, New York, the latter tactic is as much the goal of the business as the sale itself. Partnerships, in theory, lead to more seamless communication, greater cooperation, more willingness to work together and go the extra mile, and, in general, a smoother transaction.

The company formed in 1985, mainly selling dairy ingredients to local food manufacturers in the New York Tri-State area. It began exporting on a small scale right from the start and grew slowly through a combination of competitive pricing and customer service.

As a sign of just how important overseas customers have become for Agri-Dairy, the company opened a dedicated International Division office in Irvine, California, in April 2008.

"Developing long-term relationships, not only with buyers but with suppliers, ensures that we have consistent product supply for customers on a long-term basis," says Gabriel Sevilla, Director, International Sales. "More than products, we are providing value-added service to customers. We pride ourselves on knowing our suppliers well and, in particular, the needs of each importing country in terms of required documentation and logistics concerns."

"My team and I concentrate 100 percent on export development. Our goal is to provide the highest level of customer service for international customers," he adds. "We want to ensure smooth transactions through customs and that we are meeting customers' needs and expectations."

Sevilla's words are evident in Agri-Dairy actions. The customer service team has expertise in forecasting, risk and inventory management (including hedging), fixed and market-based contracts and various financial tools. Through its export logistics team, Agri-Dairy helps ease the complexities of worldwide shipping, handling all freight and documents for suppliers and customers. It also offers technical support to help develop products with specific nutritional targets and functional specifications.

Agri-Dairy can even help a company focus on product sectors that offer the best growth potential. "We provide market information and analysis to keep our customers informed of trends in the dairy industry," says Sevilla.

Such service has helped Agri-Dairy grow from a local New York operator to a global dairy supplier, marketing a wide range of products to more than 20 countries worldwide.

"Anyone can sell whey, but not everyone offers a range of dairy ingredients made to specifications that work, problem-free, for suppliers or customers," says Sevilla. "We know products, we know suppliers, we know customers and we understand specifications."

AGRI-DAIRY PRODUCTS, INC.

Product Line

- **Anhydrous milkfat**
- **Butter**
- **Cheese** (cheddar, colby jack, cream cheese, gouda, monterey jack, mozzarella, parmesan, pepper jack, swiss, processed cheeses, dried cheeses and imitation cheeses)
- **Lactose**
- **Nonfat dried milk** (low-, medium- and high-heat)
- **Whole milk powder**
- **Sweet whey powder**
- **Whey protein concentrates** (34% to 80% protein)
- **Whey protein isolates**
- **Specialty blends**

Contact Information

Website: www.agridairy.com
Office Location: Irvine, California

Contact: Gabriel Sevilla,
Director, International Sales
Email: gsevilla@agridairy.com

BelGioioso Cheese Inc.

When the judging concluded at the 2008 World Cheese Awards last September, BelGioioso Cheese Inc. once again ascended the medal stand to receive accolades for the taste and quality of its cheeses. Reviewers singled out its creamy gorgonzola for a gold medal and burrata for a bronze.

The honors are nothing new to BelGioioso. The Denmark, Wisconsin-based cheesemaker's commitment to authentic Italian craftsmanship has earned it no less than 38 awards spanning 13 cheese varieties. Its products have been recognized not only at the World Cheese Awards, but also the U.S. Championship Cheese Contest, the American Cheese Society Competition, the Royal Winter Fair of Toronto and other events.

"Consistent quality, exclusive recipes and clean, distinct flavors are behind our success," says Francesca Auricchio Elfner, Export and Operations Manager. "Because we are a family-owned business, with total control over the cheese-making process from start to finish, including production, aging, packaging and shipping, we deliver a superior product with every variety we craft."

And that's not just rhetoric – BelGioioso backs up such a pledge with an impressive pedigree.

Founder Errico Auricchio's cheese roots stretch back more than 100 years – all the way to Italy, where his great-grandfather first began producing traditional artisan-quality cheese. Errico moved to the United States in 1979 with his family "to start a company that would make great Italian cheeses as we did in Italy," he says. He also brought along Italian master cheesemakers Gianni Toffolon and Mauro Rozzi.

The company began by manufacturing internationally popular Italian varieties, like provolone, parmesan and romano, but soon found itself branching off into styles less familiar to the average consumer, like asiago and pepato.

Today, BelGioioso, still owned and operated by the Errico Auricchio family, runs five cheese production facilities and makes more than 20 varieties.

"The plant environments are designed around each cheese and the needs of our cheesemakers to achieve the highest product quality possible," says Elfner. "Every cheese is treated individually, according to its own personality."

Toffolon still manages production and devotes time to further develop his skills. This includes completing the Wisconsin Master Cheesemaker Program, a one-of-a-kind, three-year training curriculum. Toffolon carries Wisconsin Master Cheesemaker® certificates in parmesan (a variety he's been making for more than 25 years) and fontina.

Rozzi has been making cheese for 46 years now and takes a personal and meticulous approach to artisan cheese craftsmanship. "Precise steps must be followed intricately, and the passion must come from within," he says. "Making cheese isn't a job. It's a calling."

Export Products

Of the more than 20 varieties BelGioioso makes, its export efforts focus on asiago, American Grana®, Auribella®, fontina, parmesan, pepato, Peperoncino®, sharp provolone and romano. The three trademarked varieties are proprietary BelGioioso products.

- American Grana®, premium parmesan made using the same authentic craftsmanship as practiced in the old world, is matured in the company's own cheese cave for a minimum of 18 months, resulting in a deep nutty flavor and granular texture.
- Auribella® is a semi-firm whole-milk cheese aged at least six months with a full-bodied, robust flavor and slightly crumbly texture that makes it perfect for shredding.
- For its Peperoncino®, BelGioioso adds red pepper flakes to its asiago to create a hot, zesty cheese – and possibly the next to win cheese contest honors.

Contact Information

Website: www.belgioioso.com
Office Location: Denmark, Wisconsin

Contact: Francesca Auricchio Elfner, Export and Operations Manager
Email: Francesca@belgioioso.com

Proliant Dairy Ingredients

Proliant Dairy Ingredients, Ankeny, Iowa, has been one of the trailblazers in the U.S. dairy export business, entering the sector back in 1991 through a joint venture with California's Hilmar Cheese Company. At the time, foreign markets were on the minds of very few U.S. processors.

The two companies collaborated to build a business that was shipping more than 50,000 metric tons (MT) of dairy ingredients to overseas buyers annually. Hilmar's manufacturing expertise, combined with Proliant's research and development capabilities and global marketing reach, helped spread knowledge of the nutritional benefits, functionality and versatility of whey and lactose ingredients to a worldwide audience.

After Hilmar purchased Proliant's interest in the business in 2004, Proliant's parent Laurisden Group Inc. (LGI), fresh from the positive experience of the joint venture, continued to believe in the growing global demand for high quality dairy ingredients.

Late in 2007, Proliant Dairy took a bold step, deciding to redefine its presence on the world's dairy stage, controlling manufacturing as well as research and marketing. In January 2008, the company began building its own processing plant in Melrose, Minnesota.

The state-of-the art facility, capable of producing more than 31,000 MT of dairy product solids per year, opened on September 7, 2008, specializing in ingredients for food and feed applications.

The first product to roll off the production line was VersiLac™, a proprietary new dairy ingredient that is non-hygroscopic, free flowing and low dusting, highly dispersible and soluble, heat stable, and has a neutral flavor and creamy white color.

"With VersiLac™, Proliant provides customers with an economical and highly versatile new dairy ingredient that can be used to replace more expensive corn-based ingredients like dextrose, maltodextrin, high fructose corn syrup, corn syrup solids or other dairy products like skimmed milk powder and whey powders," says Chris Snyder, President of Proliant.

In doing so, VersiLac™ also provides potential labeling benefits. It can be identified as "dairy product solids," "modified whey" or "reduced-protein whey," among others, so a user can select the label that best fits its competitive situation.

In cases where dextrose, maltodextrin or corn syrup holds negative connotations, VersiLac™ allows users to improve the consumer appeal of a product label. Even if a customer does not completely replace one of these ingredients, simply using less permits the company to move that ingredient further down on the label.

As part of LGI, Proliant enjoys the benefits of being supported by a large, integrated, multinational corporation. LGI has manufacturing and sales offices in more than 20 countries and extensive experience in the complex world of export sales and international customer support.

Independently and through LGI, Proliant has access to a broad-based network of scientists and technicians able to consult with customers on food ingredients, animal nutrition and nutraceutical applications.

"Over the years, we have developed a network of global marketing partners and international distribution," says Snyder. "Proliant is well versed in overcoming challenges with international sales, and has earned a reputation for customer service excellence and working with our export customers to ensure mutually beneficial and long-lasting relationships."

Contact Information

Website: www.proliantinc.com
Office Location: Ankeny, Iowa

Contact: Lori Stevenson,
Vice President of Sales and Marketing
Email: lori.stevenson@proliantinc.com