

# Characteristics of Milk Products and Emerging Consumer Trends

International dairy commerce cannot be viewed as a global commodity market, such as that for oil or steel, where a country's supply of the commodity can satisfy demands anywhere in the world. Instead, the global dairy market comprises many interrelated dairy product markets that vary in geographic scope from narrow to global depending on the product. As the management focus of the dairy industry becomes more global, with national and multinational companies competing in nearly every region, many product markets are also becoming more global. Still, consumers of milk and dairy products across regions exhibit widely varying preferences for taste, convenience, nutrition, wholesomeness, and packaging.

Dairy products range from fairly standardized goods, such as milk, butter, and nonfat dry milk powder, to multivariety, multiflavored products, such as specialty cheeses, fermented drinks, and milk protein fractions used in food and beverage items. Some dairy product markets are local or national, while others are global (table 1). Products such as fresh milk, yogurt, and cheese are intended for direct consumption. Dairy products are also consumed indirectly as ingredients in other foods, such as pizza, snack bars, and bakery products. Nonfood uses range from nutraceuticals to industrial applications.

## Consumer Preferences and Differences in Per Capita Consumption

Variations in consumer demand for milk-based products around the globe differentiate localized markets when products are not traded globally or regionally. Variations in consumer preferences reflect economic status, culinary practices, and eating habits of different households. Income levels and the availability and cost of milk are key factors behind differences in dairy product consumption throughout the world (fig. 1). For example, high transportation costs and local preferences limit the international market for fermented milk drinks and yogurts.

Per capita consumption of fluid milk is growing rapidly in many middle-income countries, particularly in Latin America. Per capita milk consumption in Mexico now exceeds that in Japan (fig. 2), but consumption of dairy products in Latin America remains less than half of that in the United States and Western European countries. Dairy products in general, including dry milk powders, remain luxury goods for many consumers in low- and some middle-income countries.

Major differences in consumption patterns for dairy products can exist even within a country or region for a variety of reasons, including ethnic and cultural factors. This is particularly true in Europe where, for example, Finland has a noticeably higher proportion of per capita liquid milk consumption to per capita cheese consumption. France and Greece have a higher proportion of consumption of soft-type cheeses than the rest of the EU. Although it has grown steadily over the last three decades, per capita consumption of cheese in the United States remains lower than that in the EU.

Table 1

**Dairy products and their characteristics**

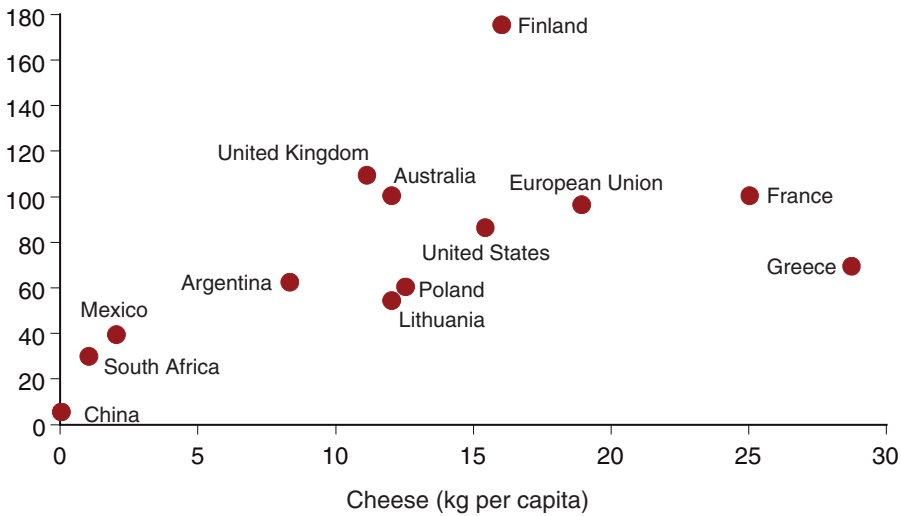
General category	Specific products	Geographic market	Consumption/primary use	Quality attributes
Fluid milk	Fresh whole milk UHT milk	Local or national (rarely traded) Regional	Direct consumption	Freshness Shelf stability
Fresh milk products	Cultured milk Yogurt	National or regional	Direct consumption	Freshness
Ice cream	Artisanal / bulk	National or regional		Flavor/texture
Milk powders	Whole milk powders Nonfat dry milk	Global (heavily traded)	Direct consumption Food or feed ingredient	Reconstituted milk flavor Shelf stability
Butter fats	Cream	National or regional (small trade)	Direct consumption or ingredient	Shelf stability Freshness
	Butter Butter oil	Global (heavily traded)		
		National or regional	Direct consumption	
Nonfat component	Milk protein concentrates	Global	Food ingredient	Functionality
	Whey proteins			
	Lactose		Pharmaceutical use	
	Casein			
Cheese	Fresh cheese	National or regional (traded among high-income countries)	Direct consumption	Freshness Shelf stability Flavor/aroma/texture
	Processed cheese			
	Natural aged cheese			

Source: USDA, Economic Research Service.

Figure 1

**Per capita consumption of liquid milk and cheese**

Liquid milk (kg per capita)

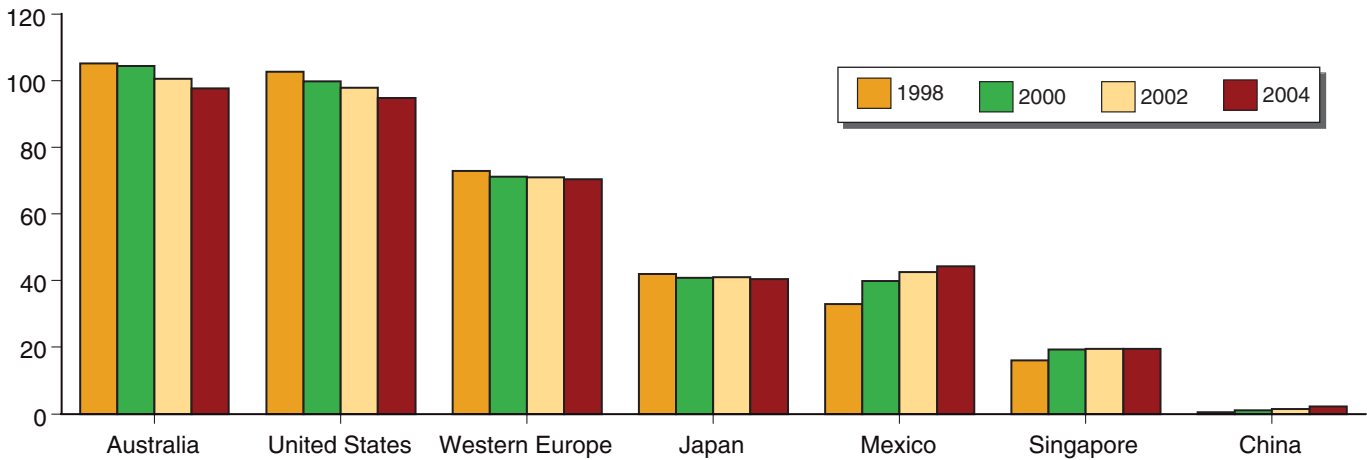


Source: Prepared by USDA, Economic Research Service using data from International Dairy Federation.

Figure 2

**Per capita consumption of milk declining in high-income countries while growing in developing countries**

Milk (liters per capita)



Source: Prepared by USDA, Economic Research Service using data from Euromonitor International.

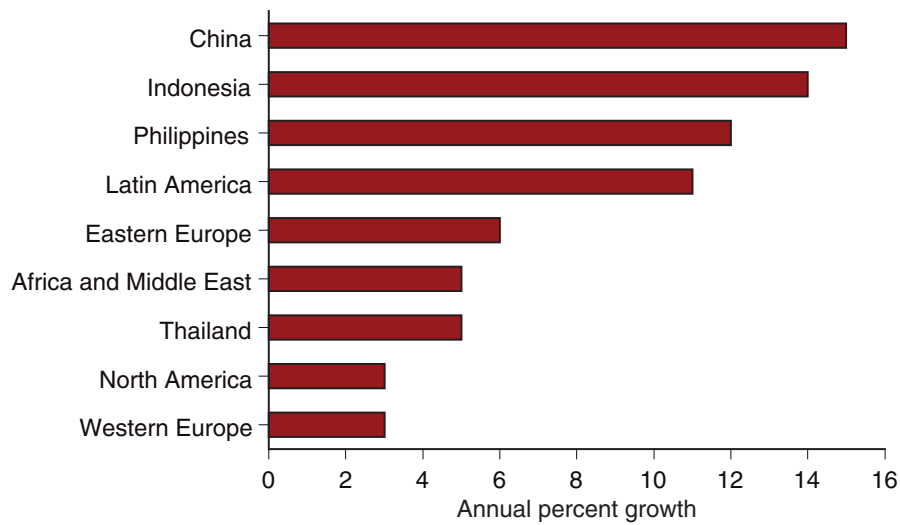
Retail dairy purchases are growing at widely different rates around the world in response to rising incomes and expanding urban populations. Mass media promotions and new forms of retail channels are also driving growth in countries where dairy products are only beginning to reach consumers (Fuller et al., 2005). In China, for example, dairy product consumption is growing at 15 percent per year. Supermarkets in China are helping to effect this increase by providing consumers access to expanded product selections and brands (Hu et al., 2004). The Chinese government is also facilitating the change by encouraging milk consumption in schools as a means to improve the diets of children.

In many other emerging markets of developing countries, retail growth in dairy markets is averaging more than 10 percent per year (fig. 3). In high-income countries where growth in per capita consumption and population have leveled off, demand for dairy products is still rising about 2 percent per year, driven primarily by consumption of higher value-added products rather than volume increases. Rapid growth in demand in middle-income developing countries will help boost dairy trade.

Although higher incomes generally lead to higher overall consumption of dairy products, the same cannot be said of consumption of individual products. For example, in several high-income countries, including the United States, consumption of cheese is increasing but consumption of fluid milk is decreasing. Per capita consumption of yogurt is also relatively high in high-income countries, such as Japan and Western Europe, and demand growth is unabated (fig. 4). However, unlike markets for dry milk powders or butter, the global market for yogurt is highly fragmented by country or region so as to meet specific consumer demands for taste or nutritional attributes.

Figure 3

### Average annual retail growth in dairy products, 1998-2004

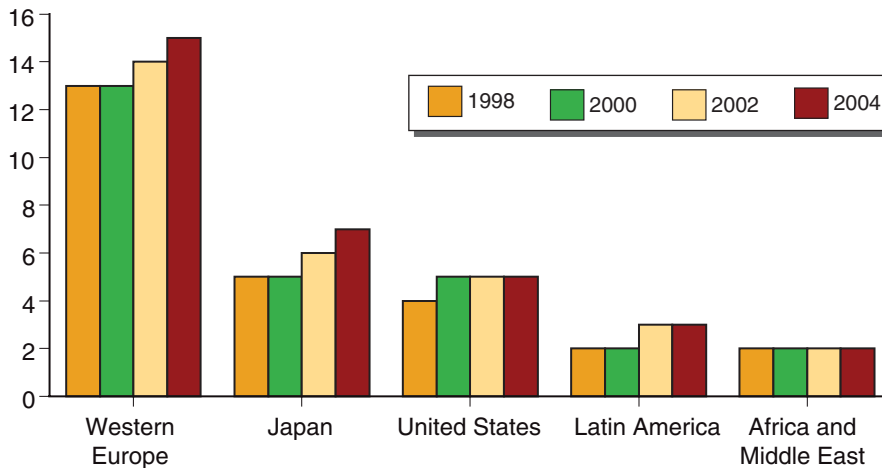


Source: Prepared by USDA, Economic Research Service using data from Euromonitor International.

Figure 4

### Per capita consumption of yogurt is rising faster in high-income regions

Kg per capita



Source: Prepared by USDA, Economic Research Service using data from Euromonitor International.

## New Dairy Products and Targeting Consumer Segments

Protected industries are generally thought to have less incentive to invest in product innovation and technologies. Dairy industries, despite the protection of trade barriers, do not fit that mold as evidenced by the number of new product launches. To remain competitive, firms in the dairy industry must constantly entice and retain new consumers as food preferences change. Rising demand for nondairy substitutes—products made from grains, soy, rice, nuts, and oils and fats that can be seen as substitutes for dairy-based

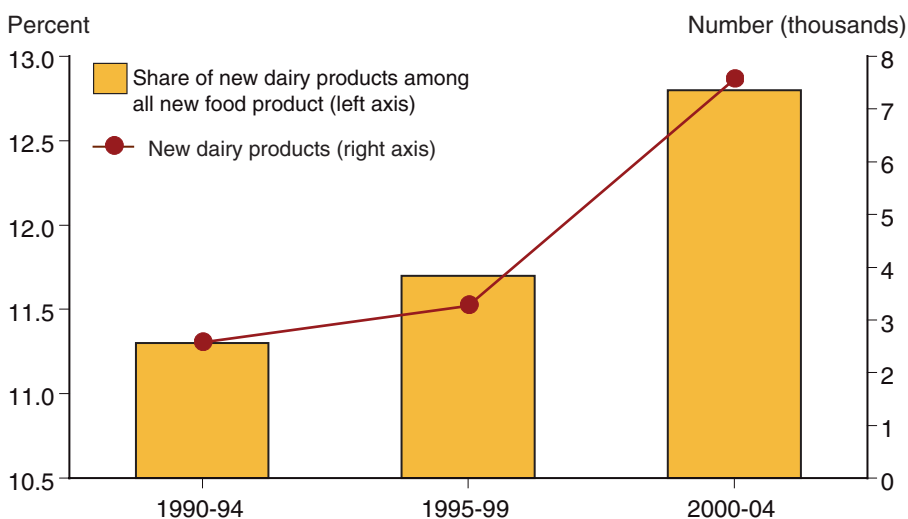
products—is one force sparking the drive to retain market share. New dairy products worldwide more than doubled in number between 1995-99 and 2000-04 (fig. 5).

Dairy product marketing by multinational firms, such as Nestlé (Switzerland), Arla Foods (Denmark-Sweden), Danone (France), Lactalis (France), Unilever (Netherlands-U.K.), and Kraft Foods (U.S.), increasingly acknowledges regional preferences and demographic factors to reach specific consumers. For example, Nestlé launched a yogurt in Germany for babies, while Kraft launched the Manchego type of processed cheese in the United States to attract Hispanic consumers (app. table 1).

Foreign direct investment (FDI) in domestic dairy industries provides consumers with access to goods produced by global firms. FDI in the U.S. market includes Nestlé’s and Unilever’s stakes in the ice cream industry, French involvement in the yogurt and cheese markets, and other European brands, such as Président cheese made in Wisconsin and California. Fonterra Co-op Group (Fonterra), a New Zealand dairy firm, exports U.S. milk powders worldwide. Fonterra partners with other dairy companies in Australia, South America, and South Africa, enabling it to meet dairy demand in those countries with local milk supplies.

Marketing strategies for dairy products also emphasize the functionality of certain products to attract consumers. Milk for drinking is becoming a differentiated product tailored to specific consumer tastes and preferences. Innovative manufacturers are capitalizing on the growing consumer awareness of the role that specific components of dairy foods play in human vitality. This strategy has led firms to introduce such products as probiotic milks, yogurts, and fermented dairy drinks having health benefits deriving from “good” bacteria. Firms are also launching multiflavored milk drinks as a way to attract new consumers, especially young people.

Figure 5  
**New dairy product introductions increasing at faster pace than all new food products**



Source: Prepared by USDA, Economic Research Service using data from Datamonitor Productscan.

## Technology-Driven Ingredients

The growing awareness of the many roles of specific milk components is helping to boost demand for those components as ingredients. The dairy industry is developing technologies to economically and efficiently extract and process these components of milk. Within the dairy ingredient complex—which includes fat, sugar (lactose), and proteins—proteins are the targets of much of the research and development (see box “Milk Proteins: Economic Significance and Uses”). The growth in new markets for milk proteins exemplifies the transformation of milk from a commodity to a value-added product tailored to meet specific consumer requirements.

Milk proteins are a major part of functional food product formulations, and their use is expected to grow (Gloy, 2004). The outlook for milk protein markets is promising given current demand trends among both food processors and consumers for protein ingredient specificity. For processors and manufacturers, the confirmed functionality of ingredients, not perceived or intangible values, determines market values. Dairy-based ingredients have the potential to evolve into truly global products traded in a world market, and pricing is likely to become highly competitive as this market matures.

### Milk Proteins: Economic Significance and Uses

The rapid rise in the milk proteins market is the result of growth in demand from food processors. Processors require specialized ingredients for processed cheese, yogurt, bakery products, and nutritional foods, such as high-protein sports drinks and energy bars. In the United States, imports of milk protein concentrates (MPC) have been encouraged in part by the higher price of nonfat dry milk (NFDM), which is supported by the domestic price support program. The U.S. International Trade Commission (ITC) found that the higher support price for NFDM contributed to a higher return to NFDM than to MPC. The ITC concluded that the current U.S. milk price support program created a disincentive to manufacture MPC in the United States.

Milk proteins were not considered a significant trade issue during the General Agreement on Tariffs and Trade in the 1990s because the product was not commercially viable in international markets. Since the mid-1960s, almost all casein or MPC-related products supplied to manufacturers in the United States have been imported. U.S. and Canadian milk producers are increasingly concerned about this trend, since MPC trade appears to circumvent WTO agreements (Bailey, 2003). MPCs may eventually threaten dairy support programs and lead to lower producer prices.

Although detailed data are limited, trade in whey products (dry whey, modified whey products, and whey protein concentrate) shows substantial growth. These byproducts of cheese production can offer almost all of the nutrition of skim milk powder at a very low price. The emergence of this market has caused prices of whey protein concentrate to become a floor for international prices of skim milk powder. Importers can readily shift from whey products to skim milk powder as the price falls.

*Continued on page 8*

## **What Are Milk Proteins?**

Milk proteins consist of a casein-type protein (fat soluble) and a whey protein (water soluble), a byproduct of cheesemaking. In the United States, commercial production of milk proteins has been almost entirely of whey proteins because the casein-type protein is fully used in the production of natural cheese. Within these two broad types, bovine milk contains 10 different milk proteins types differentiated by their unique amino acid profiles, each having different commercial applications and functional attributes but all being of generally high food quality.

## **How Are Milk Proteins Manufactured?**

Milk proteins are manufactured using ultra-filtration, a membrane separation technology that removes water, some lactose, and minerals from milk. Repeated passes through an ultra-filtration membrane alter the milk solids composition, increasing the protein percentage and reducing the percentage of lactose and other solids in the final product. MPC with protein content less than 70 percent is commonly used in frozen deserts, bakery, and confectionery products. Lower protein MPC is also the form most commonly used in standardizing cheese milk. The most common use of MPC with protein 70 percent or greater is in sports and nutrition drinks. These higher protein forms of MPC are not typically used in cheesemaking because of the higher cost. NFDN can be used instead of MPC in most applications, but its suitability varies across products. NFDN, which contains lactose as well as milk proteins, does not substitute well in products where a more concentrated milk protein is required. MPC can be easily formulated to meet specific product requirements in the rapidly growing sports/nutritional beverage and food market. Use of nonfat dry milk in these applications would require modification to elevate protein content and lower lactose content, likely through reconstitution and ultrafiltration of NFDN.

## **How Are They Regulated?**

Regulations on the use of MPC vary by country. In the United States, MPC may not be used for cheeses with the U.S. Food and Drug Administration (FDA) standard of identity. However, some dairy manufacturers have made changes to accommodate MPC use in nonstandardized cheeses. Kraft Foods Inc. changed the product description on its American Singles from “Pasteurized Process Cheese Food,” which has the FDA standard of identity, to “Pasteurized Prepared Cheese Product,” which does not. MPC is listed as an ingredient in Kraft American Singles. Dannon is now using MPC as a substitute in its low-calorie yogurts.

Of the whey protein types, lactoferrin has the widest range of bioactive properties and is used in health supplements and nutrition formulation, and as an antimicrobial agent used to inhibit against foodborne pathogens. In 2003, FDA and USDA approved the use of lactoferrin as a meat preservative.