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|  **Unit Three: Dairy Products*** **Milk**
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**Milk**

**Milk** is a pale liquid produced by the [mammary glands](https://en.wikipedia.org/wiki/Mammary_gland) of [mammals](https://en.wikipedia.org/wiki/Mammal). It is the primary source of [nutrition](https://en.wikipedia.org/wiki/Nutrition) for infant mammals (including humans who breastfeed) before they are able to [digest](https://en.wikipedia.org/wiki/Digestion) other types of food. Early-[lactation](https://en.wikipedia.org/wiki/Lactation) milk contains [colostrum](https://en.wikipedia.org/wiki/Colostrum), which carries the mother's [antibodies](https://en.wikipedia.org/wiki/Antibody) to its young and can reduce the risk of many diseases. It contains many other nutrients including protein and [lactose](https://en.wikipedia.org/wiki/Lactose).

As an [agricultural](https://en.wikipedia.org/wiki/Agriculture) product, milk is [extracted from non-human mammals](https://en.wikipedia.org/wiki/Milking) during or soon after pregnancy. [Dairy](https://en.wikipedia.org/wiki/Dairy) farms produced about 730 million tonnes of milk in 2011, from 260 million dairy cows. India is the world's largest producer of milk, and is the leading exporter of skimmed milk powder, yet it exports few other milk products. The ever increasing rise in domestic demand for dairy products and a large demand-supply gap could lead to India being a net importer of dairy products in the future. The United States, India, China and Brazil are the world's largest exporters of milk and milk products. China and Russia were the world's largest importers of milk and milk products until 2016 when both countries became self-sufficient, contributing to a worldwide glut of milk

**Nutrients**

* Protein - body building and repair
* Carbohydrates - energy and warmth
* Fats - energy and warmth, carries fat-soluble vitamins ADEK
* Vitamins - Growth, prevents diseases
* Vitamin D - bones and teeth, prevents rickets
* Vitamin A - aids growth, prevents night blindness
* Riboflavin (Vitamin B2) - regulates production of energy from dietary fat, carbohydrates and protein.
* Minerals - strong bones and teeth, body regulation
* Calcium - bones and teeth, prevents osteoporosis
* Phosphorus - bones and teeth

**Processing Terms**

* Pasteurization – heating raw milk at a high enough temperature for a sufficient time to remove pathogens (bacteria) and increase shelf life. Has no effect on nutritional value.

Homogenization – breaks up and disperses milk fat throughout the milk to prevent cream from rising to the top.

UHT milk – heated to a higher temperature than pasteurized milk, stays fresher longer, has longer shelf life (up to 3 months) because milk is packaged in sterilized, air free packaging.

Fortification – 98% of milk sold in the USA is fortified with Vitamins A and D. Some milk is also fortified with extra protein and extra calcium.

**Types of milk**

* **Whole Milk** (3.25% fat) contains 150 calories and 8 grams (g) of fat per serving (8 fluid oz). Although not required, whole milk may be fortified with vitamin D at a level of 400 International Units (IU) per 1 quart. If vitamin D is added, the label must state this fact.
* **2% Reduced-Fat Milk** (2% fat) contains 120 calories and 5 grams (g) of fat per serving(8 fluid oz). Vitamins A and D are removed with the milk fat. For this reason, these vitamins must be added to 2% reduced-fat milk so that it contains at least 2,000 IU of vitamin A and 400 IU of vitamin D per 1 quart. The addition of these vitamins must be stated on the label.
* **1% Lowfat Milk** (also called Light Milk) (1% fat) contains 100 calories and 2.5 grams (g) of fat per serving (8 fluid oz). Vitamins A and D must be added to a level of at least 2,000 IU of vitamin A and 400 IU of vitamin D per 1quart. The label must indicate the addition of these vitamins.
* **Fat-Free Milk** (also called Skim or Nonfat Milk) (0% fat) contains 80 calories and 0 grams (g) of fat per serving (8 fluid oz). Vitamins A and D must be added to a level of at least 2,000 IU of vitamin A and 400 IU of vitamin D per 1quart The label must indicate the addition of these vitamins.
* **Chocolate Milk** (fat-free,1% lowfat, 2% reduced-fat, whole milk) is milk to which chocolate or cocoa and a sweetener havebeen added. This milk is just as nutritious as its unflavored counterpart. Compared to plain milk, chocolate milk contains about 60 more calories per serving (8 fluid oz).
* **Evaporated Milk** (6.5% fat) is made by removing about 60% of the water from whole milk. The milk is then homogenized, fortified with vitamin D to a level of 25 IU per 1fluid ounce, canned and heat sterilized. The addition of vitamin A is optional. If added, each fluid ounce must contain not less than 125 IU of vitamin A.

**Evaporated Fat-Free Milk** (0.5% fat or less) is a concentrated, fortified (vitamins A and D) fat-free (skim or nonfat) milk that is canned and sterilized

 **Sweetened Condensed Milk** (8% fat or less) is a canned milk concentrate of whole milk to which sugar has been added. The sweetener used (usually sucrose) prevents spoilage. Sweetened condensed fat-free milk contains no more than 0.5% milk fat.

**Storage of milk**

* Pick up as one of the last items in store
* Refrigerate as soon as possible
* Put freshest milk in the back and use the oldest first)
* Chill UHT milk before serving. Refrigerate after opened.
* Dry milk should be refrigerated after reconstituted
* Do not pour unused milk back into original container
* Close container so milk will not absorb flavors
* Canned milk - store in cool, dry place; rotate and turn cans upside down in storage every few months

**Milk products**

**yogurt**

* Yogurt is a mixture of milk (whole, reduced-fat, lowfat or nonfat) and cream fermented by a culture of lactic acid-producing bacteria, Lactobacillus bulgaricus and Streptococcus thermophilus.
* Other bacteria (e.g., acidophilus) and other strains of the above bacteria may be added to the culture. Sweeteners (e.g., sugar, honey, aspartame), flavorings (e.g., vanilla, coffee) and other ingredients (e.g., fruits, preserves, stabilizers such as gelatin) may also be added. Yogurt contains at least 3.25% milk fat and 8.25% solids-not-fat. The mixture of dairy products and optional ingredients, except bulky flavorings, must be pasteurized or ultrapasteurized. The milk in most yogurts is also homogenized. Some yogurts carry a seal on the label indicating that the yogurt contains a significant level of live, active culture.

**Cream (noramal)**

* **Half-and-Half** is a mixture of milk and cream containing at least 10.5% but not more than 18% milk fat. This product contains about 20 calories and nearly 2 grams (g) of fat per tablespoon.
* **Light Cream (coffee cream, table cream)** contains at least 18% but less than 30% milk fat. This product provides about 30 calories and 3 grams (g) of fat per tablespoon.
* **Light Whipping Cream (whipping cream)** has at least 30% but not more than 36% milk fat. This product can be used as is (unwhipped) or whipped. Liquid (unwhipped) whipping cream contains about 44 calories and 5 grams (g) of fat per tablespoon.

**Heavy Cream** must contain at least 36% milk fat. This product is readily whipped and can retain its whipped state longer than that of light whipping cream. Heavy cream provides about 52 calories and 6 grams (g) of fat per tablespoon

**Sour Cream**

* **Sour Cream (cultured sour cream)** is the product resulting from adding lactic acid bacteria to pasteurized cream at least 18% milk fat.
* **Acidified Sour Cream** results from souring pasteurized cream with safe and suitable acidifiers, with or without lactic acid-producing bacteria. One tablespoon of sour cream contains about 26 calories and 2.5 grams (g)of fat.
* **Reduced-Fat Sour Cream** and Acidified Sour Cream contain at least 25% less fat per serving than a serving (2 tablespoons) of sour cream or acidified sour cream, respectively. Reduced-fat sour cream contains 20 calories and 1.8 grams (g) of fat per tablespoon.

**Cooking with cream & cooking with cheese (Assignment -2)**

**Storage of cream**

🡪Refrigerate cream as soon as possible after purchase.

🡪Opened cartons of cream should be refrigerated immediately after use and used up within 1 week.

🡪Store cream on refrigerator shelves where it is cooler, rather than in the refrigerator doors.

🡪Use the freshest cream possible and always use by the “best before date”. Buy smaller amounts more often rather than storing open, larger containers in the refrigerator.

🡪Cream doesn’t freeze well. Upon thawing it can separate and lose its creamy texture. If freezing foods such as soups or stews, add the cream after you reheat the thawed food.

**Cheese**

All cheese is made from milk, but different manufacturing and aging processes are used to produce the array of cheeses available today. Cheese can be made from many types of milk, cows, goat, buffalo

* Cheese is made by coagulating or curdling milk, stirring and heating the curd, draining off the whey (the watery part of milk), collecting and pressing the curd, and in some cases, ripening.
* Cheese can be made from whole, 2% low fat, 1% low fat or fat-free milk, or combinations of these milks.
* About one-third of all milk produced each year in the U.S. is used to make cheese. In 1998, 9.7 billion pounds of natural and processed cheeses were produced

**Nutrients in cheese**

* Because cheese is concentrated milk (it takes 10 lbs of milk to make 1 lb of cheese, it is considered nutrient dense, providing high quality protein, minerals such as calcium, phosphorus and zinc, and vitamins A, B2 (riboflavin) and B 12. Cheese provides a significant source of calories (about 100 cal per oz) and fat (5-8 grams per oz). Reduced Fat (3 gms less fat per oz) and Fat free cheese (less than 0.5 fat grams per oz) are options for low fat diets. Lower calorie cheese choices include feta, cottage, mozzarella and soft cheeses).

**Types of cheese**

More than 400 different varieties of cheese are available. Cheeses are categorized in several ways: natural versus process cheeses, unripened versus ripened and soft versus hard. Many cheeses are named for their place of origin, such as Cheddar cheese, which originated in Cheddar, England.

**Natural cheeses** are often categorized according to their moisture or degree of softness or hardness

* **Unripened** cheeses are made by coagulating milk proteins (casein) with acid.
* Examples include soft cheeses like cream cheese, cottage cheese and Neufchatel.
* **Ripened** cheeses are made by coagulating milk proteins with enzymes (rennet) and culture acids. These cheeses are then ripened (aged) by bacteria or mold. Cheddar, Swiss, Colby, brick and Parmesan are some examples of bacteria-ripened cheeses.
* **Mold Ripened** cheeses including Blue, Roquefort, and Stilton are examples of mold-ripened cheeses.

**Natural cheeses include**: (types of cheese)

**Soft Cheeses or cream cheese:** Cream cheeses are not matured. Brie and Neufchatel are soft-type cheeses that mature for more than a month. Neufchatel is a soft cheese which can be sold after 10 days of maturation.,

eg :Camembert, ricotta, cottage

**Semi-Soft Cheeses:** Semi-soft cheeses, and the sub-group *Monastery*, cheeses have a high moisture content and tend to be mild-tasting. Some well-known varieties include

**Eg** : [Havarti](https://en.wikipedia.org/wiki/Havarti), [Munster](https://en.wikipedia.org/wiki/Munster_%28cheese%29) and [Port Salut](https://en.wikipedia.org/wiki/Port_Salut)., Blue, brick, feta, Havarti, Monterey Jack, mozzarella, provolone

**Medium-hard cheese :-** Cheeses that range in texture from semi-soft to firm include Swiss-style cheeses such as [Emmental](https://en.wikipedia.org/wiki/Emmental_cheese%22%20%5Co%20%22Emmental%20cheese) and [Gruyère](https://en.wikipedia.org/wiki/Gruy%C3%A8re_cheese%22%20%5Co%20%22Gruy%C3%A8re%20cheese). The same bacteria that give such cheeses their [eyes](https://en.wikipedia.org/wiki/Eyes_%28cheese%29) also contribute to their aromatic and sharp flavours. Other semi-soft to firm cheeses include [Gouda](https://en.wikipedia.org/wiki/Gouda_%28cheese%29), [Edam](https://en.wikipedia.org/wiki/Edam_%28cheese%29), [Jarlsberg](https://en.wikipedia.org/wiki/Jarlsberg_cheese%22%20%5Co%20%22Jarlsberg%20cheese), [Cantal](https://en.wikipedia.org/wiki/Cantal_%28cheese%29%22%20%5Co%20%22Cantal%20%28cheese%29), and [Cașcaval](https://en.wikipedia.org/wiki/Ca%C8%99caval%22%20%5Co%20%22Ca%C8%99caval). Cheeses of this type are ideal for melting and are often served on [toast](https://en.wikipedia.org/wiki/Toast) for quick snacks or simple meals.

**Hard cheese**

Harder cheeses have lower moisture content than softer cheeses. They are generally packed into moulds under more pressure and aged for a longer time than the soft cheeses.

**Blue cheese**

Blue cheese is a general classification of [cheeses](https://en.wikipedia.org/wiki/Cheese) that have had cultures of the [mold](https://en.wikipedia.org/wiki/Mold) *[Penicillium](https://en.wikipedia.org/wiki/Penicillium%22%20%5Co%20%22Penicillium)* added so that the final product is spotted or veined throughout with [blue](https://en.wikipedia.org/wiki/Blue), or blue-grey mold and carries a distinct smell, either from that or various specially cultivated bacteria. Some blue cheeses are injected with [spores](https://en.wikipedia.org/wiki/Spore) before the [curds](https://en.wikipedia.org/wiki/Curds) form, and others have spores mixed in with the curds after they form. Blue cheeses are typically aged in a temperature-controlled environment such as a [cave](https://en.wikipedia.org/wiki/Cave)\* (a hollow underground place)\*. Blue cheese can be eaten by itself or can be spread, crumbled or melted into or over foods.

**Eg :**  [Roquefort](https://en.wikipedia.org/wiki/Roquefort_cheese), [Danablu](https://en.wikipedia.org/wiki/Danish_Blue_Cheese%22%20%5Co%20%22Danish%20Blue%20Cheese), [Cabrales](https://en.wikipedia.org/wiki/Cabrales_cheese%22%20%5Co%20%22Cabrales%20cheese), [Gorgonzola](https://en.wikipedia.org/wiki/Gorgonzola) and [Blue Stilton](https://en.wikipedia.org/wiki/Stilton_cheese)

**Process Cheeses.** These cheeses are made by blending one or more natural cheeses, heating and adding emulsifying salts. Process cheeses contain more moisture than natural cheeses.

**Pasteurized process cheeses** include American cheese, cheese spreads and cheese foods. Cold-pack cheese is a blend of natural cheeses processed without heat.

**Storage of cheese**

* **Storing – Refrigerate at 40 degrees F in wax paper or sealed containers – do not recommend aluminum foil or cling wrap. Store away from other foods. Cheese can be frozen but may become mealy and crumbly when thawed.**
* **To melt cheese, best to grate or cube and cook very slowly. If cheese is overheated it will become tough and rubbery or will clump and refuse to melt.**
* **It is best to weigh (scale) cheese because of difference in volume when it is grated, shredded or cubed.**

**Butter**

* **Butter is essentially the fat of milk. It is usually made from sweet cream (as opposed to sour cream) and is salted. To be called butter, it must contain not less than 80% of milk fat.**

**Different types of butter**

* **Cultured butter** - An unsalted butter made from cream to which bacterial culture has been added. This gives it a distinctive, delicate, tangy taste that some refer to as having "old-country flavour".
* **Whipped butter** - Made by the uniform incorporation of air or inert gas into butter. It makes it softer and easier to spread. It does not have the same density as regular butter, therefore, it should not be used in recipes calling for plain butter.
* **Churned butter or sweet butter** - It is traditional, everyday butter.
* **Flavoured butter** - Butter herbs and/or spices have been added during the process, for example garlic butter.
* **Farm butter** - Called "beurre cru" (raw butter) in France, it is made from unpasteurized milk. It typically has a better taste, but does not keep well.
* **Ghee** - A type of clarified butter that originated in Eastern cultures. It is simmered until the moisture evaporates and the butter carmelizes. Available in specialty stores.
* **Unsalted** - Contains 0% salt, used in pastries and cake production
* **Semi-salted butter or lightly salted**

In the USA Butter grades are determined by classifying the flavor, then rating the body, color and salt characteristics. The resulting score translates into a grade B, A, or AA.

 ------------------------------THE END-------------------------------