



Milk is one of the most highly regulated and safest foods available to consumers. The milk in your glass was tested up to 17 different times before it reached you. Milk and dairy foods must undergo a number of safety and quality procedures, such as pasteurization, to make sure they are safe and wholesome for you to consume.

The composition and attributes of milk also makes it very versatile. Milk is used to make a variety of dairy products, including cheese, yogurt, butter and ice cream. Milk is also an ingredient in many other products, such as milk chocolate and protein bars, like the “Special K Snack Bar.” The quality and composition of the milk can influence both the yield and the taste of these products.

## Milk Quality and Testing

*What steps do you think ensure milk and dairy products are safe to consume?*



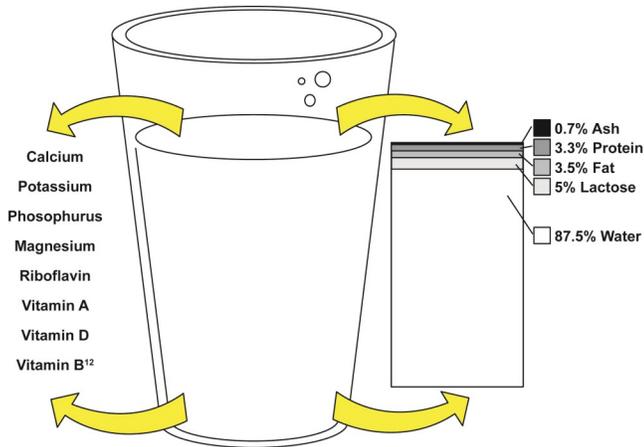
With recent food illness outbreaks, people are concerned about the safety of their food now more than ever. The U.S. Food and Drug Administration (FDA) and other regulatory agencies establish processes and protocols that all food must go through to ensure that it is safe for consumers to eat.

Milk and dairy products are among the most highly regulated foods in the nation. All milk and dairy products must undergo a number of safety, quality and sanitation procedures on the farm, in transit and at the processing plant to ensure their safety. Preserving the quality and safety of milk begins at the farm and follows through to the refrigerator.

Those steps include:

1. At the farm, the ***cows producing the milk must be kept clean and comfortable***. Their barns must be kept very clean. The dairy farms are inspected regularly by a state sanitation inspector to make sure the milking equipment, housing facilities and cows are clean. Federal inspectors from the Food & Drug Administration (FDA) also inspect farms to ensure safety.
2. ***Healthy cows produce quality milk***. When cows do get sick, they are given medicine – much like an antibiotic a doctor would prescribe for humans. If a cow is given an antibiotic, her milk is discarded until she has tested or deemed by a veterinarian to be healthy again. The milk is tested before it is shipped for processing to make sure the milk is free of antibiotics residue.
3. Cows are milked two to three times a day. Their ***udders and teats are cleaned and sanitized before milking*** to keep the milk clean. The milk from a cow flows from her udder to pre-sanitized pipes connected to a large milk tank. The milk is quickly cooled to 40 degrees Fahrenheit. Human hands never touch the milk.
4. Milk from the farm is transported in insulated tanker trucks to processing plants. Before it is delivered to the plant, it is ***tested for safety and quality***. Once the milk passes several safety checks, the milk is ***pasteurized***. Pasteurization is the process of heating milk to high temperatures (at least 145 degrees Fahrenheit) for a short period of time. Pasteurization ensures milk and dairy foods are safe to drink and eat.
5. Throughout the process, the dairy industry ***works closely with the FDA, state and federal regulators*** to monitor and test dairy production, processing and marketing to ensure the safety. Every load of milk shipped from every farm in the U.S. is tested and re-tested for safety and quality – up to 17 times throughout the process. Any milk not meeting federal and state standards is discarded, never reaching consumers.

Dairy farmers, industry personnel and regulators work to ensure the safety and wholesomeness of the milk we drink. This effort starts with the quality care farmers give to their cows, and continues in the processing plant and at the marketplace.



## Dairy Products Made From Milk

*How do you think dairy products are made from milk?*

Milk is one of the most nutrient-dense foods available in the marketplace. The composition and attributes of milk have made it a nutritional mainstay in the human diet since biblical times. Milk's composition can vary depending on the species (cow, goat, and sheep) and the breed of that species (Holstein, Jersey, Ayrshire). The animal's diet and stage in life can also influence the composition.

In general, milk is:

- ◆ 87.5 percent water
- ◆ 5 percent lactose (or milk sugar)
- ◆ 3.5 percent fat, 3.3 percent protein
- ◆ 0.7 percent mineral (such as calcium)

Nine essential nutrients are found in milk, including protein, calcium, potassium, phosphorus, magnesium, riboflavin, vitamin A, vitamin D and vitamin B<sup>12</sup>. Most health experts consider milk to be an important part of our diet because of the complete nutritional package it provides for the body.

Cheese, yogurt, ice cream and other dairy products are all made from milk.

causes the milk proteins to tangle into solid masses, or *curds*, which makes cheese. After the curds are formed, the remaining liquid (called whey) is drained off and sometimes used as an ingredient in other foods.

- ◆ Milk sugar (or lactose) is key to making **Yogurt**. When lactose goes through fermentation, or the conversion of carbohydrates into alcohols or acids under anaerobic conditions. It produces lactic acid. Combined with the milk protein, the lactic acid gives yogurt its texture and characteristic tang.

The quality and attributes of milk can influence the taste, texture and yield of the products produced from it. For example, some breeds of dairy cows produce milk with higher fat levels. The higher fat levels will enhance the

- ◆ **Ice cream** is also made from the cream (or fat) in milk. The cream is combined with other flavors and ingredients, and stirred slowly while cooling to prevent large ice crystals from forming. The result is a smoothly textured ice cream.

## Lesson Vocabulary Definitions:

- ◆ **Pasteurization** — the process of heating milk to high temperatures (at least 145 degrees Fahrenheit) for a short period of time.
- ◆ **Fermentation** — the conversion of carbohydrates into alcohols or acids under anaerobic conditions.
- ◆ **Sanitation** — A means of promoting health through the prevention of human contact with harmful microbiological, biological or chemical agents of disease.
- ◆ **Antibiotic** — a product or medicine used to treat infection.
- ◆ **Coagulation** — curdling or a complex process in which compounds come together to clot.
- ◆ **Curds** — a dairy product obtained by coagulating milk with rennet or an edible acidic substance.
- ◆ **Anaerobic** — without oxygen or air.