

From Milk to Cheese – making a long story short

Cheese is made from milk, and that milk comes from animals as diverse as cows, sheep, goats, horses, camels, water buffalo, and reindeer.

After milk is received by the cheese-maker, it is weighed and tested for quality.

Cheese can be made from either **pasteurized** or **raw milk**. In pasteurized milk, any pathogens are eliminated by heating the milk to 72°C for about 15 seconds. Cheese made from raw milk must be cured for over 60 days to eliminate pathogens. Milk purchased from small dairies which don't pasteurize contains the bacteria necessary to produce lactic acid - one of the agents that triggers **curdling**. The cheese makers let the milk sit until enough lactic acid has formed to begin producing the particular type of cheese they're making. At large cheese factories, which purchase pasteurized milk, a culture of bacteria must be added to produce lactic acid.

The favourable bacteria are known to cheese-makers as **starter cultures**. Their primary function is to convert the milk sugar – lactose – in a lactic acid which acidifies the milk and prepares it for the addition of **rennet** [an enzyme from the stomachs of young ruminants]. Most cheese makers expedite the **curdling process** with rennet, lactic acid, or plant extracts, such as the vegetable rennet produced from wild artichokes, fig leaves, safflower, or melon.

Under the influence of starter and rennet, the casein begins to coagulate, trapping most of the milk fat along with the proteins and some of the **whey**.

As the gel-like mass begins to solidify, it is cut into **curds**.

This begins the separation of curds from whey – which is the excessive liquid which is removed in the cheese-making process. The size of the curds varies, depending on the type of cheese being made. **Large curds**, cooked at **low temperatures**, retain more whey, have less protein bonding and yield **softer cheeses**, such as Feta or Brie. Curds that are cut smaller and cooked at higher temperatures allow more whey to escape and more protein bonding, thus yielding harder cheeses, such as Asiago and Parmesan.

When separation is complete, **the whey is drained**.

The curds are then pressed into molds, if necessary, to facilitate further moisture drainage. At this stage the cheese may be inoculated with a flavoring mold, bathed in brine, or wrapped in cloth before being deposited in a place of the proper temperature and humidity to age. Some cheeses are aged for a month, some for up to several years. Ageing sharpens the flavor of the cheese.

Some cheeses may develop a rind naturally, as their surfaces dry. Other rinds may form from the growth of bacteria that has been sprayed on the surface of the cheese. Still other cheeses are washed, and this process encourages bacterial growth. In place of or in addition to rinds, cheeses can be sealed in cloth or wax. For local eating, this may be all the packaging that is necessary. However, large quantities of cheese are packaged for sale in distant countries. Such cheeses may be heavily salted for export (such as *Roquefort*) or sealed in impermeable plastic or foil.

Because they possess such disparate characteristics, different types of cheese are required to meet different compositional standards. Based on its moisture and fat content, a cheese is labeled soft, semi-soft, hard, or very hard. Having been assigned a category, it must then fall within the range of characteristics considered acceptable for cheeses in that category. For example, cheddar, a hard cheese, can contain no more than 39 percent water and no less than 50 percent fat. In addition to meeting compositional standards, cheese must

From Milk to Cheese – making a long story short

also meet standards for flavor, aroma, body, texture, color, appearance, and finish. To test a batch of cheese, inspectors core a representative wheel vertically in several places, catching the center, the sides, and in between. The inspector then examines the cheese to detect any inconsistencies in texture, rubs it to determine body (or consistency), smells it, and tastes it. Cheese is usually assigned points for each of these characteristics, with flavor and texture weighing more than color and appearance.

One controversy in the cheese field centers on whether it is necessary to pasteurize the milk that goes into cheese. Pasteurization was promoted because of the persistence of *Mycobacterium tuberculosis*, a pathogen or disease-causing bacteria that occurs in milk products. The United States allows cheeses that will be aged for over sixty days to be made from unpasteurized milk; however, it requires that many cheeses be made from pasteurized milk. Despite these regulations, it is possible to eat cheeses made from unpasteurized milk to no ill effect. In fact, cheese *connoisseurs* insist that pasteurizing destroys the natural bacteria necessary for quality cheese manufacture. They claim that modern cheese factories are so clean and sanitary that pasteurization is unnecessary. So far, the result of this controversy has merely been that connoisseurs avoid pasteurized milk cheeses.

Regulations exist so that the consumer can purchase authentic cheeses with ease. France, the preeminent maker of a variety of natural cheeses, began granting certain regions monopolies on the manufacture of certain cheeses. For example, a cheese labeled "*Roquefort*" is guaranteed to have been ripened in the Combalou caves, and such a guarantee has existed since 1411. Because cheese is made for human consumption, great care is taken to ensure that the raw materials are of the highest quality, and cheese intended for export must meet particularly stringent quality control standards.

Fresh cheeses are the most basic. They're uncooked, unaged and sometimes still contain **whey** (the liquid part of milk). They don't keep very long and therefore need to be eaten soon after they're made. This cheese category includes mozzarella, cottage cheese, ricotta, cream cheese, farmer cheese, mascarpone and *queso fresco*. Fresh cheese is characterized by its soft, creamy texture and mild taste.

Soft-ripened cheeses are semisoft in texture and sometimes have a white, or "bloomy," rind. This is created with the application of molds (more on this later). Soft-ripened cheeses are usually a little more flavorful and buttery than fresh cheeses, but they're still very mild. Camembert and Brie are examples of this type of cheese.

Most varieties of "stinky" cheese, like Limburger, are **washed-rind**, or monastery cheese. These cheeses have reddish-orange rinds. The "stink" comes from being washed in a liquid, such as salted water, wine or beer, during the ripening phase. The washing encourages the growth of bacteria and mold, which gives the cheese a very strong smell and taste.

Some cheeses have rinds that form naturally, without the introduction of molds or bacteria. These **natural-rind cheeses** are usually aged and are heavier than other types of cheeses. Many of them are made from raw milk, and they include English Stilton and the French *fromage de chèvre*.

English Stilton is a **blue-veined cheese**. These cheeses resemble marble, with bluish-green veins crossing through the pale cheese. The veins are mold cultures, introduced during the cheesemaking process. Depending on the type of cheese, the mold may give it a very strong flavor. Maytag Blue, Gorgonzola and Roquefort are other examples of blue-veined cheese.