

Pasteurisation

Milk is sold in a variety of forms today, but very few of us ever see raw milk any more. Ordinary drinking milk is routinely subjected to pasteurization and homogenization and sometimes to vitamin fortification too.

Most milk sold for direct human consumption has been pasteurized, or heated hot and long enough to destroy all disease-causing organisms and most others as well. The great French scientist Louis Pasteur studied the spoilage of wine and beer in the 1860s and developed a heat treatment that preserved these fluids without greatly injuring their flavour. Nowadays, pasteurization is a practical necessity. It extends the shelf life of milk not only by killing microbes, but also by inactivating enzymes native to milk, especially the fat-splitters, whose slow but steady activity can make it unpalatable. There are many different combinations of temperature and time that pasteurize milk, but a few are by far the most commonly employed. One standard method is to heat the milk to 62 °C and hold it there for 30'; another keeps it at 71 °C for 15". The first has the advantage of staying well below the temperature at which a cooked flavour develops, and while the second flirts with this limit, it is much faster. Ultrapasteurization, in which a temperature of 138 °C is held for one second, is a more severe treatment that does leave behind a cooked flavour. Homogenization, whose name comes from the Greek for 'of the same kind', involves forcing the

milk at high pressure through a very small nozzle onto a hard surface; it breaks the fat globules up into more uniform particles about a quarter of their original size. As a result, the fat remains evenly dispersed in the milk. Homogenized milk is whiter, blander, less stable to heat, and more sensitive to spoilage by light than unhomogenized milk. All milk is pasteurized before or simultaneously with homogenization.

In addition to being pasteurized and homogenized, milk may be fortified with the fat-soluble vitamins A and D.

Low-fat milks are made by centrifuging some of the globules off before homogenization. Whole milk is about 4% fat, low-calorie milks 1 or 2% and skim milk between 0.1% and 0.2%. 'Acidophilus' milk is designed for people with lactose intolerance; it has been cultured with *Lactobacillus acidophilus*, a bacterium that consumes the lactose and produces lactic acid in the process.

Milk is a highly perishable food. Even pasteurized milk contains millions of bacteria and will sour quickly unless refrigerated.

The flavour of milk can be altered by the electrical energy carried in ordinary daylight. This chemical reaction is called "autoxidation". So, for both nutritional and gustatory reasons, clear glass or plastic containers of milk should be kept in the dark as much as possible.

(from: McGee, *On Food and Cooking*, Unwin Hyman)

- 1** Use these words to complete the short summary of the reading passage: bacteria, bacterium, dispersed, enzymes, fat globules, flavour, harmful, intolerance, light, nutritional, pathogens, percentages, refrigerated, sour. *Tip: copy the summary in your exercise book.*

Most milk sold for beverage purposes is pasteurized to destroy (1) which may have contaminated milk. Pasteurization kills all (2) microbes and inactivates fat-splitting (3) which would soon make milk unpalatable. Standard pasteurization slightly changes the (4) of milk.

In homogenization, the (5) of milk are broken down into very small particles which remain uniformly (6) in the liquid.

The (7) value of milk can be increased by adding vitamins.

Milk is sold in a variety of forms containing different (8) of fat.

Milk cultured with *Lactobacillus acidophilus*, a lactose-consuming (9), can be used by people with lactose (10)

Being a very perishable food, even pasteurized milk must be kept (11) to prevent the millions of (12) in it from causing it to become (13) Milk should also be kept in the dark because it is very sensitive to spoilage by (14) which may alter its flavour.

- 2** Use either *how* or *what* to complete the questions below, then answer them using your own words as far as possible.

- a. is milk treated in pasteurization?
- b. are the advantages of pasteurization?
- c. is homogenization carried on?
- d. are low-fat milks made?
- e. is "acidophilus" milk produced?