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Lecture 3 :: Methods of treating milk

Milk as secreted by the udder cells of a healthy cow is probably sterile, i.e. it contains no micro-organisms capable either of souring the milk or causing disease. But when milk reaches its reservoir within the udder, and particularly in passing through the teat of the udder and reaching the milking pail, the risk of picking up dexterous microorganisms steadily increases.

Raw milk must undergo heat treatment to prevent not only its rapid deterioration but also any risk of its conveying disease to the consumer. Heat treatment is generally most satisfactory because it causes the minimum of change in the composition of flavors and acceptability of the milk. Effective heat treatment does not necessarily entail the destruction of all micro-organisms originally present but it accomplishes the destruction of any pathogens in the milk.

N.B. Milk produced under sanitary conditions still contains many bacteria. Therefore it must be treated properly before consumption.

The most common method of treating raw milk is by applying heat.

There are at least five methods of treating milk.

1. Boling

This is the easiest and most practicable method of making milk safe in every home. As soon as raw milk is produced or delivered it should be boiled.

Boiling is raising the temperature of the milk to boiling point and maintaining the milk at this temperature for a few minutes. Then the milk should be immediately cooled. If it has to be stored the temperature should be maintained below 100c. Since these may be impracticable in a home,



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every care should be taken to keep the milk as cool as possible > Preferably the milk should be consumed as soon as possible after cooling and not stored for an extended period of time after it has been boiled and cooled.

Boiling of milk destroys all microorganisms except **the spore formers** but it changes the nutritive value of milk, its flavors and palatability and appearance. However this disadvantage should be disregarded in favor of the safety of boiled milk i.e. its freedom from disease-causing microorganisms. Boiling is technically difficult to process on a large scale and is commercially uneconomical.

2. Pasteurization

The term pasteurization, named after Louis Pasteur (1822-1895) the famous bacteriologist, was first devised to be applied to other fluids, the main **one being milk and used for controlling spoilage in wine and beer.** Afterwards pasteurization became popular.

Pasteurization of milk can be defined as the process of heating every particle of milk and milk products to a predetermined temperature and holding this temperature for a predetermined time.

Pasteurization of milk is not sterilization but it is a destruction of all pathogenic micro-organisms, a good number of other non-pathogenic and non-spore forming bacteria and certain enzymes in the nutritive value and the chemical nature of the milk.

2.1 Objectives of pasteurization

The first: objective of pasteurization is to ensure that all pathogenic micro-organisms commonly found in milk are completely destroyed.

The second objective: is to safeguard the food value of milk; to ensure that its chemical compositions/constituents are retained as much as possible.



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The third objective: is to ensure that other non-pathogenic bacteria and certain undesirable enzymes, which may cause spoilage, are inactivated or reduced to optimal levels.

.2.2 Principles of pasteurization

The criterion for selecting a given combination of pasteurization temperature and exposure time is to maximize the objectives of pasteurization of rendering raw milk safe for human consumption.

In the early days of milk pasteurization the first task was to determine a temperature/exposure/time point at which the most heat-resistant non-spore-forming pathogen commonly found in milk would be destroyed completely. At that time this was *Mycobacterium tuberculosis*.

Good Luck

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