



Chapter 14

Fluid Milk Processing

Dispensing of Fluid Milk through Bulk Vending, Bottles, Cartons and Pouches

Introduction

Fluid milk requires a storage place in every step of transfer from milch animal to consumers. More production of milk and demand of milk irrespective to production sites and also for the reasons of hygiene and economy, there are the development and establishment of dairy processing industries worldwide, where milk is processed into various milk products including the different varieties of fluid milk products such as pasteurized milk (double toned, toned, standardized, full fat, skim milk) sterilized milk, flavoured milk etc. The growing demand for milk in cities far from production sites directed to the development of containers suitable for various stages of marketing and distribution. These are metal cans, glass bottles, pouches, cartons, bulk vending machine etc and thus contributing substantially in rapid growth of distribution of fluid milk.

Heat treatment is given in processing of fluid milk for enhancing the shelf life and safety. After that the processed milk is immediately chilled to below 5°C and stored under hygienic conditions and packaged and subsequently stored and despatched through refrigerated vehicles to maintain the low temperature. Processing of fluid milk is as follows:

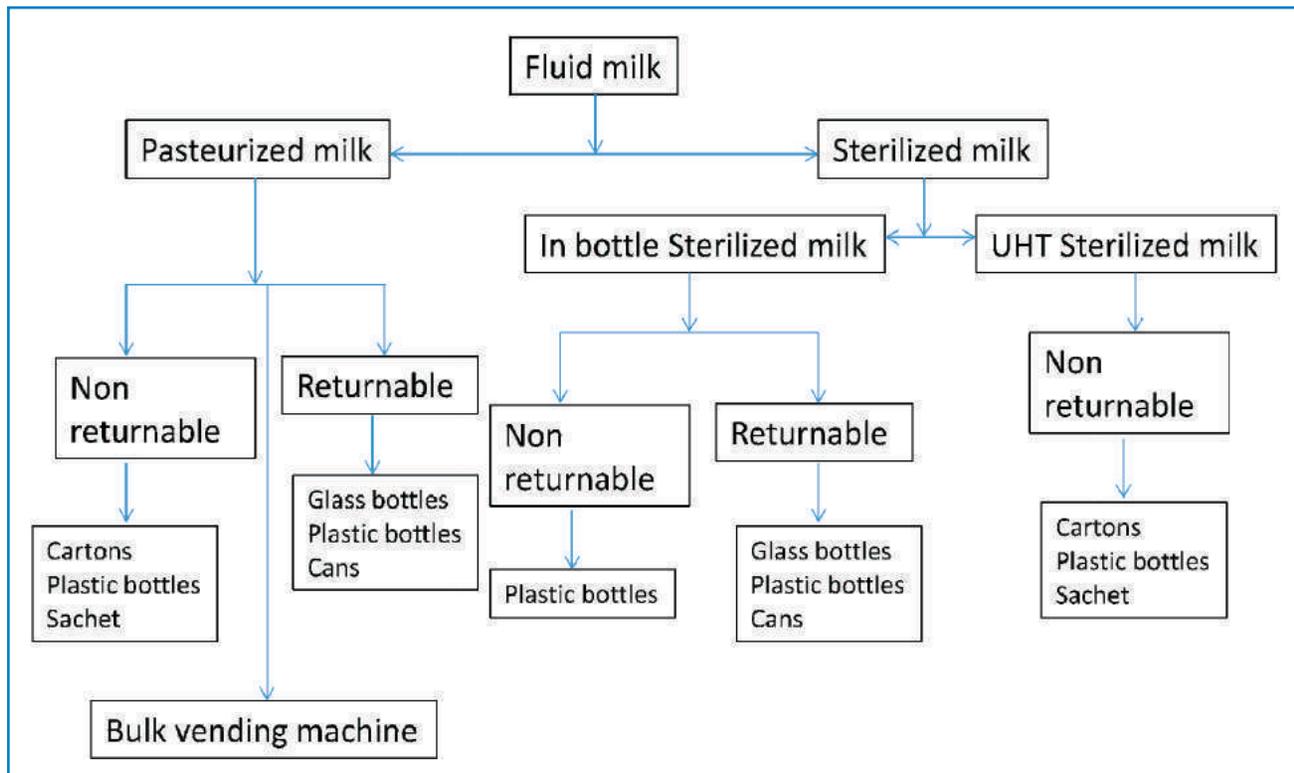


Fig.14.1. Dispensing of fluid milk

Pasteurization (HTST - high-temperature short-time - heating at 72°C for 15 seconds) followed by cooling to below 5°C and packing in different types of useable and single used containers for dispensing of milk.

Sterilization is achieved partly by using a more severe heat treatment (about 110°C for 20–30 min) and partly by applying the treatment after the bottle is filled and sealed. The milk packages are stored and distributed under ambient conditions.

UHT treatment is a process of high bactericidal effect, developed as a continuous flow process in which the milk is heated at 135°C–150°C for about two seconds followed by aseptic packaging in sterile containers.

Pasteurized milk in general, a shelf life of several days at a temperature below 10°C can be assumed. In-bottle sterilized milk can normally be kept for weeks and UHT milk aseptically packaged can be kept for several months under ambient conditions. Sterilized and UHT milks are commodities which by their very nature must be distributed to the consumer as a packaged product. Pasteurized milk, however, which is normally required to have a shelf life, under refrigeration, of only a few days can be distributed in wholesale quantities provided the necessary care is taken to prevent contamination.



Returnable packaging system: Returnable packaging containers are collected after use and washed and sterilized before re-filling. For pasteurized milk this must be refrigerated. Basic operation involved is washing and sterilization of container, filling and capping, crating, and storage in stacking. This is suitable for pasteurized milk (e.g. bottles, aluminium cans etc.) and sterilized milk (e.g. in bottles).

Single-service packaging system: Single-service containers are discarded after use. There is no collection and washing of the milk packages - only crates are collected and washed. Intermediate storage of packing material and filled packages is required and this must be provided in the plant. Two basic types of single-service containers are cartons and plastic sachets. This packaging system is suitable for pasteurized and UHT milk. Plastic sachets are usually pillow-shaped and made of low density polyethylene film. They may be reeled single or double film or lay-flat tube, the latter avoiding the necessity of making the longitudinal seam in the packaging machine. The material should be coloured to reduce light transmission and the colour code of packaging is used for identifying the milk type packed easily during dispensing.



Fig.14.2. Packaging of pasteurized milk in pouches



Fig.14.3. Storage of packed milk in cold store

Tetrahedral cartons made from polyethylene laminated paper board and packed in hexagonal plastic crates have been chosen as the model for analysis of a system of pasteurized milk packaging. This is very flexible type packaging system for dispensing the liquid milk.

Liquid milk is most commonly sold to the consumer by general grocery stores, selected dairy shops, etc. Distributors maintain the cold chain through refrigeration facilities for marketing pasteurized milk and sterilized and UHT milk is sold by retailers under conventional conditions.

Automatic Milk Vending Machines

This does not require packaging of milk and milk is directly dispensed into container provided by consumers. Cooled pasteurized milk is delivered by tanker to the vending station from where milk is directly purchased by consumer. This consists of a refrigerated room housing a milk storage tank of the requisite capacity. The milk is pumped from the tanker to the storage tank from which it is discharged as required through the coin- or token-operated dispensers like a petrol pump.



Activity

- Visit a pasteurized milk processing plant where liquid milk is processed and packed in retail packaging system.
- Visit a bulk milk vending system nearby city (e.g. Bulk milk vending system is operated in New Delhi by the National Dairy Development Board/ Mother Dairy, Delhi).

REVIEW QUESTIONS

1. Compare Bulk vending vs retail packaging of milk.
2. Single use and reuse packaging system of liquid milk.
3. What do you mean by in bottle sterilization of milk.
4. Differentiate UHT sterilization vs in bottle sterilization.
5. Give shelf life of pasteurized milk under refrigerated conditions.





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