



PASTEURISED MILK

Product/process description

Liquid milk has a high demand because of its nutritional value and pleasant flavour. Milk from cows has a creamy white appearance, but from goats and other animals has a yellower colour and a higher viscosity. Milk is sold universally for domestic consumption, for use with other products (eg. tea, porridge) and for use by other processors (eg. butter, cheese, yoghurt). For small-scale processors this is a relatively difficult product to produce as the process requires careful control over hygiene, a relatively high capital expenditure and short distribution channels to good markets as the shelf life (at 3-5 days) is shorter than most products.

Principles of preservation and methods of processing

The principle of preservation is the destruction of pathogenic and most spoilage bacteria and inactivation of most enzymes by heat during pasteurization at 63°C for 30 minutes. This time and temperature combination is described by regulations in some countries and should be carefully adhered to.

Process flow diagram

Process	Notes
Raw milk	Milk is immediately filtered, by use of filtering pads, soon after milking.
Cool	A surface cooler is used to cool the milk to stop further multiplication of micro-organisms in milk.
Pasteurise	Use batch pasteurizer. Control of temperature and time is very important for correct pasteurization to give expected shelf life. The vessel to be used should be fabricated from stainless steel or aluminium or bought locally from hardware shops. Milk should be heated with constant stirring to prevent the product overheating/burning at the bottom.
Cool	Cool quickly to temperature below 10°C. Cooling is done by placing the pan containing the hot product into another vessel which contains cold water. The product is stirred continuously until the temperature drops.
Pack	Pack into sterilized bottles and seal with sterile lids using a small filling and capping machine.
Store	Storage should be in either a cooler or a refrigerator at below 10°C. The milk should not be exposed to sunlight as this will heat it, promote rancidity of milk fat and destroy the vitamin riboflavin.
Transport	The transportation of milk from the storage room to the market should be in a refrigerated vehicle if the distance to be covered is long. But for a short distance which takes less than an hours drive, refrigeration is not necessary:

Quality control

Hygiene and raw material control

As milk is a low acid food that is very susceptible to spoilage and transfer of pathogenic bacteria to consumers, the methods used to handle milk at the dairy play an important role in determining the quality of the final product. The main hygienic requirements are:

- Thoroughly clean and sterilize (with chlorine solution or boiling water) all equipment and utensils before and after processing (NB aluminium equipment should not be cleaned with chlorine solution).
- Strict enforcement of personal hygiene measures.
- Filter milk after milking to remove visible dirt and any 'ropiness'.
- Cool milk immediately to control further growth of micro-organisms and enzyme activity

Process control

The main control points are the temperature and time involved in heating and cooling the milk. Overheating and slow cooling causes changes to flavour, colour and nutritional value; underheating may result in inadequate destruction of enzymes and micro-organisms leading to a reduced shelf life and the risk of food poisoning.

Packaging and storage

During packaging the most important quality control check is to ensure that filling equipment, bottles and caps are thoroughly cleaned and sterilized to prevent recontamination of the heat treated milk. This is especially important if the bottles are reused. Bottle fill weights should be accurately controlled and storage temperatures should be controlled below 10°C.

Equipment/materials:

- Filling machine
- Capping machine
- Bottle sterilising equipment
- Thermometer
- Filtering pads
- Milk cooler
- Refrigerator

References and further reading

Dairy Processing Practical Action Technical Brief

Flavoured Milk Practical Action Technical Brief

Small-scale Butter Making Practical Action Technical Brief

Yoghurt Practical Action Technical Brief

Yoghurt Incubator *Practical Action technical Brief*

Practical Action
The Schumacher Centre for Technology and Development
Bourton-on-Dunsmore
Rugby, Warwickshire, CV23 9QZ
United Kingdom
Tel: +44 (0)1926 634400
Fax: +44 (0)1926 634401
E-mail: inforsew@practicalaction.org.uk
Website: <http://practicalaction.org/practicalanswers/>

Practical Action is a development charity with a difference. We know the simplest ideas can have the most profound, life-changing effect on poor people across the world. For over 40 years, we have been working closely with some of the world's poorest people - using simple technology to fight poverty and transform their lives for the better. We currently work in 15 countries in Africa, South Asia and Latin America.