

ULTRA HIGH TEMPERATURE (UHT) PASTEURIZATION

As we have discussed previously, the UHT pasteurization process involves heating the milk at a temperature of 88°C for 3 sec. The equipment is much the same as the HTST units and the controls are also similar, but the operating temperature is higher. The holder is much smaller for smaller pasteurizing time.

Advantages

- Better texture of milk due to short holding time
- Greater bacterial destruction is possible.

When UHT treatment is needed for greater bacterial destruction or its beneficial effect on the body and texture of ice cream, then the treatment may be given following regular pasteurization.

Pasteurization and homogenization

- Since nearly all fluid milk and ice cream mix etc. are homogenized, homogenizers are integrated to the continuous pasteurization process.
- As the homogenization temperature must be at least 60°C, the homogenizer must be located either between the regenerator and heater or after the heater.

- The equipment, when installed, should not reduce the holding time below the legal minimum either when they are operating or when they are at rest.
- The capacity of the homogenizer can seldom be synchronized exactly with the timing pump unless a vented cover or other relief valve is employed, and then the pump operates at slightly greater capacity than the homogenizer.
- The usual practice now a day is to use homogenizer having 3-8% greater capacity than the maximum flow rate of the system. They are equipped with a recirculation, by-pass loop from the discharge line to the suction feed line.
- Here the timing pump regulates the flow rate of the system at all the times.

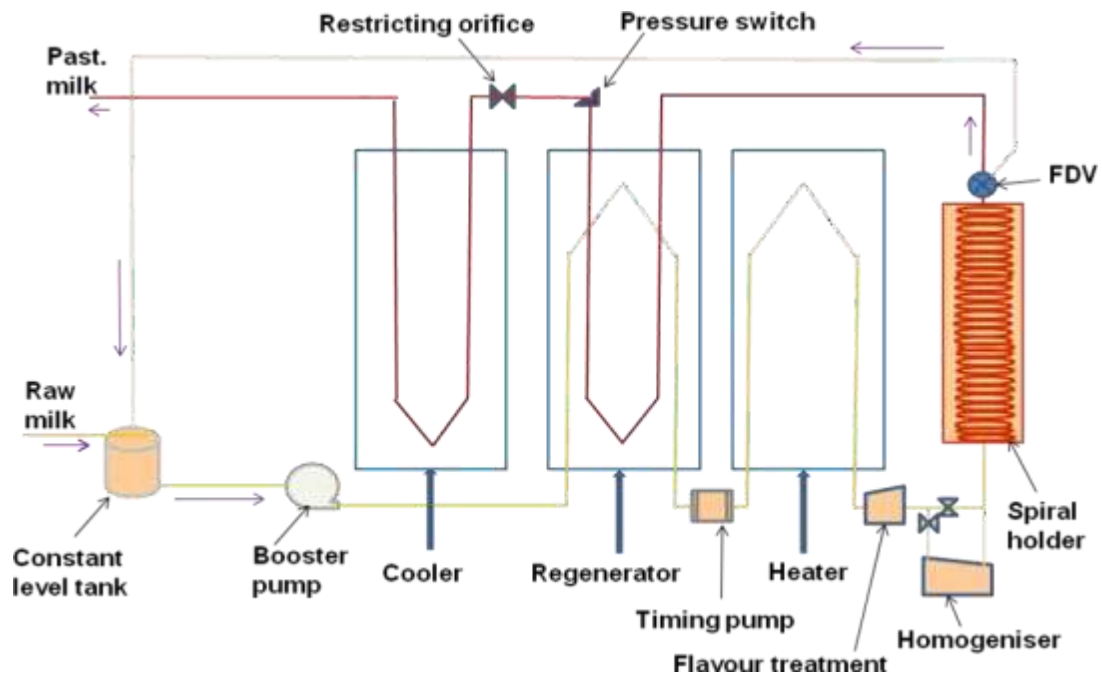


Fig. 5.10 Homogenizer incorporated in HTST pasteurization system

Like homogenizers, clarifiers and separators may also be integrated into the lines of HTST and UHT systems.

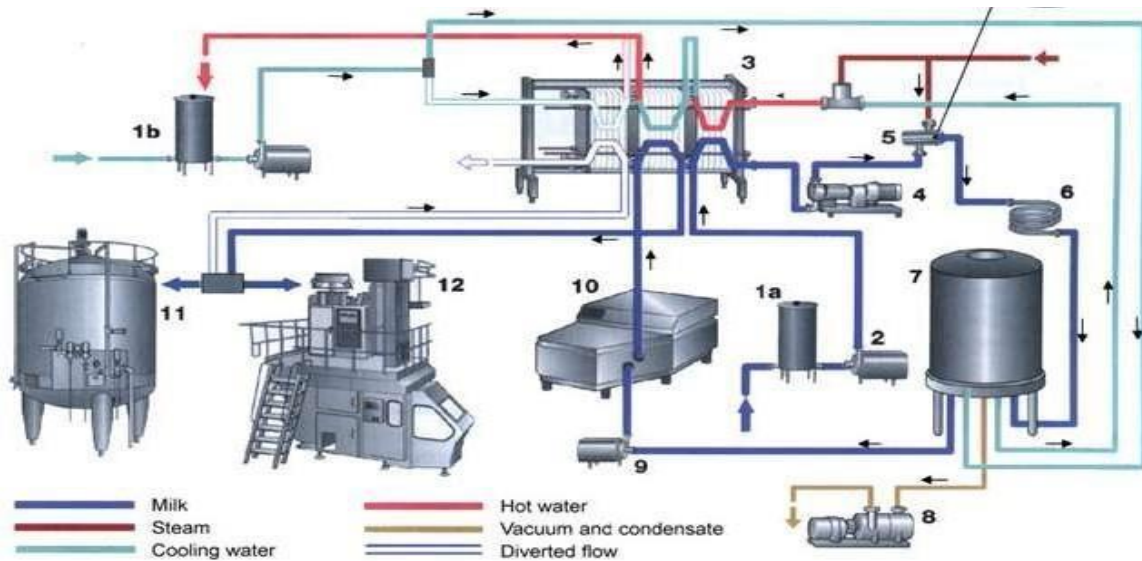


Fig. 5.11 UHT process with heating by direct steam injection combined with plate HE

(1a: Balance tank milk, 1b: Balance tank water, 2: Feed pump, 3: Plate heat exchanger, 4: Positive pump, 5: Steam injection head, 6: Holding tube, 7: Expansion chamber, 8: Vacuum pump, 9: Centrifugal pump, 10: Aseptic homogenizer, 11: Aseptic tank, 12: Aseptic filling)

Uperization (Ultra-pasteurization)

This is another method of pasteurization and the unit operations involved in the process are given in Fig. 5.12.

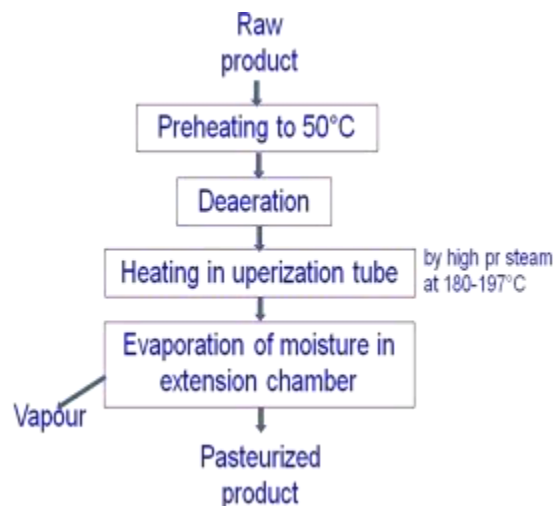


Fig. 5.12 Uperization process

The process involves heating the milk with high pressure steam at 180-197°C. The milk is heated to 150°C for less than 1 sec to obtain the desired effect of pasteurization.

Vacreation

- The process of heat treatment under vacuum in stainless steel chamber is known as vacreation.
- Vacreation is normally done for cream used in manufacture of butter.

The purpose of vacreation is to

- Kill bacteria,
- Inactivate enzyme,
- Remove undesirable odors and flavors,
- Deaeration to expel dissolved air and finely dispersed bubbles.

The system consists of a product feed pump, steam pressure controller, a temperature-recorder controller, vacuum controller, milk inlet controller, concentration ratio controller. The equipment is called 'Vacreator' (trade name adopted from Protech engineering, NZ).

Care and maintenance of pasteurizing equipment

- Keep all surfaces clean
- Routine preventive maintenance and adjust controls
- Proper care and lubrication of gasket
- Lubrication of motor, pump and other necessary equipments
- Thermometers and control equipments should be checked for accuracy. Replace if out of tolerance.

Flavor treating system of milk

The milk may contain flavors, which are mainly as follows.

- Flavor which is made of volatile component
- Weed and feed flavor

When it is desired to remove flavor, the following methods are adopted.

- Aeration
- Vacuum flashing or distillation
- Steam injection followed by vacuum washing

The volatile substances can be removed by aeration. The fat and soluble flavors are removed by steam washing method.

Types of flavor treating equipment

Vacuum alone type

- Deaeration with no vaporization of the product
- Vaporizing unit

Steam vacuum unit

- Temperature control steam supply type
- Excess steam supply type / steam washing

The vaporizing unit is placed immediately after the flow diversion valve.