Practical Exercise 8

Study of batch pasteurizer and HTST pasteurizer

Objective

To study batch and HTST pasteurizer.

Requirements

Batch pasteurizer and HTST (high temperature short time) pasteurizer

Principle

Pasteurization is a heat treatment to destroy all pathogenic microorganisms in milk. This process makes milk safe to consume. The method used for pasteurization are:

a. Batch method: Low temperature long time (LTLT) pasteurizer

In Low Temperature Long Time (LTLT) method, milk is heated to 63°C in a jacketed tank or vat with agitator. Milk in the vat is heated by using hot water or steam (Fig. 8.1). Milk is kept for 30 minutes at 63ºC temperature and then it is allowed to cool. This method is used for processing milk upto 5000 liters.

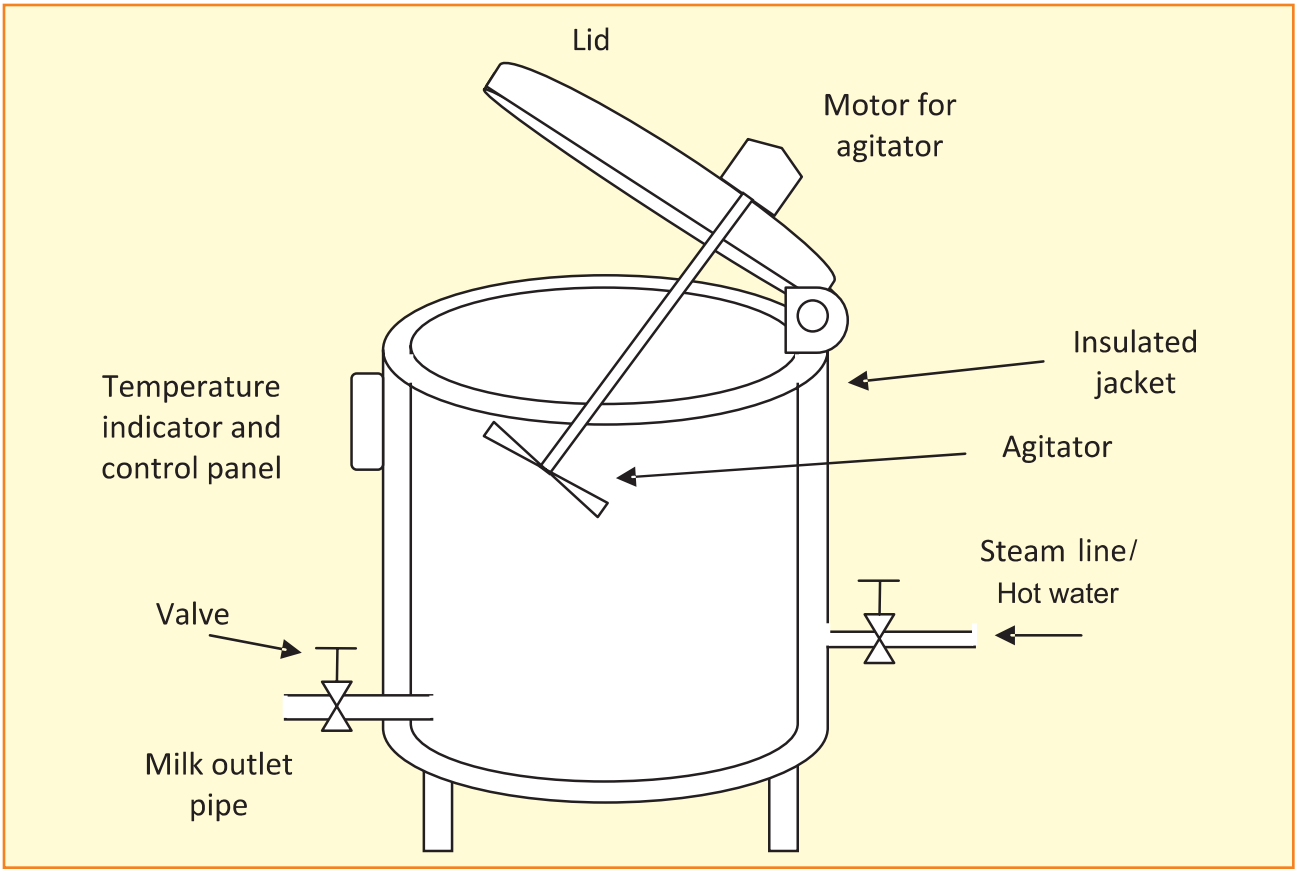

Fig.8.1. Batch pasteurizer

b. Continuous method: High temperature short time (HTST) pasteurizer

High Temperature-Short Time (HTST) pasteurization is the most widely used method for commercial processing of milk (Fig. 8.2 and 8.3). Milk is heated to a temperature of at least 72°C and is kept at this temperature for not less than 15 seconds. Milk is then immediately cooled to a temperature of less than 4°C.

Working of HTST pasteurizer

- Raw chilled milk which is at 4-5 °C is pumped into the balance tank of pasteurizer from the milk silos.
- Milk from the balance tank is pumped by a centrifugal pump to the inlet of regeneration section.

- In the regeneration section, temperature of raw milk is raised by the returning pasteurised milk. This helps to recover and utilize heat of the pasteurized milk. This process saves energy for heating raw chilled milk.
- Milk from the regeneration section then flows into the heating section. Milk is heated upto 72°C in the heating section and is kept for 15 sec in the holding tubes.
- A temperature sensor at the end of holding tube measures the temperature. If milk temperature is less than 72°C then the flow diversion valve (FDV) is set to divert flow mode. Milk temperature less than 72°C indicates that milk is not properly pasteurized. Milk flow is diverted by the FDV towards the raw milk balance tank.
- If the milk temperature is more than 72 °C then FDV is set to forward flow mode. Pasteurized milk flows toward the regeneration section where it cooled by the incoming raw milk.
- Milk enters the chilling section and milk temperature is lowered to 4 °C by the chilled water.
- From the chilling section milk flows towards the packaging section.

Fig.8.2. HTST Pasteurizer

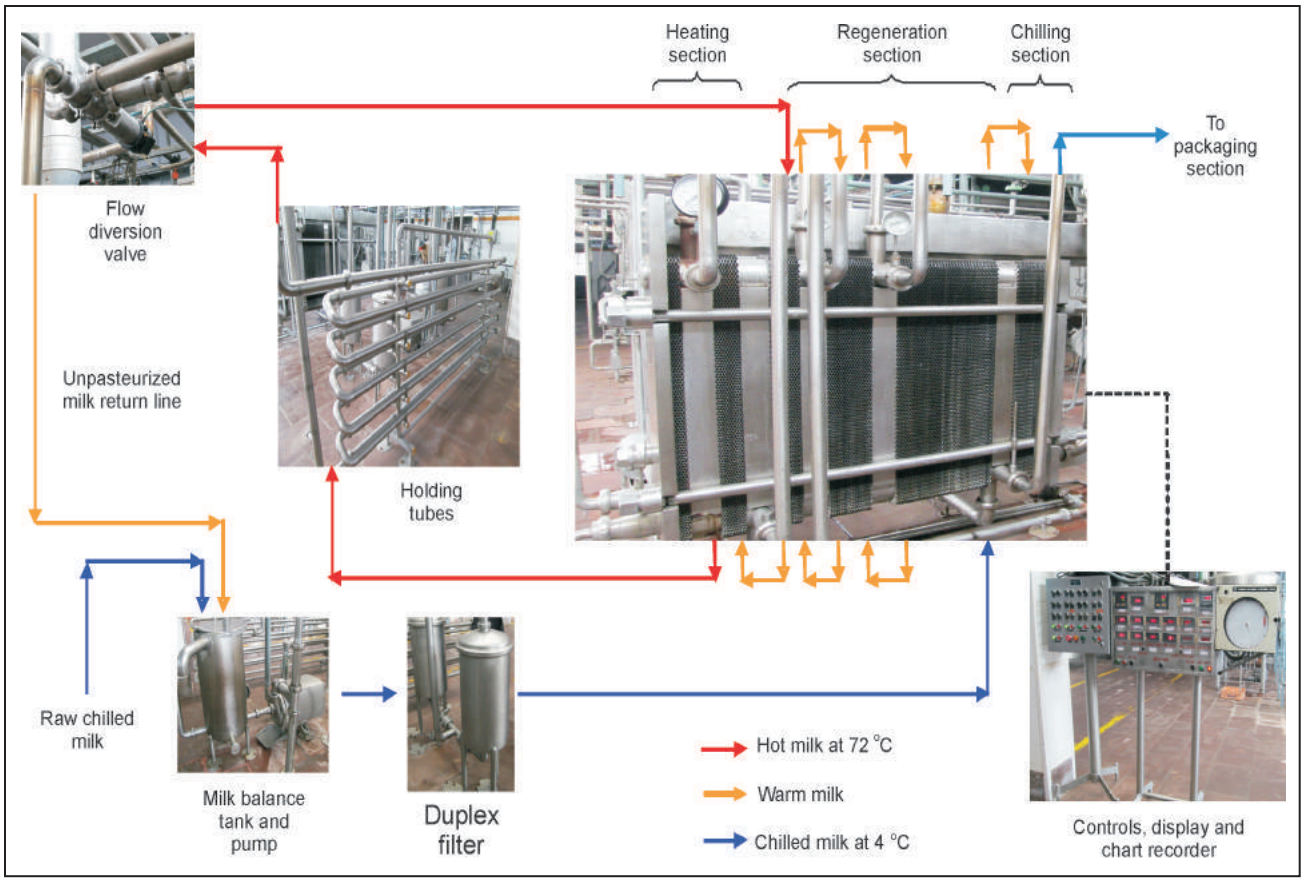

Fig.8.3. HTST Pasteurizer

REVIEW QUESTIONS

1. List differences between LTLT and HTST pasteurization?
2. What is the purpose of FDV valve?
3. Describe working of HTST pasteurizer?
4. What is the purpose of regeneration section?
5. With a neat diagram describe batch pasteurizer.