Practical Exercise 5

Study of cream separator

Objective

To study construction and working of cream separator

Principle

The fat content in raw milk varies widely from 3.5-6.0%. Cream has to be removed from raw milk to make standard, toned or double toned milk. Sometimes entire cream is removed which is known as skimming. This cream is removed from the whole milk by using cream separator (Fig.5.1 and 5.2).

Fig.5.1. Cream separator

Construction

Parts of A cream separator.

1. **Outer Casing:** It covers the motor, gear system and bowl assembly.
2. **Drive mechanism:** Drive mechanism consists of electric motor and gear system. Motor shaft is connected to

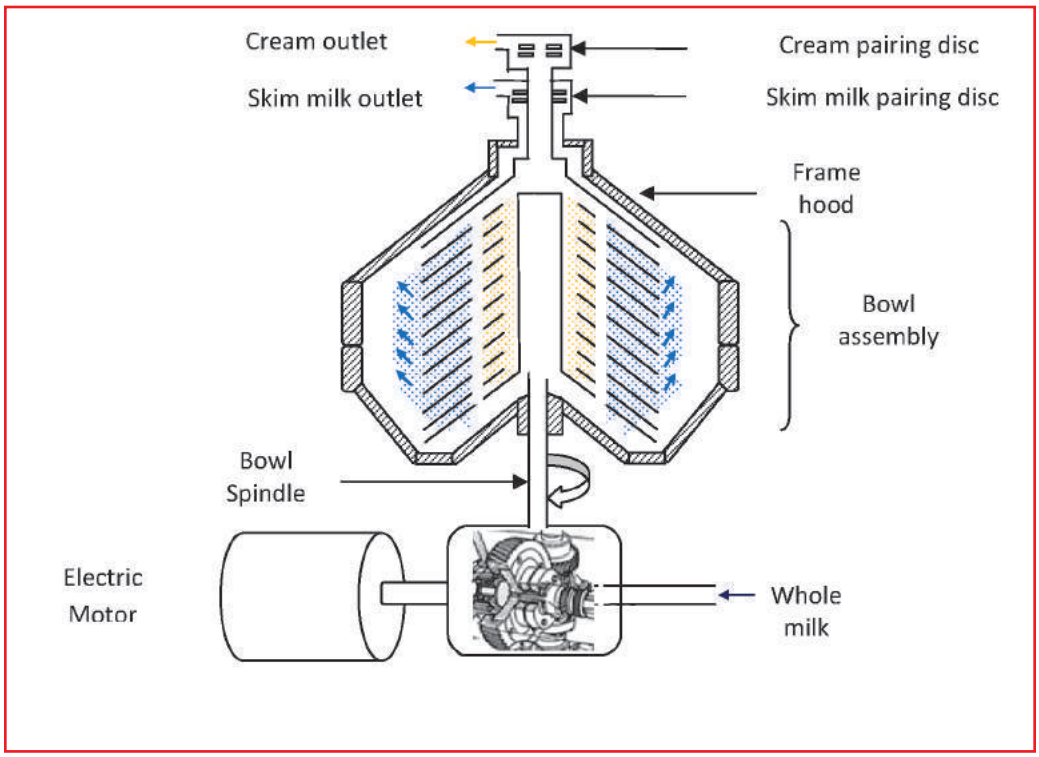

Fig.5.2. Construction of cream separator

a gear system which increases the rotational rpm (Revolution per minute) which is required for centrifugal separation. Advanced cream separators has provision to vary operational rpm to operate separator at different capacity.

3. **Bowl assembly:** It consists of bowl, bowl hood (cover) and disc stack

4. **Disc stack:** It has numbers of cone shaped discs which are stacked one above the other. The discs are made up of stainless steel. It has distribution holes which are positioned one above the other making channel for the ascending liquid

5. **Pairing disc or centripetal pump:** There are two centripetal pumps located at the top of disc bowl in a cream separator. One is for pumping cream and other is for skimmed milk. Centripetal pump has rotating vanes to pump milk or cream towards the outlet.

6. **Cream outlet:** The cream after separation through the disc stacks is discharged from the cream outlet.

7. **Milk/skim milk outlet:** Milk from which cream has been removed is discharged from the milk outlet.

Working principle

Milk is pumped into the cream separator at 50-55 ^{o}C which is the optimum temperature for cream separation. Milk enters the bottom of bowl assembly through the hollow bowl spindle. An electric motor rotates the bowl assembly at a high rpm. Due to high rotational speed and centrifugal force the heavier phase (milk plasma) flows away from the axis towards the bowl walls. This Milk plasma or the skimmed milk is pumped out by a centripetal pump toward the milk outlet. Simultaneously, the lighter phase (fat/cream) in the milk is separated from the whole milk and flows towards the axis of the bowl assembly. Cream is channeled upwards through the distribution holes in the disc and then it is pumped by the centripetal pump towards the cream outlet.

REVIEW QUESTIONS

1. What is the purpose of cream separator?
2. With a net diagram show various part of a cream separator?
3. Briefly describe the working principle of a cream separator?
4. What is the function of pairing disc?