EXPERIMENT 4 STUDY OF CREAM SEPARATORS

Structure

4.1 INTRODUCTION

A cream separator is used to separate milk fat for making cream. Cream separation is broadly classified into two groups: (a) Gravity separation, and (b) Centrifugal separation. Gravity separation work on the principle of gravitational force, which is acting on all the constituents, simultaneously when milk is left in a container undisturbed for some time. Non-fat milk fractions being heavier than fat assumes the lower position while fat i.e., cream resisn surface and form a cream layer.

Centrifugal cream separation work on the principle of centrifugal force whos magnitude is more than that of gravitational force. The centrifugal force throws the heavier portion away from the centre, i.e. skim milk. Simultaneously, there is another force called centripetal force which acts on the lighter portion, i.e. cream, and attracts it towards the centre. Thus we get cream and skimmed milk.

4.2 OBJECTIVES

- know the with different parts of a cream separators.
- study the constructional features of cream separators.
- understand the functions of the parts of the separators.

4.3 EXPERIMENT

i. Principle

a) **Gravity separation:** If milk is left undisturb for about 12 – 14 hours to form a cream layer at the to which is removed and collected separately as cream. The remaining portion is skim milk.

b) **Centrifugal separation:** A centrifugal cream separator consists of the principal parts like driving motor, axis, separator bowl, cream spout, skim milk spout, regulating float, faucet and supply tank. Other parts are bowl nut, skim milk notch, top bowl, cream screw, top discs, intermediate discs, bottom disc, distributor rubber ring and bowl bottom.

Whole milk enters into the separator bowl either through the faucet and regulating

float or directly from supply pipe. With the help of milk distributor, milk gets distributed over the separating disc in the form of thin film. The bowl revolves at a speed of 3000 to 5000 r.p.m. and centrifugal force is generated which outways the gravitational force due to which separated (skimmed)milk being heavier goes towards periphery. Cream being lighter comes towards the centre. Each separating disc has holes through the cream screw. The cream gets collected separately with the help of cream spout. Skimmed milk hits the inner valve of the bowl top as it is being separated by the individual discs which ultimately comes out through the skim milk openings provided at the bowl top.

ii. Requirements

Cream separator, spanner set, screw driver, bowl wrench, disc transfer rod, separator oil, tray, milk cans, thermometer, rubber mat etc..

iii. Procedure

1) Dismantle the following parts of a centrifugal separator
   - i) Supply can
   - ii) Milk regulating valve
   - iii) Sanitary float
   - iv) Bowl a) bowl nut, b) bowl shell c) skimming discs d) milk distributor e) rubber ring f) bowl base
   - v) Cream spout
   - vi) Skim milk spout
   - vii) Spindle driving gear
   - viii) Ball bearing sleeve
   - ix) Worm spindle
   - x) Thrust bearing
2) Draw a neat sketch of the cream separator indicating the name of each part.
3) Clean the bowl, discs, milk and cream spouts, and the machine frame.
4) Re-assemble the cream separator in the reverse order to that used for dismantling.

iv. Observations

Observe and Record the following:

1) Type of cream separator
   - i) Gravity /pressure
   - ii) Hermetic /separately driven.
2) Make of the separator
3) Driving mechanism
4) Bowl details and its speed of rotation (r.p.m.)
5) Purpose of the equipment
   - i) separation
   - ii) clarification
   - iii) standardization
6) The speed of the bowl and how it is attained

7) The location of the cream / skim milk screw.
8) Motor H.P.

v. Results

i) Rate of milk separation = …… Kg/hour
ii) Rate of cream separated = …… Kg/hour
iii) Fat % in cream = …… %
iv) Temperature during separation = …… deg.C.
v) Fat % in skimmed milk = …… %

4.4 PRECAUTIONS

i) While dismantling, place all parts on rubber mat.
ii) While refitting the bowl, see that the rubber gasket is placed properly in its groove.
iii) In case, the cream separator vibrates during running, stop the driving mechanism. When the separator comes to rest, find out the cause of vibration.