Practical Exercise 4

Chilling and storage of milk

Objective

To know about the chilling and storage process of milk

a) at village cooperative/ at big dairy form using bulk milk cooler

b) at chilling centre or at main processing plant

Principle

Raw milk is perishable commodity and have limited shelf life few hours at ambient temperature (around 30°C), because milk has all the necessary nutrition for required for microorganisms to grow. This leads to utilization of lactose (milk sugar) and production of lactic acid. This causes the development of acidity in milk and cause curdling of milk upon boiling or thermal processing. Therefore, milk must be stored at temperature less than 4°C as quickly as possible. This chilled storage restricts the growth of microorganisms and hence prevents or delays the acidity development in the milk. Milk is collected from the farmers or milk producers at village cooperative society, if the volume of milk collection is more than 2000 litres per day, then bulk milk cooler (BMC) is provided to a particular society or dairy form. If the if the volume of milk collection is less than 2000 litres per day than milk is collected in can and these can are unloaded at chilling centre or at main processing plant whichever is near to village milk cooperative society.

Requirements

Milk, plate chiller, storage tank, thermometer thermocouple

Procedure

a) At village cooperative / at big dairy farm using bulk milk cooler (BMC)

i. Open the lid of the BMC

ii. Thoroughly clean the BMC with detergent solution manually

iii. Pour the milk to BMC through filter cloth

iv. Close the lid of BMC

v. Set the temperature 4°C

vi. Turn-on cooling unit and agitator

vii. Record the initial temperature and time to reach 4°C

b) At chilling centre or at main processing plant

i. Receive the milk cans according to the society wise at reception dock

ii. Open the cans lid and record the sensory quality and also perform other platform tests if necessary

iii. Unload the accepted cans and collect the milk in dump tank

iv. Record the temperature and collect the sample for chemical and microbial analysis of milk

v. Turn-on the chilled water supply to plate-chiller

vi. Switch-On centrifugal pump connected to dump tank

vii. Turn the valve to allow the chilled raw milk flow to raw milk collection tank

viii. Switch-on the agitator of raw milk storage tank

Observations

Record the following observations

i. BMC capacity _____litres

ii. Raw milk temperature before dumping into BMC _____°C

iii. Final cooling temperature _____°C

iv. Time taken to reach the final temperature _____minutes

v. Dump tank capacity _____litres

vi. Capacity of milk pump (centrifugal) _____litres

vii. Temperature of milk in dump tank _____°C

viii. Temperature of milk after chilling _____°C

ix. Temperature of milk in raw milk storage tank _____°C

x. Capacity of raw milk storage tank _____litres

REVIEW QUESTIONS

1. What is the importance of chilling?
2. Briefly describe procedure of milk chilling at village cooperative/dairy farm.
3. Briefly describe procedure of milk cooling at chilling centre.
4. What is the temperature of milk chilling?
5. How will you determine BMC capacity?