

DEPARTMENT OF LIVESTOCK PRODUCTS TECHNOLOGY

# COLLECTION, CHILLING AND STANDARDIZATION OF MILK

**Dr. Jena Ram Gehlot**  
**Assistant professor**  
**Department of Livestock Products Technology**

# COLLECTION OF MILK

- ❑ In almost all developed dairying countries, production of milk is confined to rural areas, while demand is mostly urban in nature. Hence milk has to be collected and transported from production points in the milk-shed areas to processing and distribution points in cities.
- ❑ The common systems for collection (assembling ) of milk are as follows.
- ❑ By co-operative organization. Formed by individual or collective milking societies. Suits producers best as no profit making middlemen are involved.
- ❑ By contractors. Less return to producers.
- ❑ By individual producers.
- ❑ Practical for those situated near processing in dairies.

Note: a milk shed is the geographical area from which a city dairy received its fluid milk supply. The allocation of definite milk sheds to individual dairies for the purpose of developing the same is now being considered in India.

Milk collection cum chilling centers/depots. Normally attached to city dairies.

### **Objects:**

To preserve the quality of raw milk supplies, and

To provide easy transport to the processing dairy.

Location. This is guided by

Adequate milk production

adequate (potable) water supply

proximity to a good road or railway station

electric supply and

sewage disposal facilities.

## Major items of equipment

- Milk weigh tank/pan and weighing scale
- Drop (dump) tank with cover
- Cash washer
- Milk pump (sanitary type)
- Surface/plate cooler
- Refrigerating unit (of suitable capacity 7);
- Cold room (of suitable capacity);
- Milk testing unit, etc.
- Operational procedure. Essentially this is the same as a in a small dairy. On arrival, the milk is graded for acceptance/rejection, weighed, sampled for testing, cooled and stored at a low temperature until dispatch to the processing dairy.

# CHILLING OF MILK

## Cooling of milk

- ❑ Milk contains some microorganisms when drawn from the udder, their numbers increase during subsequent handling.
- ❑ The common milk microorganisms grow best between 20 and 40c. Bacterial growth is invariably accompanied by deterioration in market quality due to development of off flavors, acidity etc.
- ❑ One method of preserving milk is by prompt cooling to a low temperature.
- ❑ **Milk plate Chiller** : To maintain the quality of milk received in the Dairy/Chilling Center, it is chilled to 4°C by milk chiller. The chiller consists of stainless steel plates. Chilling is done by flowing milk from one side and chilled water from other side of the plates.

## Methods

❑ In can or can immersion method.:- From carrying pails, the not only is the milk cooled, but it also stays cool and a much smaller mechanical refrigeration unit is required.

### ❑ **Surface cooler**

❑ Advantages :

- i. Transfer heat rapidly and efficiently.
- ii. is relatively inexpensive
- iii. also aerates the milk, thus improving its flavor.

### ❑ **In tank or bulk tank cooler**

❑ Advantage: Permits collection of producers milk on alternate days.

# COOLING AND STORAGE OF RAW MILK

## Cooling

- ❑ As soon as milk is received in the plant, it is chilled to 5°C or below and stored cool till used, to prevent deteriorating in its bacteriological quality during the interim period.

## Object

- ❑ To maintain milk at a low temperature so as to prevent any deterioration in quality prior to processing/product manufacture.
- ❑ To facilitate building for the raw milk supply, which will ensure uniform composition
- ❑ To flow for uninterrupted cooperation during processing and bottling
- ❑ To facilitate standardization of the milk.

# IMPORTANCE OF CHILLING

- ❑ Chilling of milk means rapid cooling of raw milk to sufficiently low temperature so that the growth of micro-organisms present in milk is checked.
- ❑ In chilling process the temperature of milk should be reduced to less than **10 degree Celsius preferably 3 - 4 degree Celsius.**
- ❑ Milk inside the udder is almost sterile and as soon as it leaves the udder, it is exposed to atmosphere.
- ❑ The microorganisms gain entry into the milk, the moment it comes to atmosphere.



- ❑ Lower temperatures inhibit the growth of most of the microorganisms. It should be clearly understood that chilling process does neither kills microorganisms nor it renders milk safe for human consumption. It is only a means of checking the growth of microorganisms for sometime
- ❑ If milk has to be transported to longer distances, considerable time is involved between production and heating process. During this period milk must be protected from spoilage by the action of microorganisms.
- ❑ Chilling, therefore, is considered necessary soon after it is received at the chilling canters. The most effective means of controlling the growth of microorganisms without affecting the physico-chemical properties and nutritive value of milk is to chill it.

# METHODS OF CHILLING

- Can Immersion
- In Can Cooling
- Surface Cooler
- Tubular Cooler
- Plate Chiller
- Bulk Milk Cooler

# STANDARDIZATION OF MILK

- ❑ **Definition:** Standardization of milk refers to the adjustment, i.e., raising or lowering, of the fat and / or solids not fat percentages of milk to desired value, so as to conform to the legal or other requirements prescribed.
- ❑ **Problem:** How many parts by weight of 40% cream and 3% milk must be mixed to make milk testing 5% fat ?
- ❑ **Solution:** Hence, 2.0 parts of 40% cream when mixed with 35 parts of 3.0% milk will give 37 parts of 5% milk.

# PEARSON SQUARE METHOD

- ❑ The Pearson Square or Rectangle Method, also called Pearson's Square or Pearson's Rectangle, is a simplified method for solving a two variable simultaneous equation.
- ❑ While it is being used here with milk it is widely used in standardization calculations for sausage manufacture, jam manufacture and blending various drinks; anywhere where it is necessary to calculate the amounts of two components that need to be mixed together to give a final known concentration.

**Thank You**  
Thank You

REFERENCE : OUTLINES OF DAIRY TECHNOLOGY | SUKUMAR DE