Primary production of milk

Fig 4.13 An in-can cooler is placed on top of the milking bucket or any type of milk can.

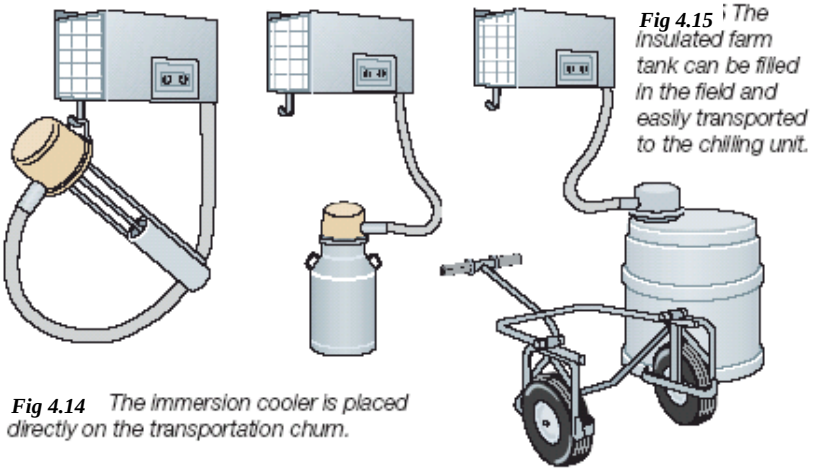

Fig 4.14 The immersion cooler is placed directly on the transportation churn.

Fig 4.15 The insulated farm tank can be filled in the field and easily transported to the chilling unit.

Cooling of milk

Efficient cooling of the raw milk after milking is the best way to prevent bacterial growth. Various cooling systems are available; the choice depends on the produced volume of milk.

An in-can cooler, shown in Figure 4.13, is suitable for small producers. It is much favoured by users of chilled water units and producers using direct-to-can milking equipment.

An immersion cooler is designed for direct cooling of the milk in churns as well as in tanks. The condensing unit is mounted on a wall, Figure 4.14.

The evaporator is located at the lower end of the immersion unit.

The immersion cooler can also be used for indirect cooling, i.e. for cooling water in insulated basins. The milk is then cooled in transport churns immersed in the chilled water.

Insulated farm tank for immersion coolers are available in both stationary and mobile types (Figure 4.15). When road conditions prevent access by tanker truck, a mobile tank can be used to bring the milk to a suitable collection point. Mobile tanks are easy to transport and thus suitable for milking in the fields.

Direct expansion tanks as shown in Figure 4.16 can as well be used for cooling and storage of the milk.

Cooling of milk on the farm

Milk leaves the udder at a temperature of about 37°C (98.6°F). Fresh milk from a healthy cow is practically free from bacteria. It must be protected from being contaminated after it has left the udder.

Unless the milk is quickly cooled down after extraction, it may soon be spoiled by micro-organisms, which thrive and multiply most vigorously at temperatures around 37°C (98.6°F). Milk should therefore be cooled immediately after it leaves the cow.

Figure 4.18 shows the rate of bacterial growth at different temperatures over time.

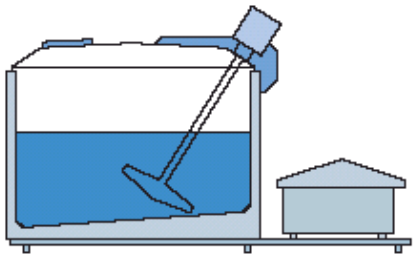

Fig 4.16 Direct expansion tank used for cooling and storage of milk.

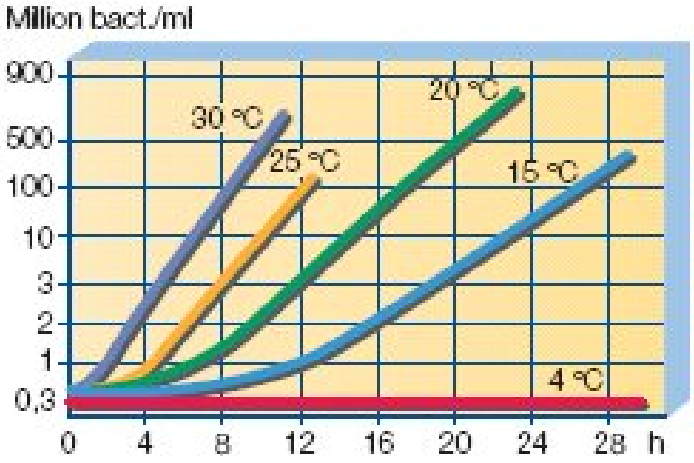

Fig 4.18 The influence of temperature on bacterial development in raw milk.

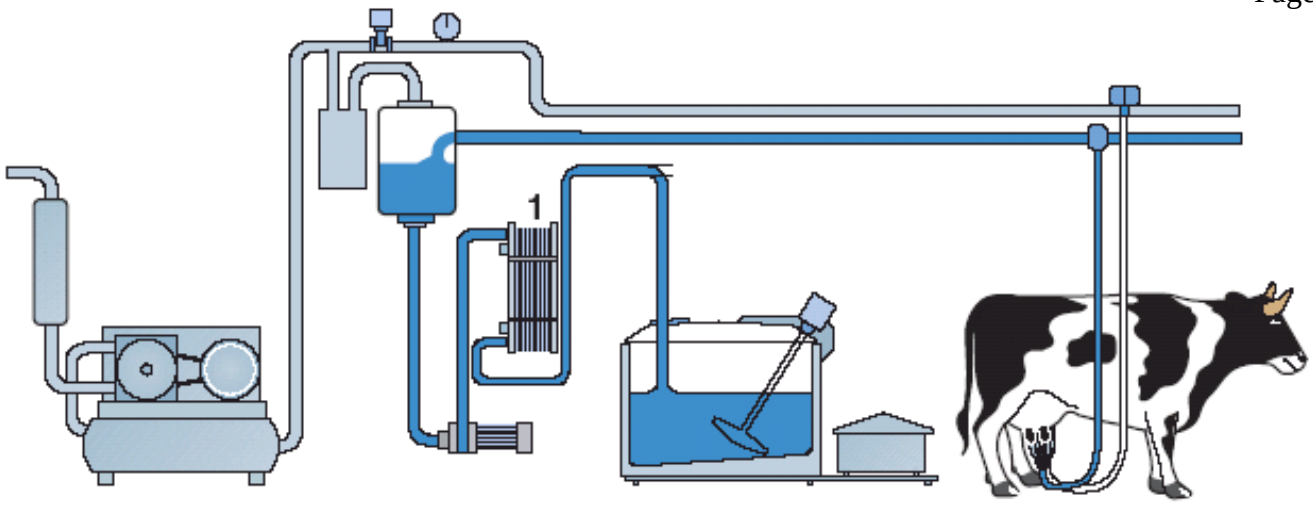

Fig 4.17 *Milking equipment on a large farm with heat exchanger (1) for rapid cooling from 37 to 4 °C.*

Farm cooling equipment

Where milking machines are used, the milk is commonly collected in special milk tanks at the farm (Figure 4.16). A wide range of milk tanks of various sizes are available with built-in cooling equipment designed to guarantee cooling to a specified temperature within a specified time. These tanks are often in most cases equipped with equipment for automatic cleaning to ensure uniform high standard of hygiene.

On large farms, and in collecting centres where large volumes of milk (more than 5,000 litres) (1321 gallons) must be chilled quickly from 37°C (98.6°F) to 4° C (37°F), the cooling equipment of the bulk tanks may be inadequate. In these cases the tank is mainly used to maintain the required storage temperature; a major part of the cooling is carried out by means of a heat exchanger in line in the delivery pipeline (Figure 4.17).

MilkoPet® milk suppliers typically use this method of cooling where the ideal milk temperature is reached rapidly from milking so that it is packed and ready for delivery to our customers in the most hygienic condition possible by world standards.

Frequency of delivery to the dairy

In former times, milk was delivered to the dairy twice a day, morning and evening. In those days the dairy was close to the farm. But as dairies became larger and fewer, their areas of collection increased and the average distance from farm to processing increased. This meant longer intervals between collections.

Collection on alternate days is common practice today in most of the large dairy countries with modern milk production. Collection every three or even four days is not entirely unknown.

The surrounding region where MilkoPet® milk is produced is primarily engaged in dairy farming where over the past decade farm and herd size has increased as has milk product exports to world markets. Milk is collected and delivered daily to our dairy factory by a fleet of purpose built refrigerated tankers for processing against customer orders within eight hours of arrival. This geographic advantage combined with environmental and climatic advantages in the MilkoPet® farming region, allow us to deliver quality milk to destinations throughout the world.

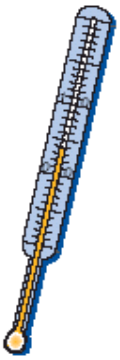

Fig 4.12 *Milk must be cooled to 4 °C as soon as possible.*

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