



THE ROLE AND IMPORTANCE COOLING THE MILK AFTER HARVESTING

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Abstract: In this article, notions were presented regarding one of the basic operations of the milk processing process, namely post-harvest cooling. Changes in milk produced by microorganisms do not occur in a short time from milking, due to the presence in its composition of a certain enzyme that inhibits the growth of bacteria, in particular of group A streptococci. The main enzymes possessing bactericidal and bacteriostatic action are lacteins 1,2 and 3. Beneficial action is only exercised in raw milk, in the case of heat-treated milk, the substances responsible for this activity are inactivated, that is why we can say that pasteurized milk is a better development environment for microbes than the raw one. Another important factor, care helps to delay the change of milk contaminated by microorganisms, is the process of cooling or under-cooling it, through which their multiplication is reduced, but also the activity of enzyme bacteria.

Keywords: cooling the milk, processing of milk, technological milk operations

1. INTRODUCTION

Fresh milk milks and milk in general is an excellent nutrient medium for multiplying microbes, the main factor being lactic bacteria present in milk, or which reach its contents during or after milking.

Cooling raw material immediately after milking is one of the measures to comply with European norms, adopted by Romania, in terms of milk quality and hygiene.

Fresh milk milks, kept at room temperature, 20-25°C, will be the environment in which lactic bacteria, will develop in force. These bacteria, who really like milk sugar (lactose), do not come from inside the cow udder but on his skin and nipples, on the surface of vessels and instruments used for milking, of air dust, as well as from the hands and the clothes of the milkers.

Therefore, even if all the cleaning measures of the utensils used are applied, some of the microbes will still get into the milk, either during milking or in the handling at raw material. Therefore, we must find ways to prevent microbes from being multiplied or even destroyed.

Microbes are eliminated only by boiling milk or by raising the temperature to at least 75 °C.

However, as this is almost impossible to achieve in most Romanian farms, the solution is to apply a method by which microbes will remain alive, but they will not multiply, and thus will no longer produce acids that damage the integrity of the milk. This can be done by cooling, bringing fresh milk to a temperature of 4-5°C.

2. TECHNICAL REQUIREMENTS

For cooling the milk tanks there are used tanks of various sizes and capacities, instant cooling systems and other systems which provide rapid and modern cooling. Automatic flushing tanks come to support farmers by saving time and energy, while limiting the exposure of what is inside to the shortcomings of the external environment.

Milk cooling systems are equipment that uses cold water, ice water or refrigerants as a thermal agent and which can be:

- pools for cooling the milk cans: are used to cool cold milk collected with cold water or water, being a cumbersome method with a great deal of work;
- cooling valves: there are vessels fitted with cooling coils or double walls through which the refrigerant circulates as chilled water or brine, agitation systems to reduce cooling time;
- heat exchanger: allows very rapid cooling of milk, the heat exchange being achieved by means of cooling agents, usually circulating in countercurrent with milk; constructively, they are tubular type coolers, tubular chillers and plate coolers.

The time to store milk at temperatures is the next:

- at 0°C - 20 days;
- at 2°C - 15 days;
- at 5°C - 10 days;
- at 7°C - 5 days;
- at 10°C - 2 days;
- at 16°C - 1 day;
- at 21°C - 0,5 days.

Cooling plates are heat exchangers made of plates with a working surface of 0.18 m², made of stainless steel 0.5 mm thick. They are built in two variants in walls and mounted on their own metallic support. These machines are currently used to cool milk in factories.



Fig. 1 Cooler



Fig. 2 Cooling tank

3. CONCLUSION

1. Quick and efficient cooling of milk is essential for preserving milk quality. The milk comes out of the udder at a temperature of about 35 ° C and the milking milk should be cooled immediately.
2. Milk has a natural resistance against bacteria immediately after milking, but only rapid cooling at a temperature of between 4 ° C and 6 ° C prevents or minimizes the subsequent development of microorganisms.

3. The best means of cooling milk at farms or at collection centers are the cooling valves (with indirect cooling, using cold agent or with an intermediate agent or with direct cooling, with refrigerant).

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