Seasonal changes of microorganism species composition of raw gathering milk

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Summary

Seasonal changes of common number of microorganisms in 1 ml of milk, of lactic acid, thermoduric, peptogenic bacteria and cryptogamous number were determined in raw gathered milk in conditions of separately taken milk plant.

Foreign microflora is one of the main factors which influence on milk stability and quality of dairy products. Initial microflora developed in raw milk before pasteurization is such important as residual and secondary one appeared after pasteuralization.

Microbiological characteristic of pasteurized milk is in direct dependence on quantity and quality composition of raw milk microflora. Two last indices are not being equivalent in different seasons. Therefore investigation of seasonal changes of bacteria quality and quantity in raw milk has practical significance.

We studied microflora of raw milk delivered by 5 suppliers of Bila Tserkva Dairy in different seasons. Common number of bacteria, number of lactic acid, thermoduric, peptogenic microorganisms and E.coli, enterococcus in 1 ml were determined in milk.

Seasonal changes of different types of bacteria are reflected in table.

According to table data, common bacteria number was from $1{,}1 \times 10^7$ to $5{,}1 \times 10^7$ per 1 ml.

Quantity of lactic acid microflora in winter-spring period was less in comparison with summer-autumn period. Their number was minimal in February. Number of lactic acid bacteria was elevated to summer strictly and reached the maximum in May-July and remained on high level to November.

Number of peptogenic bacteria was less than common bacteria number (1–3 % of common bacteria number).

Percentage of thermoduric bacteria was 10 % of common bacteria number. Maximum number of thermoduric bacteria was in summer months.

According to results of bacteriaskopy, quality composition of lactic acid bacteria was changed dependently on season too. Streptococcus forms prevailed on winter-spring period and thermoduric lactic acid bacillus – on summer-autumn period.

Number of putrefactive microorganisms in milk increased on winter and spring period (from November to April) and reached the maximum in March-May. This index

decreased in summer and autumn begining from June and became minimal in August-October (table).

Coli-titre was from $1x10^{-4}$ to $1x10^{-}6$ in spring-summer period and from $1x10^{-2}$ to $1x10^{-5}$– in autumn-winter period.

Titre of enterococcus was $1x10^{-3}$ during all period of investigation. This index was higher than $1x10^{-3}$ only in some batches of milk. Their presence in milk is an important sanitary characteristic of it. Intestinal bacillus and also enterococcus are obligate occupants of intestinal and their presence shows that pathogenic bacteria could come into milk.

Thus, certain appropriateness in change of main groups of raw milk microflora were observed. Milk has fewer components necessary for milk-acid bacteria (aminoacids, vitamins, growth substances) in winter-spring period when average temperature becomes lower. Such conditions are favourable for group of peptogenic bacteria which are more polyenzyme and unpretentious to chemical changes of milk composition in comparison with milk-acid bacteria. A milk-acid bacteria multiplies more rapidly than proteolytic bacteria in summer thanks to higher biological value of milk, higher temperature and more rapid growth.

Such heat-resistant species as cryptogamous bacteria occur in group of putrefactive microorganisms. Some products of methabolism of peptogenic microflora are thermostable. They remain in milk after pasteurization and cause taste and consistency defects in dairy products and also inhibit normal development of lactic acid bacteria applied in product with starters. Small quantity of cryptogamous bacillus *Bac. cereus* which is a pathogenic microorganism was revealed in raw milk. These bacteria can cause toxicoinfections on general contamination of product.

Conclusion:

1. Raw milk supplied on dairy has high bacteria number with predominance of acid-formed microflora.

2. Peptogenic bacteria have found an important part in such microbiological index as common bacteria number in raw milk in winter-spring period, lactic acid bacteria – in summer-autumn period.

3. The level of sanitary culture of farms must be elevate significantly to receive milk of high sort in accordance to requirements of State Standard DSTU 3662–97.