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# DETERMINATION OF THE COEFFICIENT OF THE INJECTOR-SLOT MILK HOMOGENIZER OF MILK WITH SEPARATE GIVING OF CREAM

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*Formulation of the problem.* Homogenization is used in most technological lines of dairy production. Its use ensures the production of a product with a high degree of dispersion, the average particle size of the dispersed phase according to regulatory requirements should be 0.8 μm [1]. However, grinding the fat phase to such a size in the most common valve homogenizers machines requires high energy consumption, amounting to more than 8 kWh/t of processed product [2]. A promising direction to reduce the energy costs of the process while ensuring a normatively justified degree of homogenization are jet homogenizers, the principle of which is based on creating the maximum difference between the rates of dispersion and dispersed phases of the product [3, 4].

*The main research materials.* Providing a technologically determined average diameter of fat globules after dispersion is no less important than reducing the energy costs of the process. In the laboratory sample of the jet-slit homogenizer of milk developed in TSATU dispersion occurs due to creation of the maximum difference of speeds of movement of dispersion and dispersed phases of a product [5]. During its operation, pre-skimmed milk at high speed enters the place of greatest narrowing of the confuser, where it is added through the annular slit the required amount of cream [6]. When moving in skim milk, the fat ball due to the action of significant tangential stresses is drawn in the direction of flow and when the resistance forces exceed the forces of interfacial tension is divided into several smaller structures [7].

The maximum phase difference in this type of installation is provided by applying the cream at the place of greatest narrowing perpendicular to the flow [5, 7]. In this case, the energy consumption and dispersion of the milk emulsion will be

directly related to the parameters of the cream supply channel for the overall assessment of the impact of which the coefficient of jet homogenization is introduced [5]. To determine the rational parameters and modes of operation of the dispersant, this indicator should take into account the fat content of the cream, the width of the annular gap and the speed of the dispersed phase of the product [1, 6].

In the course of analytical studies in the study of the average diameter of fat globules after dispersion, it was necessary to use the coefficient of jet-slit homogenization as a value that would take into account the influence of cream fat, ring slit width and cream feed rate on the dispersed characteristics of the finished emulsion. Ideally, the fat content of the cream should be 100%, they should be fed through an annular slit 0 mm wide at a speed of 0 m/s [4, 7, 8]. However, since it is not possible to reproduce such conditions in practice, it is necessary to take into account the influence of these factors on the average diameter of fat globules[5].

After conducting experimental studies, graphs of the influence of fat content, cream velocity and ring slit width on the corresponding coefficients were constructed. Empirical equations were found for each of the coefficients [3, 4, 8]. Taking them into account will ensure the selection of rational modes of operation of the jet-slit homogenizer of milk to ensure the production of dairy products with a technologically specified average diameter of fat globules. And this, provided that the simultaneous reduction of energy costs for the dispersion process will give the manufacturer the necessary advantages over competitors in the struggle to increase consumer demand [9].

*Results and conclusions.* To increase the degree of dispersion, which is achieved by increasing the coefficient of jet-slit homogenization, you should use high-fat cream, which should be fed through the annular slit of minimum width at a minimum speed. The reduction of the specific energy costs of the process, which reaches for jet machines 7–10 times in comparison with the valve homogenization, is achieved through the use of the principle of separate phase feed.

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