

HYDROMECHANICAL MEANS OF INTENSIFICATION OF UF-PROCESSING OF REDUCED DAIRY RAW MILK

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Of all the processes of membrane treatment of liquid food macromolecular polydisperse systems (in particular, plant extracts, dairy raw materials) more suitable ultrafiltration (UF). The UF process has such advantages as high efficiency, low power consumption, lack of phase transformations of raw material components. Unlike reverse osmosis and nanofiltration, the UF process proceeds at much lower pressure and at the same time provides much higher selectivity than microfiltration. Simultaneously with the concentration of nutritional solutions, the UF carries out their purification from low molecular weight substances, bacteria, maintaining a constant pH value. All of the above stipulates the need to use the process of ultrafiltration during the processing of fat-free dairy raw materials (buttermilk, skimmed milk, serum from sour cream cheese).

It should be noted that the process of UF-treatment of food liquids has certain disadvantages, the main of which is the formation of a polarization layer on the selective surface of the membrane.

Solving the problem of formation of a polarization layer can be in two main directions. The first is related to the intensification of the process of redistribution of particles of the dispersed phase from the surface of the membranes to the central axis of the flow of the separated food liquid, which allows to level the levels of their concentration near the surface of the membrane and in the volume of the solution. The second direction is based on setting the low speed of the UF-separation process, where the concentration polarization does not reach significant values.

Among the methods of active influence on the process of forming a layer of concentration polarization can be distinguished hydromechanical, physical and chemical.

Today, from all methods of active influence on the process of formation of a layer of concentration polarization, hydromechanical methods are most suitable in terms of preserving the native properties of the components of the non-fatty dairy raw material (Fig. 1). Despite the fact that in the literature a large number of methods and devices for mechanical

prevention of the formation of a polarization layer on the surface of membranes, their potential capabilities are far from exhausted.

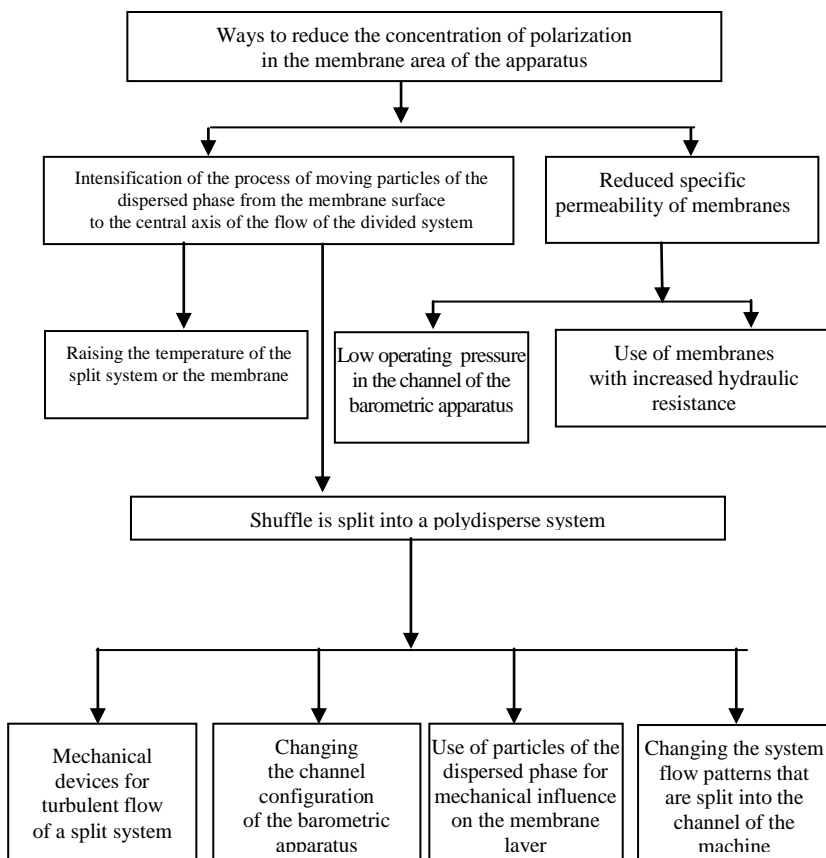


Fig. 1. Scheme of classification of methods for reducing concentration polarization for UF-separation of food liquids

Therefore, the basis for new developments should be the task of creating structures for devices for ultrafiltration of skimmed milk raw materials in order to maximize the elimination of the polarization layer of high molecular weight substances formed on the surface of semipermeable membranes, an increase due to this penetration (performance) of the membranes and, as a result, the intensification of the UV treatment process.