

ULTRAFILTRATION OF COTTAGE CHEESE WHEY FOR CLEANING OF NITROGENOUS SUBSTANCES

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Abstract

Wide industrial application of cottage cheese whey ultrafiltration purification technology from protein is hindered by the low efficiency of the main process due to the heterogeneity of the raw material and the lack of a reasonable technology for its pre-clarification. The aim of the study was to improve the technology of deep purification of cottage cheese whey from proteins by their preliminary partial isolation with a complex of natural polysaccharides and its subsequent ultrafiltration.

The main object of research was the whey produced at the production of cottage cheese and its permeate. Source of plant polysaccharides was liquid extract of Jerusalem artichoke (industrial type). Baromembrane separation processes were performed on certified laboratory. Experimental determination of the membrane permeability and selectivity, physical and chemical characteristics of the separated products was performed using generally accepted methods. Physical and chemical characteristics of the studied objects, permeate quality indicators, and the main parameters of the ultrafiltration process were established using standard research methods. The adequacy of the obtained equations was checked using Fisher criterion, the calculated value of which cannot exceed the table value, depending on the number of experiments performed and the number of factors studied. The equations coefficients were analyzed in accordance with the Student's criterion (at a significance level of 0.05 when $p = 0.95$).

The main results of the work performed were following: 1) the basis of the concept (as described in the article) of cottage cheese whey purification based on modification of its composition with liquid Jerusalem artichoke extract (about 30%) and subsequent ultrafiltration separation is formulated; 2) dependences describing the effect of operating pressure on the permeability and selectivity of ultrafiltration membranes with delay thresholds from 45 to 200 kDa were obtained experimentally; and 3) it was found that samples of permeate obtained in laboratory conditions, in comparison with traditional methods of cottage cheese whey clarification, had the high quality (residual nitrogen content - less than 0.088%, and dry solids - no more than 5.3 %).

The experiments proved that pretreatment of cottage cheese whey with liquid Jerusalem artichoke extract allows its subsequent membrane separation to increase the membrane permeability by an average of 16-21% compared to the traditional ultrafiltration method. The enrichment of cottage cheese whey with vegetable polysaccharides opens a new direction in the production technology of functional food products.

Key words: *Milk raw materials, Cottage cheese whey, Membrane separations.*