CONCENTRATION OF COTTAGE CHEESE WHEY PERMEATE BY NANOFILTRATION

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Abstract

Development of technology for deep processing of secondary dairy raw materials containing up to 50 - 55% of milk solids is an urgent scientific and practical problem in the conditions of constantly growing anthropogenic pressure of food production on the environment. The aim of the study was to develop one of the main stages of the full cycle of processing permeate technology obtained as a result of sequential preliminary and then ultrafiltration purification of cottage cheese whey and experimental determination of the main operating parameters of the used nanofiltration process.

Raw materials were fresh, developed in production conditions, cottage cheese whey, which is the main part of secondary dairy raw materials in the territory of the Russian Federation, Jerusalem artichoke and its ultrafiltration permeate. To determine the physical and chemical characteristics, quality indicators of semi-finished products and the finished product, the main parameters of the nanofiltration process, certified equipment, devices and standard research methods were used.

Results of the work performed were following: 1) the basis of the technology for the pre-purification of cottage cheese whey before its ultrafiltration separation was proposed; 2) a polymer membrane was selected experimentally and dependences were obtained describing the effect of the working pressure, the circulation rate of the separated system, and the content of dry substances in it on the permeability and selectivity of the nanofiltration membrane; and 3) it was found that the samples of nanofiltration (NF) permeate obtained in laboratory conditions differed from analogs developed without the pre-treatment stage, with a smaller number of nitrogenous compounds - up to 0.1%, a lower optical density - up to 0.28, and a higher lactose content up to 22.3%.

The experiments proved that pretreatment of cottage cheese whey with liquid Jerusalem artichoke extract, its subsequent ultrafiltration and final nanofiltration purification allows us to produce NF-permeate with higher quality indicators (from 300% in the content of total nitrogen, up to 125% in density and up to 120% in the content of lactose) compared to the traditional method of its production.

Key words: *Permeate, Baromembrane separation, Nanofiltration.*