SCIENTIFIC AND TECHNICAL ASPECTS OF THE COMPLEX TECHNOLOGY OF FREEZE-DRIED SEMI-FINISHED PRODUCTS FOR THE PRODUCTION OF ENTERAL NUTRITION PRODUCTS BASED ON SECONDARY DAIRY RAW MATERIALS

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Abstract

Regular consumption of functional food products developed on the basis of natural dairy raw materials, combined with reasonable physical activity, is becoming the norm of life of the modern working-age population and an alternative to the ever-increasing price of medical services. This is confirmed by the growing demand for food products, including long-term semi-finished products containing native whey proteins, made according to the "clean label" principle that is, made only from natural ingredients without artificial additives. The aim of this research is formation of the basic principles of the complex technology of complete processing of whey on the basis of its membrane fractionation and freeze-drying for the production of long-term storage semi-finished products used in the production of products for enteral nutrition.

The main raw material for conducting experimental studies is fresh cottage cheese whey obtained under production conditions (Russian standard (GOST R) 53438-2009). For experimental work, we used certified laboratory equipment (KrosFlo® Research IIi (Novaset LS 0.1 microns and 300 kDa): Alfa Laval TestUnit M20 (NF 200 Da), Olympus CX41, VELP UDK 149, MilkoScan FT 120). When determining the physicochemical properties of raw materials, semi-finished products and finished products, standard and generally accepted methods were used.

The efficiency of application of a complex of processes involving sequential baromembrane purification of cottage cheese whey based on the use of micro-, ultra -, and nanofiltration and subsequent freeze-drying of concentrated permeate and retentate of cottage cheese whey is proved. Optimal parameters of the main processes of processing of raw materials are established. The physicochemical and organoleptic parameters of the obtained freeze-dried samples of permeate and retentate were determined. Analysis of the results of experimental studies showed that freeze-dried permeate and retentate of cottage cheese whey obtained in laboratory conditions in accordance with the developed complex technology surpass the nearest analogues in the following main indicators: structure, solubility, color, taste, increased 2 - 3 times shelf life (up to 24 - 25 months).

The results of experimental studies had shown that in their main quality indicators, freeze-dried NF-permeate UF-retentate is significantly superior to the nearest industrial analogues. This gives reason to believe that it is advisable to use the main results of the research performed in the development of the formulation and production technology of long-term storage semi-finished products and finished products for enteral and functional nutrition.

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