

# DEVELOPMENT OF THE TECHNOLOGY OF A NEW GENERATION FUNCTIONAL PRODUCT FOR SPORTS NUTRITION

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**Introduction.** In recent years, the concept of human recovery and the prevention of aging of the body through the use of a diet of sour-milk products develops very rapidly. The interconnection of the macroorganism and its microflora is very close. Normal microflora affects the structure of the intestinal mucosa and its adsorption capacity, participates in the exchange of fatty acids, lipid metabolism, bile acids, water-salt and gas exchange. Microorganisms of the gastrointestinal tract carry out a number of enzymatic reactions, synthesize vitamin K, vitamins B, nicotine, folic and pantothenic acids. The insufficiency of representatives of healthy microflora causes weakening of both cellular and humoral factors of immunological defense. Normal microflora, due to pronounced antagonistic activity, protects the body from pathogenic microflora. The imbalance of human microbial ecology leads to serious illnesses both in the gastrointestinal tract in particular and in the body as a whole. Therefore, the development of fermented beverages is relevant low fat content and high content of vitamins, flavanoid organic acids, etc. The valuable raw material in this aspect is the cranberry. Using it as a part of food products will increase the protective functions of the body and fight against pathogenic infectious agents.

**Aim.** To develop of the technology of a functional product for sports nutrition based on propionic acid bacteria enriched with cranberry extract and honey.

**Materials and methods.** The following research objects were selected for the development of the technology of the functional product: milk with a reduced content of fat 1,5%, honey, fresh cranberry and lyophilized dried starter of propionic acid bacteria. Modern methods of research are chosen for the development of optimal technology of the functional product on the basis of low-fat milk, honey, cranberry extract and propionic acid bacteria. Physico-chemical methods of research: determination of titrated acidity; determination pH. Microbiological methods of research: Koch cup method; Gram stain. Technological methods of research: spectrophometric method; determination of the degree of syneresis. Organoleptic methods: sensory profile. Statistical processing of results was carried out using the Excel software for Windows. The statistical significance was  $p \leq 0.05$ .

**Results and discussion.** Based on the conducted physico-chemical, microbiological and biotechnological research methods, the composition of the

fermented product on the basis of propionic acid bacteria and honey has been developed. Based on this research it was substantiated that for the enrichment of the sour milk beverage of the developed composition with vitamins, anthocyanins and pectin substances, it is expedient to add 5% of the cranberry extract obtained by infusion of the extract at a temperature of 45 °C.

Fermentation is an important stage in the process of obtaining a functional fermented product. Fermentation parameters include temperature and time of fermentation and aeration mode. The temperature of the fermentation was chosen according to the literature: 30 °C. This is the optimal temperature for the highest physiological activity of *Propionictarium freudenreichii* subsp. *shermani*. Several experimental samples were prepared to determine other values of the fermentation parameters.

It should also be noted that the aerobic conditions of cultivation did not meet the requirements of propionic bacteria – their amount practically did not change since the beginning of fermentation, titrated acidity has changed slightly, and the sour milk clot has not been formed for 24 h, therefore, only the samples obtained under anaerobic fermentation conditions were further studied. The formation time of the sour-milk clot in all samples of the beverage obtained in anaerobic conditions was in the range of 10 to 14 h and did not differ significantly depending on the amount of added starter.

Therefore, we can conclude that the optimal fermentation parameters for obtaining a sour milk drink based on propionic acid bacteria are: the temperature of the fermentation – 30 °C; souring time – 12 h; conditions – anaerobic.

To select and substantiate the feasibility of using a cranberry extract, an experimental study was conducted to determine the optical density of solutions using the Ulab 101 spectrophotometer, and using the direct dependence between the optical density of the compounds and the antioxidant activity (total amount of phenolic compounds), the best extract containing the highest amount of biologically active substances was chosen.

Thus the following parameters for the preparation of cranberry extract were selected to be added to a fermented drink: the hydromodule is 1:10; insertion at a temperature of 45 °C; extraction time – 90 min.

**Conclusions.** Based on the technological, physico-chemical, microbiological tests, technology of the functional fermented product on the basis of propionic acid bacteria enriched with cranberry extract and honey was developed. The technological process of this product consists of the following operations: reception and preparation of raw materials, normalization of the fat content; homogenization, pasteurization and cooling of the mixture; fermentation; preparation of cranberry extract; cooling and mixing of the bunch; bottling, packaging, marking and pre-cooling of the product.