

SECTION 1. Technical sciences

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**BIOLOGICALLY ACTIVE SUBSTANCES OF MILK-PROTEIN
CONCENTRATES WITH BERRY PUREE**

Today one of the most important problems in food industry is the lack of dietary protein, especially of animal origin. The annual deficit of proteins in the world is estimated at least at 15 mln. T., and its average rate of consumption in recent years has decreased by 17 ... 22%. Partly the solution the problem of protein deficiency is possible through the use of technology of milk-protein concentrate (MPC) received with precipitation of proteins of the dairy industry by-products, as buttermilk, whey and skim milk. Products made with the use of such concentrates will have high nutritional and biological value, and balanced amino acid composition.

However, despite the significant benefits the consumption of products with a high content of proteins can cause a number of problems related to the functioning of the body. Thus, by increasing the number of amino acids, high content of proteins will shift the acid-base balance to the acid side, what may cause the reduction of the assimilation of minerals, the lowering of immunity, the appearance of joint pain and other signs of acidosis. In addition, a harsh increase of proteins in the consumption can lead to the lowering of blood pressure, to the exhaustion of cardiovascular and central nervous systems and to the violation of vitamin metabolism.

To prevent such negative consequences we have developed the technology of MPC with the use of plant material as a proteins coagulant. The obtained MPC has a balanced amino acid composition, high biological value of proteins, and also contains a number of vitamins, minerals and nutrients which can increase the immunity and adjust negative changes in the body.

The particular importance among the nutrients that devolve to MPC from plant material have organic acids and P-vitamin substances. Organic acids, despite their negligible content in products, have significant biological activity and significantly affect the metabolic processes, participate in shift of body's pH to the alkaline side, prevent transformation of excess carbohydrates to fat, stimulate the output of ATP, thereby saturating the cells with energy, and also have antiseptic, detoxification, antiviral, antimicrobial and antioxidant properties. Bioflavonoids and other P-vitamin substances are also characterized by significant radioprotecting and antioxidant properties. In addition, they increase the resistance of the body, strengthening walls of capillaries and reducing their insight, facilitate the synthesis and accumulation of ascorbic acid and have the ability to prevent anaphylactic shock.

This work provides the results of studies of organic acids and P-vitamin substances content in cranberry and viburnum puree, used as coagulants, and in MPC obtained with

their use. The applied methods for determining of P-vitamin substances are based on measuring of optical density of studied material's hydro-alcohol extracts. Measurements were taken with the use of photoelectric colorimeter KFK-2. The content of organic acids was determined by titration method. To calculate the content of P-vitamin substances and organic acids we used calibration graphs, analytical and numerical methods. The results are presented in Table. 1.

Table 1. The content of organic acids and P-vitamin substances, g / 100 g

The content of substances	Cranberry puree	Viburnum puree	MPC with cranberry puree	MPC with viburnum puree
Organic acids, %	17,14	15,88	1,2	1,09
Anthocyanins, mg	320,99	281,90	23,87	15,05
Leykoantotsianins, mg	1374,09	1611,38	58,00	38,91
Flavonols, mg	210,47	420,50	26,83	51,21
Catechins, mg	1055,75	976,18	68,00	53,21
Other P-vitamin substances, mg	326,08	539,17	2,82	3,85

As one can see from the presented data, MPC, obtained after precipitation of buttermilk proteins with the use of vegetable puree, contains organic acids and P-vitamin substances of raw materials, and the degree of conversion is an average 4 ... 8%, despite on the rather strict conditions of thermocoagulation. Making the part of MPC these compounds assist the equalization of the acid-base balance in the body, improve the absorption of vitamins and minerals, contained in the concentrate, and, due to their bactericidal and fungistatic properties, prolong the expiration date of the resulting products.

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