ECRONICON OPEN ACCESS

EC NUTRITION
Short Communication

About Use of Serum in Creation of Food Carbohydrate-Protein Gel for Athletes

Alla L'vovna Novokshanova[1]*, Nataliya Olegovna Matveeva[2] and Andrei Alekseevich Kuzin[3]

[1]Associate Professor, Department of Milk and Dairy Products Technology, Federal State Budgetary Educational Institution of Higher Education "Vologda State Dairy Academy Named After N. V. Vereshchagin", Russia

[2]Post-graduate Student, Department of Milk and Dairy Products Technology, Federal State Budgetary Educational Institution of Higher Education "Vologda State Dairy Academy Named After N. V. Vereshchagin", Russia

[3]Associate Professor, Department Technological Equipment, Federal State Budgetary Educational Institution of Higher Education "Vologda State Dairy Academy Named After N. V. Vereshchagin", Russia

***Corresponding Author:** Alla L'vovna Novokshanova, Associate Professor, Department of Milk and Dairy Products Technology, Federal State Budgetary Educational Institution of Higher Education "Vologda State Dairy Academy Named After N. V. Vereshchagin", Russia.

Received: January 08, 2020; **Published:** January 17, 2020

Specialized food products for athletes are a relatively new direction in the food industry. There is no clear merchandising classification for this category of food products.

In accordance with the recommendations of the European Commission's Scientific Committee on Nutrition, food for athletes by nutrition and energy value is conditionally divided into 4 categories: foods rich in carbohydrates, carbohydrate-electrolyte solutions, protein complexes and supplements.

From dairy raw materials, sports products mainly use milk protein concentrates, whey protein concentrates, casein and caseinates, partially hydrolyzed casein concentrates, whey proteins or their various combinations and mixtures, as well as simply powdered whey or skimmed milk powder. Mostly specialized food products for athletes are dry mixes, available in powder and tablet form. In addition, an analysis of the market for products in this segment shows that most of them are biologically active additives, the use of which in the diet of athletes is limited and should not exceed 5 - 10% of the total calorie intake [1,2]. Thus, the remaining 90 - 95% of calories must be obtained through the use of the usual high-grade food products, including dairy. This confirms the relevance of the creation.

Functional products using components of milk, ready for direct consumption and not having restrictions in recommendations for consumption.

A critical point in the dairy industry is whey, which, despite its unique composition, is not fully used in food production. The reason lies in the high water content, for the removal of which or the concentration of solids, significant production and financial costs are required. When developing products using whey, we solve one problem from two sides: firstly, we rationally use secondary raw materials, and secondly, we expand the line of new functional products with high biological and nutritional value.

The aqueous phase of whey concentrates all hydrophilic compounds of milk, the most important of which are lactose, free amino acids, vitamins and mineral compounds. Almost all mineral compounds belong to biogenic elements with an established mechanism of action and a recommended daily requirement.

In connection with the stated in the Federal State Budgetary Educational Institution of Higher Education "Vologda State Dairy Farming Academy by N.V. Vereshchagin "began research on the selection of the necessary food ingredients, the creation of recipes and optimal technological solutions when using curd whey in the production of specialized foods of carbohydrate-protein profile for sports nutrition.

It is intended to use cottage cheese whey as part of a milk gel, since this form is a convenient consumer solution for a sports product that is ready for use without prior culinary preparation. Also, the advantages of carbohydrate-protein gels include: a variety of flavors, a high assimilation rate, a high concentration of carbohydrates in a compact format, a convenient consistency for swallowing, and the use of the gel does not create a feeling of an overfilled stomach.

At present, the physicochemical composition of whey obtained in the industrial production of cottage cheese has been studied. The content of protein, fat, carbohydrates was determined using an analytical analyzer, amino acids were identified by high performance liquid chromatography (HPLC), the mineral composition was studied by potentiometric method. The data are presented in the table.

Indicator	Curd Whey
Total salinity (dry residue in water), %	5,68 - 5,76
Mass fraction of protein, %	0,42 - 0,50
Mass fraction of carbohydrates, %	4,08 - 4,12
Mass fraction of fat, %	0,03 ± 0,07
Potassium, mg/kg	1265,7 - 1289,1
Sodium, mg/kg	403,4 - 483,9
Magnesium mg/kg	53,6 - 67,4
Calcium mg/kg	520,2 - 558,6

Table: *Composition of curd whey.*

It was found that due to the low concentration of protein in serum, the percentage of satisfaction with the daily amino acid requirement of such a product is relatively small and is at least 1.78% for threonine and at most 8% for isoleucine.

To increase the solids content of the product, increase its nutritional density and biological value, it is planned to strengthen the protein component of the product only with milk proteins. To obtain a gel consistency as a stabilizing additive, the possibility of using a number of non-starch polysaccharides was studied. It is supposed to improve the organoleptic characteristics of the product by introducing fruit and berry syrups, which also serve as an additional source of non-dairy carbohydrates. As you know, a combination of different carbohydrate sources is welcomed in sports products, which contributes to a better restoration of carbohydrate reserves during muscle load [3-5].

Thus, on the basis of studies on the design of protein-carbohydrate gel formulations, it is proposed to use curd whey as a basis, technological and functional ingredients are selected.

The designed product will be protein, easily digestible, with increased nutritional value.

Implementation of the project will allow: to increase production and social efficiency; to ensure the targeted use of dairy raw materials in a closed technological cycle; increase the load of industrial equipment for dairy enterprises; expand the range of food products aimed at athletes and people with increased physical activity.

Bibliography

1. Vorobyev VM., *et al*. "Classification and characterization of specialized products for the nutrition of athletes". *Nutrition* 79.6 (2010): 64-68.

2. Nikityuk DB., *et al*. "The mineral composition of carbohydrate-electrolyte drinks, vitamin-mineral complexes and dietary supplements for athletes". *Nutrition* 81.4 (2012): 72-76.

3. Jentjens RL., *et al*. "High oxidation rates from combined carbohydrates ingested during exercise". *Medicine and Science in Sports and Exercise* 36 (2004): 1551-1558.

4. Jeukendrup AE. "Carbohydrate intake during exercise and performance". *Nutrition* 20 (2004): 669-677.

5. Jeukendrup AE and Jentjens R. "Oxidation of carbohydrate feedings during prolonged exercise: current thoughts, guidelines and directions for future research". *Sports Medicine* 6 (2000): 407-424.

Volume 15 Issue 2 February 2020