

ASSESSMENT OF THE SIGNIFICANCE OF THE BIOLOGICAL VALUE OF ATHLETES' DIETS IN A HOT CLIMATE

Tukhtarov Bakhrom Eshnazarovich

Samarkand State Medical University

Aparna Nellikkal Sasi

Samarkand State Medical University

SUMMARY: It has been established that the balance of nutrients on the changed background of nutrition has reached the optimal level and amounted to 1:1.1:4.1, against 1:1.2:4.9 on the actual background of nutrition. The optimal ratio of nutrients in the average daily diets of athletes against a changed background of nutrition is achieved due to an increase in the nutritional norms of animal proteins, vegetable fats and a decrease in carbohydrate sources. The total biological value of average daily diets on a changed background of nutrition in weightlifting athletes increased in the summer-autumn season to $88.7 \pm 1.0\%$, from $72.4 \pm 1.0\%$ on the actual background of nutrition, and in the winter-spring season to $82.8 \pm 1.0\%$.

Key words: professional athletes, weightlifting, hot climate, diets, proteins, fats, carbohydrates, vitamins.

According to well-known nutritionists, the biological value of diets characterizes the strength of biological impact on a living organism in the form of the ratio of the sum of biologically active substances contained in food products to the average daily requirement of the body [1,2,3].

The purpose of the research was to substantiate the optimal options for the average daily norms of a set of products for weightlifting athletes in a hot climate based on the biological value of diets.

Research methods. The actual nutrition of athletes was studied by the method of 24-hour observation and survey at training bases. For statistical analysis, 720 menus were used in 14 male athletes. The nutritional value of the diets was calculated on the basis of tables of the chemical composition of food products [4]. The biological value of diets was assessed for all biologically active substances, separately for the cold and warm seasons of the year, and was expressed as % of satisfaction of the daily requirement:

$$BCR = \frac{\text{Vit. Sn Vit. A}_n \quad \text{lysine methionine}_n}{\text{Vit.Cp} + \text{Vit.A}_p + \text{lysine} + \text{methionine}_p \dots \text{etc.} \times 100}$$

Where, BCR is the biological value of the diet; n is the amount of biologically active substances in the studied diet in mg; p is the daily intake of this ingredient in mg.

Research results. A comparative assessment of the structural composition of biologically active substances and the biological value of the average daily diets of athletes on the actual and changed background of nutrition indicates the effectiveness of the corrections (Table 1).

The balance of nutrients on the changed background of nutrition has reached an optimal level. So, if against the actual background of nutrition, the balance of nutrients was 1:1.2:4.9 in the winter-spring season and 1:1.2:5.2 in the summer-autumn season, then against the changed background, this indicator was 1:1.1:4.1 in all seasons. Such an optimal ratio of nutrients for athletes in the average daily diets on a changed background of nutrition was achieved due to an increase in the nutritional norms of animal proteins, vegetable fats and a decrease in carbohydrate sources. Thus, the proportion of proteins of animal origin on the changed background of nutrition increased on average by 25% compared to the actual background of nutrition, vegetable fats by 15%. The decrease in carbohydrates against the background of a changed diet averaged 7-10%. As the analysis of the biological value of diets in athletes has shown, there are no statistically significant differences depending on the seasons of the year. This is due to special attention in the norms of nutrition in both the summer-autumn and winter-spring seasons to sources of vitamins and the possibility in modern conditions to ensure the year-round availability of fresh vegetables and herbs in Uzbekistan. Also, there were no significant differences in the content of vitamins B1, B2, PP, amino acids isoleucine and valine in the diets on the actual and changed background of nutrition, due to the high level of consumption of cereals - sources of this group of biologically active substances on the actual background of nutrition. At the same time, the biological value of the average daily rations on a changed background of nutrition, due to the optimization of the content of most biologically active substances in the diets, in all athletes in the summer-autumn season increased to $88.7 \pm 1.0\%$, from $72.4 \pm 1.0\%$ on the actual background of nutrition, and in the winter spring season to $82.8 \pm 1.0\%$.

Table 1.

Comparative assessment of the biological value of the average daily diets of weightlifting athletes on the actual and changed background of nutrition, $M \pm m$ in % of the need

Seasons of the year	Total biological value of diets		
	On an altered background of nutrition	On the actual background of nutrition	R
Summer-Autumn	88.7 ± 1.0	72.4 ± 1.0	<0,01
Winter-spring	82.8 ± 1.0	67.7 ± 1.0	<0,01

The increase in the total biological value of the average daily diets has been achieved by the proposed average daily nutrition rates, due to the increase in the diets of sources of vitamins A, D, B6, B12, essential amino acids - leucine, lysine, methionine and heme iron (due to fish, liver, fermented milk products), vitamin C, vitamin B9 (folacin), fiber, pectin and beta carotenoids (due to vegetables, melons, pumpkin, fruits and greens). potassium, calcium, phosphorus and magnesium (due to legumes, dairy products and dried fruits), sitosterols, choline and phospholipids (due to vegetable oils and legumes). At the same time, it should

be noted that due to natural products, the necessary norms of consumption of vitamin C, selenium and amino acids leucine, threonine have not been achieved for the body of athletes. According to the literature of recent years [5,6], selenium is an important element in the formation of enzyme systems of the redox process and regulation of metabolism in the body. Rich sources of selenium are sea products. Apparently, for continental countries that do not have sea coasts and are characterized by a diet with low consumption of marine products, the alimentary problem is not only iodine deficiency, but also selenium deficiency. If the problem of iodine deficiency for continental countries has been sufficiently studied and it can be solved by mass consumption of iodized table salt, then the problem of selenium deficiency has not been sufficiently studied and needs to be resolved. Taking into account the identified deficiency of some biologically active substances, on the basis of our hygienic and toxicological assessment [7], the chemical composition and properties of some domestic and foreign dietary supplements (biologically active additives), we have chosen the domestic dietary supplements Kuvatin and Bioferron as supplements to food for athletes. Dietary supplement Kuvatin is a hydrolyzed protein of silkworm cocoons, designed to strengthen the immune system, during intense physical exertion (athletes, people engaged in hard physical labor). and is recommended as an additional preventive measure to prevent disorders in the cardiovascular system (Table 2). Bioferron syrup with the following ingredients: barberry, raisins, cumin, beetroot, navat, drinking water (Table 3).

Table 2.

Chemical composition of the dietary supplement "Kuvatin", in mg%

No p/n	Name of amino acids	Content in mg%
1.	Glycine	32,3
2.	Alanine	20,5
3.	Serine	18,0
4.	Tyrosine	9,2
5.	Valine	3,5
6.	Aspargenic acid	8,2
7.	Glutamic acid	2,1
8.	Threonine	4,,8
9.	Phenylalanine	0,9
10.	Arginine	1,8
11.	Isoleucine	0,8
12.	Leukemiesin	0,9

13.	Proline	0,9
14.	Lysine	0,3
15.	Tryptophan	0,2
16.	Histidine	0,7
17.	Cystine	0,1

Table 3.

Nutritional and biological value of Bioferron dietary supplements.

№	Name of substances	Content
1.	Protein, in g per 100 g of product	2,0±0,2
2.	Fats, g per 100 g of product	2,6±0,3
3.	Carbohydrates, in g per 100 g of product	12,0±1,2
4.	Vitamin C, in mg per 100 g of product	50,0±2,0
5.	Vitamin B1, in mg per 100 g of product	0,02±0,005
6.	Vitamin B2, in mg per 100 g of product	0,02±0,004
7.	Vitamin B6, in mg per 100 g of product	0,04±0,01
8.	Vitamin PP, in mg per 100 g of product	0,4±0,02
9.	Folacin, in mg per 100 g of product	0,1±0,01
10.	Iron, in mg per 100 g of product	4,5±0,02
11.	Potassium, in mg per 100 g of product	488,0±4,8
12.	Calcium, in mg per 100 g of product	137,0±1,3
13.	Magnesium, in mg per 100 g of product	44,0±0,4
14.	Phosphorus, in mg per 100 g of product	42,0±0,4

Conclusions: The total biological value of average daily diets on a changed background of nutrition in weightlifting athletes increased in the summer-autumn season to 88.7±1.0%, from 72.4±1.0% on the actual background of nutrition, and in the winter-spring season to

82.8±1.0%. An increase in the total biological value of average daily diets was achieved due to an increase in the diets of vitamins A, D, B6, B12, essential amino acids - leucine, lysine, methionine and heme iron (due to fish, liver, fermented milk products), vitamin C, vitamin B9 (folacin), fiber, pectin and beta-carotenoids (due to vegetables, melons, pumpkins, fruits and greens), potassium, calcium, phosphorus and magnesium (due to legumes, dairy products and dried fruits), sitosterols, choline and phospholipids (due to vegetable oils and legumes). The additional use of dietary supplements "Kuvatin" and "Bioferron" in the nutrition of athletes made it possible to compensate for the deficiency of vitamin C, selenium and amino acids leucine, threonine in the diet.

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