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THE INFLUENCE OF THE YAKUT KUMYS ON SOME PROOXIDANT-ANTIOXIDANT INDICES OF SPORTSMEN

Abstract.

We investigate the influence of the Yakut kumys on lipid peroxidation and antioxidant system of sportsmen volunteers (freestyle wrestlers) aged 13-16 years during the recovery period in the summer sports camp "Rodnik" of the Republic Sakha (Yakutia). The athletes were divided into two groups: who drank kumys and who did not in the recovery period. The studies showed that on the 11th day of recovery period in the group of athletes who drank kumys by the scheme within 10 days, the concentration of tiobarbiturat - active products in erythrocyte membranes decreased in 1.57 times, while in the group of athletes who did not drink kumys- had remained at a high level. The content of low molecular antioxidants in the second group of sportsmen increased in 1.68 times, which was on 42% higher than in athletes who did not drink kumys. The level of ascorbic acid in the second group increased in 1.59 times, in the first group its content decreased in 8%.

Thus, it was confirmed that the Yakut kumys reception by athletes during the recovery period due to the scheme helped to reduce the intensity of lipid peroxidation and non-enzymatic activation of antioxidant defense, i.e. was the effective method in accelerating the recovery of the body.

Keywords: kumys, wrestlers, recovery period, lipid peroxidation, antioxidant system.

Introduction.

The study of adaptive reactions in athletes who train in Yakutia, is of particular significance, since the impact of extreme climatic factors are the cause of having a "polar tension syndrome". The main components of this polisindrom are oxidative stress, lack of detoxification processes, disorders of northern type of metabolic, northern tissue hypoxia, etc. [1, 2, 10]. Physical activity activates the sympathoadrenal system, increases oxygen consumption, which leads to the acceleration of the oxidation processes, including pathway of lipid peroxidation (LPO). In freestyle wrestlers and boxers Yakutia excessive activation processes (LPO) and reduced activity of antioxidant defense, is

most pronounced during the recovery phase, which plays an important role in slowing the recovery of the body and in lowering of physical performance [4]. One of the possibilities to speed up the recovery processes, improve efficiency is targeted regulation of metabolism by dietary factors. Therefore, we felt it appropriate to use koumiss as a means, for the recovery of athletes. Koumiss has long been a traditional national drink of Yakuts. It was usually used especially during haying operations, as it is quickly absorbed by the body and restores power [6]. Koumiss has a broad spectrum of action, it includes a variety of low and high molecular substances: proteins, vitamins, amino acids, mineral salts, active agents, etc. [7].

The rationale of koumiss will significantly enhance the ability of non-pharmacological medical support for sports activities. Impact of the Yakut koumiss on prooxidant-antioxidant parameters of athletes have not been studied.

Material and methods.

The study was conducted on 40 athletes, volunteers (freestyle wrestlers) of School of the Olympic Reserve (RBM) aged 13-16 years during the recovery period in the summer sports camp "Spring." The athletes were divided into two groups: the first (20 persons), which did not take koumiss in the period of reconstruction and the second (20 persons), which is daily for ten days took 250 ml 4 times in a day (3 times for 20-30 minutes before meals and at bedtime). Koumiss was manufactured by JSC «Sahaplemobedinenii" standard technology of mare's milk "Us Kut" TU 9222-001-55673105-2009. Compliance certificate from the Russian Federation № 0497019 RU.AE84.V.06712 TP.

Intensity of lipid peroxidation was determined by spectrophotometry method on the accumulation of tiobarbiturat - active products (TBA-AP) in the membranes of red blood cells [13]. Indicators of non-enzymatic antioxidant defense level was determined by the total content of low molecular weight antioxidants (LMAO) in erythrocyte membranes by spectrophotometric method [5] and the content of ascorbic acid in the serum by tetrometricheskim method [3]. The material for investigations was heparinized blood and serum. Blood sampling was performed in the morning on an empty stomach from the cubital vein.

Statistical processing of received data was performed using statistical software application package STATISTICA 6.0. The significance of differences between mean values was evaluated by nonparametric method «Kolmogorov-Smirnov». Probability of the null hypothesis accepted at $p < 0,05$.

The study was approved by the decision of the local ethics committee at FGBU "Yakut

Scientific Center of complex medical problems," RAMS.

Results and discussion.

The survey showed that in the early recovery period, the concentration of TBA-AP in the membranes of red blood cells in athletes of both groups was increased by 1.57 and 1.88 times, respectively, compared to the amount on preparatory phase (3.6 nmol / L). On the 11th day of the recovery period in the first group which does not take a koumiss, the concentration of TBA-AP has not changed. After the course of taking koumiss, in the second group the concentration of TBA-AP decreased by 1.57-fold ($P < 0.05$) (pic. 1). The total content LMAO of the first group of athletes at the origin of the study was higher in 1.31 times than total content of the second group of athletes (pic. 2). Lower LMAO in the athletes of second group shows reduced activity of enzymatic level of ant oxidative system (AOS) and the intensification of lipid peroxidation, as evidenced by the increase of the level of TBA-AP in these athletes (pic. 1). On the 11th day of the recovery period the total content LMAO in the first group of athletes has increased in 1.18 times. The second group of athletes which takes koumiss, the total content LMAO increased in 1.68 times, which is 42% higher than the first group. In addition, the positive impact of koumiss on the content LMAO proves raising of ascorbic acid as a component of low molecular weight antioxidants. The ascorbic acid in the body of athletes at the beginning of the recovery period varied within the physiological range (0.7 - 1.4 mg %) in the first group it was equal to 1.03 mg%, and in the second - 0.87 mg%. On the 11th day of the study in the first group of the vitamin C content decreased slightly to 0.95 mg%. In the second group after 10 days of reception koumiss ascorbic acid content increased to 1.59 times and equaled to 1.39 mg%. The chemical composition of the Yakut koumiss is rich in ascorbic acid, especially in June (93mg / l) and July (97mg / l), which is associated with the quality of pasture grasses. [8] Studies show that as a result of adaptation to a short growing season in the plants of Yakutia, a large structural diversity formes and increases the quantitative content of biologically active substances [9]. Raising LMAO and ascorbic acid in a parallel decrease in the level of TBA-AP in this group shows a positive effect of koumiss on the enzymatic system AOD. The antioxidant properties of koumiss due to the presence in it low molecular weight substances, including vitamins A (retinol), E (a-tocopherol), C (ascorbic acid), macro (magnesium, calcium), hormones (thyroxin, corticosteroids, etc.) , sulfur-containing amino acids (cysteine, cysteine, glutathione), which are a group of antioxidants that can inhibit lipid peroxidation. Vitamin C - an important water-soluble antioxidant, which is not synthesized in the body, and comes from the outside. Ascorbic acid can act as a donor and an acceptor of hydrogen ions due to the presence in the structure of two phenolic groups, its antioxidant properties are characterized by a wide range of inactivating actions on

various free radicals. Very important in the implementation of the antioxidant action of ascorbic acid is its ability to restore the radicals and products of a-tocopherol, regenerating its antioxidant activity. That is due to the synergistic effect of ascorbic acid and a-tocopherol in the oxidation of polyunsaturated fatty acids [11]. In defense of the lipids from peroxidation, ascorbic acid is superior to other plasma antioxidants. Alpha-tocopherol is the main fat-soluble antioxidant. It restricts the free radical reactions, as donor of hydrogen ions as vitamin C. It becomes a radical which reacts with other peroxy radicals and produce no radical connection. It stabilizes the membrane structure, on which perform the processes of free-radical oxidation, inhibits the formation of lipid oxidation, breaks the chain of free radical oxidation by neutralizing free radicals in the time of their formation [12]. Vitamin A as an antioxidant inhibits conversion of sulfhydryl groups in disulfide. Koumiss is rich by peptides and free amino acids, which are absorbed by the body at lower voltage main digestive glands. In koumiss is a large number of proteins with a particular faction of biocatalysts. Koumiss enzyme systems involved in the cleavage proteins, carbohydrates and fats, catalyze oxidation-reduction reactions. The virtual absence of toxicity, the ability to expand the narrow links metabolism, economize energy processes – cause both high efficiency and safety of koumiss for athletes.

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