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**ANTIOXIDANT AGENTS IN COMPLEX PRE-COMPETITION
TRAINING OF BOXER STUDENTS**

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Abstract

Students' sport today, according to the level of workload and the results demonstrated by the athletes, is increasingly approaching the sport of high achievements. In the same time the permanent high physical load can impact negatively both on the health and on sport results of student athlete. This should be taken into account in the organizing of all stages of the student athletes' training process. This article examines the problems of pre-competition training of boxer students. The questions under consideration are an analysis of the psycho-emotional setting's role in the pre-competition preparation of boxer students, determining of ways to regulate loads during the training process, assessment of the influence of antioxidant intake on sport results of boxer students. The high importance of the combination in the process of preparation of the psycho-emotional mood and management of physical activity is grounded. The usefulness of antioxidants' intake in the period of pre-competition training, which is characterized by maximum psychophysical loads, has been experimentally confirmed. This allowed recommending the use of antioxidants in complex pre-competition training. The results of the study can be useful for trainer in boxing and other types of single-combat sports.

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Keywords: Antioxidant agents, boxing, boxer-students, pre-competition preparation, psycho-emotional setting, regulation of physical load.



1. Introduction

Today in Russia much attention is paid to physical culture and sports. This is confirmed by the adopted laws and regulations on physical culture and sport. The President pays much attention to the development of sports such as wrestling, football, tennis, boxing, etc. (Pogadaev, Gaskov, Galimov, & Strelnikov, 2012).

Increased competition in world sports dictates special requirements for the process of improving the training system for the best Russian athletes. The improvement should be based on the knowledge of the trends of each sport allowing specific tasks to be set for the athletes, and on revealing the reserves of increasing their skill level, contributing to the successful accomplishment of the main task (Sushchenko, Shchegolev, & Korshunov, 2016).

Sport of the highest achievements is the only model of activity in which almost all body systems of the outstanding record holders can manifest themselves in the zone of absolute physical and practical limits of a human health. The goal of the sport of higher achievements is to obtain the maximum possible sports results or victories at the largest sporting events (Lopatin, 2015).

In recent years, Russian boxers became the winners at the Olympic Games, at world championships, world cups and international tournaments. To retain the conquered positions, it is necessary to further improve the training of Russian athletes.

Physical culture in the university and student sport perform an important task in the process of training specialists, contributing to the formation of a number of competencies that students can't get in the process of studying other disciplines (Bakayev, Vasilyeva, Kalmykova, & Razinkina, 2018). Sports activities contribute to personal self-realization of the students, to determination of their place in the space of physical culture, mass and high-achievement sports.

Participating in sport competitions, student athletes not only get knowledge, skills and methods of action and manifest themselves at the competitions, but also reflect their orientation and readiness for intensive physical activity, the ability to deeply analyze and choose the most expedient and effective way of solving the problem from a large number of options in the certain conditions (Manzhely and Chernyakova, 2014).

In the structure of student competitions boxing appeared not so long ago. In 2006, the Technical Commission for Boxing of the International Federation of Student Sport (FISU) was established. Since then, student boxing competitions have been held more or less systematically. In particular, in 2007 Elista hosted the European Cup among students, and in 2008 in Kazan - the student world championship. In 2013, boxing was included in the program of the Universiade 2013 in Kazan. Due to these events, the level of student boxing has recently grown significantly. Today, student boxing is, in fact, a sport of higher achievements, for which the maximum psychophysical loads are characteristic.

2. Problem Statement

Improving the effectiveness of the boxer students' training process at the pre-competition stage is the most important prerequisite for successful performances at the competitions, which in turn contributes to solving the problems of promoting and popularizing student sports and the university in which successful athletes are studied and trained.

The problems of improving the effectiveness of the training process in the period before the competition were analyzed from different standpoints by Gaskov and Kuzmin (2004), Filimonov (2011), Shivit-Khurak, Galimov, and Tsyrempilov (2012), Ruddock, Wilson, Thompson, Hembrough, and Winter (2016), Akgul and Cakmakci (2017).

Recovery means and agents can be considered as the single and most reasonable alternative to the use of various dopes. In high physical exertion, the human organism experiences oxidative stress (Mastaloudis, Leonard, and Traber, 2001). Some recent studies have shown that antioxidants can reduce exercise-induced oxidative stress (Cases, Sureda, & Maestre, 2006; Neubauer & Yfanti, 2015), and accelerate recovery after training. Along with this, there are also studies in which doubt is expressed about the reparative effect of the antioxidants. Despite the difference in opinions and in experimental results, the question of the effectiveness of antioxidants in training athletes remains open. This research is inspired by the need to search for non-doping means to improve the quality of pre-competition training of boxer students.

3. Research Questions

The questions under consideration are the following:

- the role of the psycho-emotional mood in the pre-competition preparation of boxer students;
- the ways to regulate training loads;
- the impact of antioxidant intake on sport results of boxer students.

4. Purpose of the Study

The purpose of the study is to assess the possibility, conditions and potential of the use of antioxidant agents in the complex of pre-competition training of boxer-students.

5. Research Methods

In the course of the study, the recommendations for pre-competition training of boxers were analyzed, an experiment on the antioxidant agents use in the pre-competition period, was undertaken observations of the training process and subsequent results of boxer students were examined.

6. Findings

6.1. Emotional and psychological setting before the competition

As the long-term observations of single-combat athletes have shown that high tactical, technical and physical preparedness can't serve as a guarantee of achieving high sports results in important international competitions. (Pogadaev, Gaskov, Galimov, & Strelnikov, 2012) There are many examples where athletes who have excelled at domestic competitions could not withstand the nervous tension at the European, World championships and Olympic Games.

These athletes dramatically deteriorated the effectiveness of skills, the manner and style changed, the tactical and technical arsenal was reduced, and their activity in bouts sharply decreased. Therefore, the main requirement of modern sports for single-combat athletes will be the ability to show maximum of their

capabilities in conditions of intense competition, which is possible only when a regulated level of emotional arousal is provided.

Proved is the fact that in a number of cases emotions provide achieving a very high level of performance results. Considering emotions as a means of self-regulation of the organism and maintenance of its vital functions at the optimal level, Amosov (2002) calls emotions as backup, emergency programs whose biological meaning is that they are included when the organism falls into extreme conditions and the normal rules of regulation are already inadequate. Thus, there is a hyper-function of various systems of an organism, first of all endocrine, accompanied by additional allocation of an adrenaline in blood that is necessary in the conditions demanding huge power expenses of an organism.

Thus, the following practical recommendations may be suggested:

- Due to the fact that a great emotional excitement increases the effectiveness of attacking actions, it is advisable to simulate conditions that increase the level of single-combat athletes' emotional excitement in training sessions and to improve this way the structure of the skills;
- Taking into account the positive impact of significant emotional excitement of single-combat athletes before the bout for the result of the competition, in the conditions of training sessions it is necessary to set for them rather complex but feasible tasks, the solution of which requires readiness for combat and contributes to work out the self-regulation of the level of emotional arousal;
- Apply a method of tremography that allows the trainer's obtaining quantitative characteristics of the readiness of a fighter for the upcoming bout and choosing, after comparison of the obtained data with the strength of the opponent and the importance of the upcoming bout, the means of influence, thereby increasing the level of his preparedness;
- Taking into account that as the day of the competition starts to approach, at the time of the draw and after the announcement of its results, the combatants experience considerable emotional excitement, the trainers of the team should use regulation tools aimed at preserving the nervous energy of the athletes;
- • For the best preparation of single-combat athletes for important competitions, it is necessary to dose the impact on their mental state, taking into account their individual characteristics and state in a specific period of preparation, using an appropriate combination of various training tools;
- The determination of the lower limits of the emotional excitement level of the single-combat athletes, whose violation reduces the activity and effectiveness of athletes in a bout, enables the trainer to "move" athletes from the "dangerous zone" by applying appropriate means and methods of regulation;
- Experimental data indicate the expediency of holding warm-up in 30-35 minutes before the workout on the carpet, which contributes to increasing the level of the functional capabilities of the athlete's organism, and only in 15-20 minutes - the psychological setting for the upcoming bout.

The practice of multi-cycle training, involving participation in several competitions during the year, of which one or two are the main ones, necessitates the rational distribution of training loads in the pre-competition stage (Pogadaev, Gaskov, Galimov, & Strelnikov, 2012).

6.2. Regulation of training load

Improving the system of training athletes for important competitions requires further optimization of the scientific management, one of the main tasks of which is the effective regulation of training loads in the stage of immediate pre-competition training (Bolotin, Piskun, & Pogodin, 2017). A number of authors recommend taking into account the nature of competitive activity, the main parameters of which should be modeled in the training process at the pre-competition training stage (Novikov, 1999, Shustin, 1995). However, the application of this approach in the practice of training is difficult due to the lack of knowledge on the features of the functioning of energy supply systems of the human body under conditions of sub-limit loads. The dynamics of the main parameters of competitive activity and special load tolerance and the indicators informatively characterizing such a state are not substantiated (Namazov and Sushchenko, 2012)

Thus, the need to develop a method for managing high-intensity loads, based on a comprehensive control of the current state of the organism, is urgent.

The methodological basis of the single-combat athletes' training technology at the pre-competition stage is the following:

- modeling of high-intensity competitive loads in the training process, taking into account the functional readiness;
- improvement of the training system on the principle of subordination of such phenomena as competition activity (original cause), and training as a category derived from competitive activity;
- improvement of the management system of the training process and correction of loads, taking into account complex information about the current state of the organism.

High-intensity training loads that simulate the situations of the real competition can be created with the help of the following tools and methodical methods:

- bout by the scheme: five-ten-second attack and maneuvering for 20-25 seconds with the re-attack on this scheme (3-4 attacks per minute);
- bout at the maximum rate with a gradual increase in the duration of the bout, taking into account the functional readiness of the organism;
- bout on the edge of the carpet with compulsion of the opponent to go beyond the carpet line;
- bout with the obligatory specific tasks of the following character: to execute firstly a throw or blow, to perform the move in the last seconds of the fight, to win the fight by a painful or suffocating move;
- conducting a bout with tough defense, tendentious refereeing;
- bout by the scheme: a false attack with compulsion of the opponent to go into defense with the subsequent punishment for passivity.

The use of the video recording system allows video recording and simultaneous analysis of competitive activities. Using the technique of integrated monitoring of special performance in the preparation of single-combat athletes allows adjusting the basic parameters of the training load and optimizing the management of training in each micro-cycle of pre-competition stage.

6.3. Use of the antioxidant agents

To confirm the hypothesis that the use of antioxidants during the period of maximum psychophysical loads will help maintain high performance, thereby opening up the possibility of intensifying training loads and increasing the effectiveness of the training process through super-compensation, a study was conducted for the experimental substantiation of the content and orientation of the boxer students' training process in the pre-competition period using antioxidant agents (Shamray & Faktor, 2003).

The experiment was conducted in the period of pre-competition preparation, 4 weeks before the competition. 3 groups, each of 10 athletes with approximately the same age of 18-20 years, qualifications and level of preparedness (first-degree and candidates for master of sports), were formed.

Subjects of the control group (CG) did not use an exogenous antioxidant agent. Subjects of the two experimental groups (EG1 and EG2) used the antioxidant agent Triovit in accordance with the recommendations of the developer. The members of the CG and EG1 were trained according to the generally accepted pre-competitive training model balanced in the means and methods of training and the correspondence of the volume and intensity of the training load (Nikiforov and Viktorov, 1978).

The participants of EG2 were trained according to a special model of pre-competition training, based on the hypothesis about the effectiveness of antioxidant intake (Bakulev, Faktor, & Shamray, 2004).

The difference between this model and the standard one is primarily in the intensity of the training process, as well as in increasing the workload and the general trend of a certain reduction in the proportion of general physical training in the training process.

The effectiveness of the method under test of preparing boxers with the use of an antioxidant was determined by the competition between the subject of CG, EG1 and EG2 and on the basis of an assessment of the preparedness level. To do this, tests were selected that assess the main aspects of training. Evaluation of the preparedness level carried out three times. First time the measuring was made before the beginning of the 1st week of preparation. The second one - at the end of the 2nd micro-cycle. The third measuring was carried out at the beginning of the 4th week of preparation.

Tables 1-3 show the results of testing the preparedness of boxers KG, EG1 and EG2 for the most informative indicators. The obtained results of the study confirmed the hypothesis of the effectiveness of the antioxidant agents' use.

The results of the control bouts between KG, EG1 and EG2 also showed better preparedness of EG2 athletes. The number of the winners in the groups KG, EG1 and EG2 was equal to 2, 5 and 8 correspondingly. These results significantly differ from the results of the control bouts conducted before the experiment beginning.

Table 01. Dynamics of tests assessing the level of preparedness of athletes KG

№	Test	Measuring			Difference				Reliability
		1	2	3	$\Delta_{1,2}$	$\Delta_{2,3}$	$\Delta_{1,3}$	%	
1	Attention concentration (by Anfimov-Burdon), units	1233,5± 54,6	1261,3± 52,8	1262,2± 52,6	27,8± 4,8	0,9± 1,7	28,7± 5,41	3± 0,5	$P_{1,2}<0,05$ $P_{2,3}>0,05$
2	Number of flexion and extension of the arms in the support lying for 15 seconds	27,7± 0,5	29,0± 0,4	29,5± 0,4	1,3± 0,2	0,5±0,2	1,8± 0,2	7± 1,0	$P_{1,2}<0,05$ $P_{2,3}>0,05$
3	Number of straight blows for 30 seconds	163,2± 1,6	166,8± 1,5	168,4± 1,3	3,6± 0,4	1,6±0,6	5,2± 0,7	3,1± 0,5	$P_{1,2}<0,05$ $P_{2,3}>0,05$

Table 02. Dynamics of tests assessing the level of preparedness of athletes EG1

№	Test	Measuring			Difference				Reliability
		1	2	3	$\Delta_{1,2}$	$\Delta_{2,3}$	$\Delta_{1,3}$	%	
1	Attention concentration (by Anfimov-Burdon), units	1229,2± 57,7	1266,7± 54,6	1267,8± 54,9	37,5± 6,1	1,1± 1,6	38,6± 6,6	3± 0,6	$P_{1,2}<0,05$ $P_{2,3}>0,05$
2	Number of flexion and extension of the arms in the support lying for 15 seconds	27,7± 0,5	29,0± 0,4	29,5± 0,4	1,3± 0,2	0,5±0,2	1,8± 0,2	7± 1,0	$P_{1,2}<0,05$ $P_{2,3}>0,05$
3	Number of straight blows for 30 seconds	162,6± 2,1	167,4± 1,6	169,4± 1,2	4,8± 0,7	2,0±0,9	6,8± 1,4	4± 1,0	$P_{1,2}<0,05$ $P_{2,3}>0,05$

Table 03. Dynamics of tests assessing the level of preparedness of athletes EG2

№	Test	Measuring			Difference				Reliability
		1	2	3	$\Delta_{1,2}$	$\Delta_{2,3}$	$\Delta_{1,3}$	%	
1	Attention concentration (by Anfimov-Burdon), units	1229,9± 44,2	1261,2± 44,9	1267,8± 54,9	31,3± 3,9	5,3±0,8	36,6±3,6	3± 0,3	$P_{1,2}<0,05$ $P_{2,3}<0,05$
2	Number of flexion and extension of the arms in the support lying for 15 seconds	28,0± 0,5	29,9± 0,4	29,5± 0,4	1,9± 0,2	1,3±0,2	3,2± 0,2	11±1,0	$P_{1,2}<0,05$ $P_{2,3}<0,05$
3	Number of straight blows for 30 seconds	162,2± 2,0	168,6± 1,4	169,4± 1,2	6,4± 1,1	3,4±0,6	9,8± 1,2	6± 1,0	$P_{1,2}<0,05$ $P_{2,3}<0,05$

7. Conclusion

The use of exogenous antioxidants opens the possibility of increasing the effectiveness of the training process of boxer students. Thus, it can be stated that the use of antioxidant agents in the process of highly qualified boxers' training helps maintain high performance of athletes during the period of maximum training loads, thereby contributing to the intensification of the training process in shock micro-cycles, causing more significant shifts in the organism of athletes. The degree of their training ability is additionally increased due to super-compensation during the restoration period on the eve of the competition.

The use of antioxidants for boxer students should be combined with psycho-emotional training, taking into account the multi-cycle training regime and the mandatory complex control of physical and emotional loads and the state of the organism.

References

- Akgul, M.N., & Cakmakci, O. (2017). The effect of 6-weeks competition period training on body composition of boxers. *Turkish Journal of Sport and Exercise*, 19(2), 190-195
- Amosov, N.M. (2002). *Encyclopedia of Amosov. Algorithm of health*. Moscow: AST, Stalker.
- Bakayev, V., Vasilyeva, V., Kalmykova, S., & Razinkina, E. (2018). Theory of physical culture- a massive open online course in educational process. *Journal of Physical Education and Sport*, 1, 293-297.
- Bakulev, S.E., Faktor, E.A., & Shamray, L.V. (2004). Efficiency of application of "Triovit" in the process of preparation of boxers of high qualification. *Bulletin of the Baltic Pedagogical Academy*. 56, 40-42.
- Bolotin, A.E., Piskun, O.E., & Pogodin, S.N. (2017). Special features of sports management for university students with regard to their value-motivational orientation, *Theory and Practice of Physical Culture*. 3, 51-53.
- Cases, N., Sureda, A., & Maestre, I. (2006). Response of antioxidant defences to oxidative stress induced by prolonged exercise: Antioxidant enzyme gene expression in lymphocytes. *European Journal of Applied Physiology*, 98, 263–269.
- Filimonov, V.I. (2011). *Modern system of training boxers*. Moscow: INSAN.
- Gaskov, A.V., & Kuzmin, V.A. (2004). *Structure and content of training and competition in boxing*. Krasnoyarsk: Publishing house of the Krasnoyarsk State University.
- Lopatin, V.A. (2015). Problem aspects of physical culture and sports in the university. *Interexpo Geo-Siberia*, 6 (2), 152-155.
- Manzhely, I.V., & Chernyakova, S.N. (2014). Physical culture of bachelors: content and conditions of formation. *News of Tula State University. Physical Culture. Sport*, 2, 49-60.
- Margaritis, I., & Rousseau, A.S. (2008). Does physical exercise modify antioxidant requirements? *Nutrition Research Reviews*; 21, 3–12.
- Mastaloudis, A., Leonard, S.W., & Traber M.G. (2001). Oxidative stress in athletes during extreme endurance exercise. *Free Radical Biology & Medicine*; 3, 911–922.
- Namazov, A.K., & Sushchenko, V.P. (2012). Methodical foundations of the technology of judo training at the pre-competition stage. *Health - the basis of human potential: problems and ways to solve them*, 7 (1), 258-259.
- Nikiforov, Y.B., & Viktorov, I.V. (1978). *Building the planning of training in boxing*. Moscow: Physical culture and sports.
- Novikov, A.A. (1999). Scientific and methodological problems of martial arts. *Theory and practice of physical culture*. 9, 50-56.
- Neubauer, O., & Yfanti, C. (2015). Antioxidants in Athlete's Basic Nutrition. Considerations towards a Guideline for the Intake of Vitamin C and Vitamin E. In M. Lamprecht (Ed.), *Antioxidants in Sport Nutrition* (pp. 39-66). Boca Raton, USA: CRC Press

- Pogadaev, M.A., Gaskov, A.V., Galimov, G.Y., & Strelnikov, V.A. (2012). The construction of the pre-competition stage of preparation of boxers-juniors to the main competitions. *Bulletin of the Buryat State University*, (13), 153-157.
- Ruddock, A., Wilson, D., Thompson, S., Hembrough, D., & Winter, E. (2016). Strength and conditioning for professional boxing: recommendations for physical preparation. *Strength and Conditioning Journal*, 38(3), 81-90.
- Shamray, L.V., & Faktor, EA. (2003). Influence of the preparation "Trioivit" on the special performance of boxing. In *Proceedings of the final scientific-practical conference of SPbSAFC by P.F. Lesgaft* (pp. 76-77). St. Petersburg, Russia: SPbSAFC.
- Shivit-Khurak, I.K., Galimov, G.Y., & Tsyrempilov, V.B. (2012). *Improving the effectiveness of the training process of students-boxers of high qualification at the pre-competition stage*. Ulan-Ude: Publishing house BSAA by V.R. Filippov.
- Shustin, B.N. (1995). *Modeling in sports of the highest achievements*. Moscow: RSAFC.
- Sushchenko, V. P., Shchegolev, V.A., & Korshunov, A.V. (2016). Features of personal and professional development of various professional categories in physical culture and sport. *Theory and Practice of Physical Culture*, 6, 3-5.