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Чистокровні арабські коні, скачки, біохімічний аналіз крові, ферменти.

In this communication, the results of a serum chemistry of 13 purebred arabian horses aged 3-5 years after the last start in racing season. We determined the activity of five enzymes: AST, AP, CKM, LDH and gamma-GT. We also measured the content of calcium and phosphorus.

Purebred arabian horses, horseracing, serum chemistry, enzymes.

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BLOOD COMPOSITION OF HUTSUL HORSE BREED UNDER DIFFERENT TERMS AND CONDITIONS OF USE

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Was studied the influence of various heights above sea level on morphological and biochemical composition of Hutsul horse breed mares blood.

Hutsul horse breed, complete blood test, biochemical blood test, height above sea level.

Blood is one of the major body systems with components that are sensitive to various external influences. This is why the blood test is an important part of veterinary inspection of sport horses' constitution. The peculiarity of the blood system is shown in changes that occur not only as a result of dysfunction of organs and body systems, but as the adaptive response to certain stress factors, including physical activity [1, 8, 9].

Numerous studies have shown that horse's organism influenced by physical activity change its hematological parameters, the severity of which depends on the intensity of exercises [1].

In recent years in sports practice along with traditional trainings become more common other ways of improving the operability of horses. Among non-traditional means and methods of training process intensification special place is taken by the impact of different forms of oxygen deficiency in the organism [4, 5].

The main way to improve operability of horses lays in development of clearly coordinated intense of motor activity. To this activity of the organism controlled by the central nervous system in addition to the musculoskeletal system of horses belongs the set of physiological mechanisms, that provide the possibility of intensive movement: respiratory, cardiovascular, endocrine, and so on [6].

Now when the requirements to horses are rapidly increasing, their organism is not always able to withstand intense training load. Because of this, often fail the most vulnerable elements such as heart function, neuro-reflex mechanisms of movement coordination, tendons and muscle bundles of limbs and etc. Therefore, in horse training is advisable to use alternative methods to expand their functional abilities. These methods include training horses in conditions of average height [10].

Factors of the influence of altitude on the organism include low barometric pressure and the associated reduced partial pressure of oxygen in the atmosphere, increased solar radiation, air ionization and a number of other climatic features. But crucial in reaction of an organism to a height is anoxia. Between height and barometric pressure there is a nonlinear relationship. Thus, the degree of hypoxia can be expressed in appropriate altitude barometric pressure or partial pressure of oxygen. The diffusion of oxygen from the air through the pulmonary capillary membrane is due to a significant difference between the partial pressure of the oxygen in the lungs and in venous blood, with the amount 35-50 mm Hg. During the ascent to the mountains this difference decrease and reduce the possibility of oxygen supply to the organism causing chronic lack of it. At the time of transferring horses from the plains to the average height (the height of 1000-1400 m above sea level) their organism reacts to the lack of oxygen, above all, by increasing the respiratory rate and pulse. At the same time increases the consumption of oxygen, indicating the increase in oxidation processes [6, 7].

The aim of our study was to analyze a number of indicators of morphological and biochemical composition of blood of Hutsul breed

horses that used to work at different heights above sea level in the mountains. It should be added that the difference in heights is 982 m.

Materials and methods of research. Work is based on materials of research that took place on the territory of mountainous areas in Ivano-Frankivsk and Chernivtski regions. In the experiment took part 6 Hutsul breed mares, born in 2008. They were divided in two groups:

- Control group – mares that stay in Ivano-Frankivsk region Kolomyia district: Bulka (bay, year of birth 2008), Plyamka (bay, year of birth 2008) – recreation center "Silver Lake" (Sidlyshevillage), Maya (bay, year of birth 2008) – LLC "Varto" (Cheremkhiv village). These farms are located at the altitude of 331 m.

- Experimental group which includes mares that stay at mount Magura, Vyzhnytsya district, Chernivtski region on the mountain base "Ark" (altitude 1313 m. above sea level): Mouse (grey, year of birth 2008), Katie (red, year of birth 2008) and Star (bay, year of birth 2008).

Mares from these groups were compared with each other by biochemical parameters and complete blood count. The materials for each group are handled by biometric method of Plohinski N. A. (1978). Biochemical and general blood tests were carried out in the laboratory «Bio Soft» in Kyiv.

Blood samples were taken from the jugular vein. Two samples of blood were taken for each horse. One sample was collected in a test tube with preservative EDTA and used for complete blood count. Other sample was collected in a test tube without preservative. Test tubes with blood were kept in a cooler bag and transported to the laboratory.

Results. The analysis found that all hematological parameters of the horses were within standard values. However, our results showed that the biochemical and general parameters of blood of Hutsul horses with different heights of maintenance in mountainous areas differ (Tables 1, 2).

Complete blood count of mares showed that the experimental group compared with the control group has increased following parameters: hematocrit – by 32%, hemoglobin – by 25% segmented neutrophils – by 16%, red blood cells – by 29%. In addition, a number of indicators in the experimental group were lower: platelets – by 28%, lymphocytes – by 27%, ESR – by 16%.

The high content of red blood cells in blood of horses that live at the altitude of 1313 m is related to their main function – carry oxygen to the organism. Red blood cells bodies contain hemoglobin, which is

capable of binding both unstable oxygen and carbon dioxide. It is known that about 30% of horse erythrocytes deposited in the

1. Results of general blood count of Hutsul breed mares under different terms of use

№	Indicators	Altitude		Normal
		331 M (n=3)	1313 M (n=3)	
1	Platelets, 10 ⁹ /l	353 ± 127	253 ± 8	100-270
2	Hematocrit, %	33,1 ± 3,3	48,9 ± 2,1	28-46
3	Hemoglobin, g / l	121 ± 9	161 ± 7	108-150
4	White blood cells, items*10 ⁹ /l	5,5 ± 1,1	6,1 ± 2,4	5-11
5	Lymphocytes, %	34 ± 13	25 ± 17	22-44
6	Monocytes, %	2 ± 2	5 ± 2	1-5
7	Segmented neutrophils, %	62 ± 10	66 ± 23	35-56
8	ESR, mm/h	70 ± 22	59 ± 2	50-70
9	The average content of hemoglobin in red blood cells, pg	18,7 ± 2,2	16,8 ± 0,3	14-19
10	The average volume of red blood cells, fl	48,6 ± 6,6	51,1 ± 1,0	36-55
11	The average concentration of hemoglobin, g/l	369 ± 60	330 ± 1	330-426
12	The width of the distribution of erythrocytes, %	15,9 ± 0,4	16,2 ± 0,2	15-21
13	Eosinophils, %	2 ± 2	4 ± 7	1-4
14	Red blood cells, %	6,8 ± 0,3	9,6 ± 0,3	6,5-9,5

2. The results of biochemical analysis of blood of Hutsul mares under different terms of use

№	Indicators	Altitude		Normal
		331 M (n=3)	1313 M (n=3)	
1	Alanine transaminase, IU/L	5,0 ± 1,3	10,9 ± 1,6	2,7-21
2	Albumins, g/l	33,5 ± 5,9	32,6 ± 3,1	27-42
3	Alpha-amylase, IU/l	16,0 ± 6,2	12,8 ± 2,5	9-34
4	Aspartate aminotransferase, IU/l	252,9 ± 77,2	301,0 ± 14,0	152-294
5	Protein general, g/l	63,0 ± 7,0	62,2 ± 5,5	55-83
6	Bilirubin total, mmol/l	15,4 ± 5,4	27,6 ± 4,2	9-36
7	Gamma-glutamyl transferase, IU/l	17,5 ± 3,2	18,8 ± 2,6	9-25
8	Glucose, mmol/l	4,4 ± 0,2	5,7 ± 0,4	4,2-7
9	Calcium, mmol/l	3,04 ± 0,18	2,89 ± 0,16	2,65-3,25
10	Creatinine, mmol/l	114,3 ± 25,7	134,2 ± 8,5	88-168
11	Magnesium, mmol/l	0,71 ± 0,13	0,52 ± 0,04	0,6-1
12	Urea, mmol/l	6,4 ± 0,4	4,4 ± 1,0	3,5-8
13	Triglycerides, mmol/l	0,19 ± 0,09	0,31 ± 0,06	0,1-0,5
14	Phosphorus, mmol/l	0,92 ± 0,25	1,10 ± 0,12	0,7-1,4
15	Chlorine, mmol/l	99,5 ± 0,9	93,0 ± 2,1	97-104
16	Cholesterol, mmol/l	1,72 ± 0,60	2,37 ± 0,47	1,3-3,7
17	Alkaline phosphatase, IU/l	141,7 ± 25,3	146,4 ± 17,8	102-257

spleen. As a result of lack of oxygen some of them migrate into the bloodstream, leading to increase of hemoglobin content. This increase in red blood cells rise hemoglobin and hematocrit [2].

Increased level of red blood cells and hemoglobin is caused by environmental conditions. Thus, in the highlands the oxygen pressure is reduced. In such conditions increase of blood oxygen capacity is achieved by increasing the number of red blood cells in it that allows the organism to get the necessary oxygen from the air in which it level is lower than on the plains [3].

Biochemical test of blood showed that the experimental group of mares had raised indicators: alanine aminotransferase – by 54% aspartate aminotransferase – by 16%, total bilirubin – by 44%, gamma-glutamyl transferase – by 7%, glucose – by 23%, creatinine – by 15 %, triglycerides – by 39%, cholesterol – by 28%. At the same time a number of studied parameters in blood of mares in experimental group was lower: alpha-amylase – by 20%, urea – by 31%, chlorine – by 8%.

The increase of glucose in blood of horses that stay at the altitude of 1313 m. above sea level is connected with workability. One way of transporting energy in animal's organism is the formation and breakdown of glucose. With decreasing of workability of horse the level of glucose in blood decreases. Therefore, one can conclude that the horses that live at the altitude of 1313 m have better workability than horses that stay in the lowlands, because of the lower glucose level in blood [1].

Under extreme stresses of horse's muscles in blood change alkaline phosphatase and as blood of the mares at the mount Magura contents of much more of this component it reaffirms their better workability.

Conclusions

Changes in general and biochemical blood parameters of Hutsul horse breed are due to the influence of different heights and conditions of stay.

Horses that live at the altitude of 1313 m. have higher content of red blood cells, hemoglobin and hematocrit, their rates are a little higher than normal. This is due to reduced oxygen content in the air. In horse blood activates anaerobic power and increases the ability of tissues to a more efficient use of the limited amount of oxygen.

One way of transporting energy in animal's organism is the formation and breakdown of glucose. With decreasing workability of

horses glucose in their blood is reduced. This is why horses that stay at the altitude of 1313 m have better workability.

References

1. Andreychuk A. B. Their fluence of physical activity on hematological profile of Ukrainian horse breed horses / A. V. Andreychuk [collection of scientific-practic. Conf. 22-25 September. 2005]. - H., 2014. - 312 p.
2. Bazhibina E. Methodological framework for the assessment of clinical and morphological parameters of blood of pets / [Bazhibina E., A. Korobov, Sereda S., V. Saprykin]. - M. : OOO "Aquarium Print", 2005. - 128 p.
3. Berezovsky A. B. Effect of training in terms of average height on the functional condition of horses / A. V. Berezovsky [collection of scientific-practic. Conf. Apr 17-20. 2007]. H., 2014. - 312 p.
4. Horanchuk V. V. Hypoksyterapyya / Horanchuk V. V., Sapova N. I., Ivanov A. A. - SPb. : ЭЛBY-SPb, 2003. - 536 p.
5. Kolchinskaya A. Z. Use of adaptation to hypoxia in the course of interval hypoxic training to improve the aerobic performance and health of trotting horses / [A. Z. Kolchinskaya, S. A. Kozlov, T. N. Cyganova]. - M. : PIAMS, 1999. - S. 122 -134.
6. Kolchinskaya A. Z. Normobaric interval hypoxic training in medicine and sports / [Kolchinskaya A. Z., T. N. Cyganova Ostapenko LA] | - M. : Medicine, 2003. - 408 p.
7. Levashov M. I. Integral normobaric hypoxic training as a method of rehabilitation of qualified athletes / M. I. Levashov, J. B. Berezovsky, Vladimir I. Malyuta // Actual Problems of Physical Culture i Sport №3. - K., 2004 - 115 p.
8. Nerodenko V. V. Biological basis of sports training in equestrian sport / Nerodenko V. V. - Cherkassy, 2009. - 412 p.
9. Radchenko O. M. Adaptive response in clinical internal medicine / Radchenko O. M. - Lions League-Press, 2004.
10. Suslov F. P. Sports training in conditions of average height / Suslov F. P. - M., 1999. - 202 p.