



ISSN Print: 2394-7500
ISSN Online: 2394-5869
Impact Factor: 5.2
IJAR 2017; 3(2): 272-277
www.allresearchjournal.com
Received: 11-12-2016
Accepted: 12-01-2017

Bakirov Baxtiyar
Samarkand Agricultural
Institute (Uzbekistan), Dr. of
Veterinary of Non-Contagious
Animal Diseases, Obstetrics
and Gynecology of the Faculty
of Veterinary

Ruzikulov Nuriddin
Samarkand Agricultural
Institute (Uzbekistan), PhD on
Veterinary of Non-Contagious
Animal Diseases, Obstetrics
and Gynecology. The Faculty
of Veterinary

Boboev Oybek
Samarkand Agricultural
Institute (Uzbekistan), Senior
Research Fellow – Competitor
Assistant Professor of Non-
Contagious Animal Diseases,
Obstetrics and Gynecology.
The Faculty of Veterinary

Kuchkarov Xokimjon
Samarkand Agricultural
Institute (Uzbekistan), Master
of the Faculty of Veterinary

Correspondence
Bakirov Baxtiyar
Samarkand Agricultural
Institute (Uzbekistan), Dr. of
Veterinary of Non-Contagious
Animal Diseases, Obstetrics
and Gynecology of the Faculty
of Veterinary

Etiopathogenesis, gepatogenetic implications and early diagnosis of disorders of protein metabolism in productive animals in Uzbekistan conditions

Bakirov Baxtiyar, Ruzikulov Nuriddin, Boboev Oybek and Kuchkarov Xokimjon

Abstract

The article presents the cartogram level of protein metabolism in cows, depending on the type of ration, age, time of lactation and pregnancy and geo – ecological conditions (according, to the level of environment population) of Uzbekistan, as well as the ecological factors, pathogenesis, gepathogenical consequences and early disorders diagnosis cows and karakul sheep.

Keywords: Cow, cartogram level of protein metabolism, ration type, cows age, karakul sheep, period of lactation and pregnancy, (ewe in year), geo – ecological conditions, lack of ration supply, common protein, protein fractions, hypoproteinemy, gepatogenical consequences, lipids, ferments, immune status, liver dystrophy, early diagnostics

Introduction

The analysis of research results conducted by many foreign and domestic scientists shows that one of the main features of metabolic disorders in animals are hidden for a relatively long period of time and the mass coverage of livestock making them difficult in time diagnosis and removal [3]. This reduces body weight and milk production of cows, unsustainable new born young animals, increases feed consumption per unit of output, deteriorating reproductive ability of breeding stock, resulting in large economic losses [11, 15]. According to I.G. Sharabrin and co-auth. [7], the main reason for violation of protein metabolism in cows is defective and one-sided feeding, especially low content of digestible protein diet (90-120 g per f.u.).

This pathology noted in animals is not only due to the lack, excess or low quality forage proteins [1, 4] or essential amino acids (arginine, histidine, isoleucine, leucine, lysine, methionine, cystine, phenylalanine, tyrosine, threonine, triptofan) [12], but also with diarrhea, edema, hemorrhagic diathesis, proteinuria, ascites, fasting, fever, poisoning, radioactive irradiation, a number of infectious and parasitic diseases [13].

It is recommended to evaluate the metabolism of protein in the number of common protein and protein fractions in blood serum, as well as by the results of protein sediment samples [6].

Data on the impact of early diagnosis and protein metabolism disorders of gepathogenic and other types of diseases in cows and karakul sheep in Uzbekistan is missing.

Objective of the research is to make a cartogram level, identify the etiological factors and study gepatogenic consequences, and work out the methodics of early diagnosis of protein metabolism disorders in productive cows and karakul sheep in different geo – ecological conditions of Uzbekistan.

Material and methods

The experiments were conducted in farmers associations “Gulistan” Samarkand region and “Dustlik” Pastdargom region Samarkand province, “Gulistan” Nishan district of Kashkadarya province, and “Sh. Rashidov” Kagan district of Bukhara province, “Sahobata” Nurabad district of Samarkand region and “Sayrob” Boysun district Surhandarinskoy region of Uzbekistan the territory of which the soil is accordingly not saline, saline in moderate to severe degree.

In Samarkand province 20 heifers and 20 cows were selected in 1-5 th calving with an average daily milk production of up to 10 kg (in each group, one half of the animals received silage and the concentrate ration, and the other - hay-concentrate ration). In heifers of different stages of pregnancy and in lactating cows were bled monthly for biochemical analysis, and if necessary – underwent clinical examination and examined the liver, in the other 2 areas of experiment included only the third calving cows (in the same amount and with the same type of feeding).

To compile cartogram level of protein metabolism in the blood serum common protein (refractometric method), and the study hepatogenic consequences disturbances in blood and blood serum was determined the number of erythrocytes (Goryaeva method), hemoglobin (Sali method), protein fractions (turbidimetric, nefelometric), urea (color reaction with diacilmonooxin), glucose (color reaction with ortotoluidin), bilirubin (method Iendrashek, Kleggorn and Grof), triglycerides (a method of Sardes and Manning), non-esterified fatty acids (method of electrophoresis and Tibling), phospholipids (method of Barlet-Usher), beta-lipoproteids (Burstein method Vinogradov modification), total (method Liberman-Burchard, to modify Ilk) and esterified (method Balakhovskiy) cholesterol and the activity of enzymes AST and ALT (dinitrofenilgidrazinic method Reitman, Frenkel), SDG (resorcinol method Sewell and Tovarek), LDG (2,4-dinitrofenilgidrazinec method Sewell and Tovarek), GGT (with LY-glutamine – 4-nitroanilide), and CE (colorimetric method).

Specifies the number of T (rosette method using sheep red blood cells-E-ROC) – and B (third complement component receptor formation method)-lymphocytes in the blood. When the liver study drew attention to the yellowness of the mucous membranes, body pain and topographical boundaries. Also analyzed the content of the diets of essential nutrients, vitamins and minerals components.

The results of research

The results of research carried out on the farm “Gulistan” Samarkand district of Samarkand province aimed at drawing up cartogram level of protein metabolism in cows and heifers are shown in tabl.1.

The table shows that the cows under adequate conditions of protein metabolism level varies depending on the age and manifests “wavy dynamics” which is characterized by high amounts of common protein in the serum of the first cows calving ($65,0 \pm 2,0$ - $65,6 \pm 2,22$ g/l) and then lowered that figure to fourth calving ($61,2 \pm 1,9$ - $61,5 \pm 2,01$ g/l). By the fifth calving shows a slight increase ($62,0 \pm 2,0$ - $62,5 \pm 2,0$ g/l).

Depending on the time of pregnancy and lactation, protein metabolism level manifests a peculiar dynamics. Thus, in conditions in heifers and silage and the concentrate (from $64,0 \pm 2,22$ to $66,4 \pm 1,9$ g/l) and the concentrate of hay- (with up from $63,1 \pm 1,8$ to $65,6 \pm 2,1$ g/l) feeding from the beginning to the end of pregnancy, such as the number of the indicator rises rapidly (“dynamics of rectilinear increase”).

At first calving cows silage – type feeding the concentrate to 5 months (from $65,6 \pm 2,22$ to $63,1 \pm 2,02$ g/l) under the conditions of the concentrate of hay-type (from $65,0 \pm 2,0$ to $62,2 \pm 2,1$ g/l), the second cows (from $65,2 \pm 2,0$ to $61,5 \pm 1,6$ g/l and from $64,7 \pm 1,8$ to $61,0 \pm 1,6$ g/l, respectively), and the third (from $64,5 \pm 1,7$ to $52,5 \pm 1,8$ g/l и from $64,1 \pm 2,0$

$52,0 \pm 1,6$ g/l, respectively) calving in both conditions – up to 6 months in cows calving fourth-up to 7 months (from $61,5 \pm 2,0$ to $59,5 \pm 1,84$ g/l и from $61,2 \pm 1,9$ to $59,3 \pm 1,8$ g/l, respectively) lactation protein metabolism level decreases rapidly (“dynamics of the reflection rapidly”), and then to the pregnancy increases. In the fifth calving cows in the two types of feed slide (with $62,5 \pm 2,0$ to $60,0 \pm 1,83$ and $62,0 \pm 2,0$ to $59,5 \pm 1,6$ g/l, respectively), extends to 8-months lactation (“dynamics of the rectilinear slide”).

Reduced levels of protein metabolism (total protein in the serum of 71 g/l or less) among heifers 60-70, the first and second cows calving -70-80, third, fourth and fifth calving-80-90 percent of the animals. Animals with greatly reduced levels of protein metabolism (total protein in the serum, of 51 g/l or less) in all cases, observation averaged 10-20 percent.

Cows in the extreme (from $63,5 \pm 2,1$ to $54,6 \pm 1,6$ and $63,0 \pm 2,0$ to $51,1 \pm 1,58$ g/l, respectively) and extreme sharply (from $63,2 \pm 2,12$ to $52,0 \pm 1,48$ и $63,1 \pm 2,04$ to $51,9 \pm 1,64$ g/l, respectively) geo-ecological conditions in both types of feeding level of protein metabolism to 6-month lactation decreases rapidly (“dynamics of the reflection reduction”), and then to the end of pregnancy increases. Under these conditions, the animals with a reduced level of protein metabolism was 80-100 percent, including greatly reduced level 10-40 percent.

From the analysis results, it follows that the productive cows depending on the age and the time of lactation and pregnancy, type of feed and geo-environmental conditions prominently a violation of protein metabolism that is characterized by a decrease in the common amount of protein in serum in adequate conditions to $52,0 \pm 1,6$ g/l, and in extreme, extreme dramatically – to $51,1 \pm 1,58$ g/l (at a rate of 72-86 g/l). Number of animals with a reduced level of protein metabolism (common protein in the serum 71 g/l or below) under adequate conditions during lactation enhanced reaches the average of 80-90, with a strongly reduced (including a sharp extreme) conditions to 80-100 and 10-40 percent, respectively.

Analogical data were obtained in the study of blood test karakul sheep approaching okotnogo period, especially in the conditions of Nurabad district, which established infestation hypoproteinemia ewes averaged 60-80 percent.

It is necessary not to decrease that lowering the level of protein metabolism in cows most cases accompanied decrease erythrocyte count to $5,24 \pm 0,41$ mln/mkl, the hemoglobin in the blood up to $84,0 \pm 0,49$ g/l, albumin to $26,0 \pm 0,50\%$, of urea to $1,8 \pm 0,04$ mmol/l, of glucose to $1,59 \pm 0,02$ mmol/l, triglycerides to $69,0 \pm 0,79$ mg%, phospholipids to $142,5 \pm 4,3$ mg%, beta-lipoproteids to $312,6 \pm 3,5$ mg% and cholesterol esters to $1,14 \pm 0,04$ mkmmol/l and increased bilirubin up to $4,70 \pm 0,16$ mkmmol/l, NEFA to $20,5 \pm 0,84$ mg% and the total cholesterol to $3,32 \pm 0,12$ mkmmol/l.

By lowering the level of protein metabolism was observed a marked increase in ALT (up to $0,45 \pm 0,01$ mmol/h.l), AST (up to $0,92 \pm 0,03$ mmol/h.l), of LDG (up to $5,01 \pm 0,41$ mmol/h.ml), SDG (up to $2,0 \pm 0,17$ mmol/h.ml), GGT (up to $128,4 \pm 4,35$ mkmmol /ML) and a decrease in CE (up to $51,4 \pm 1,88$ mkmmol / h.ml).

Violation of protein metabolism in cows accompanied by dysfunction of the thyroid and parathyroid glands, which was characterized by increased activity of alkaline

phosphatase in the blood serum (up to 33 units. At a rate of 9-15 units.).

Thus, the observed pulse more frequent (62, 2 - 63, 7 times per min) and respiration (23, 6- 24, 9 times per min). Hypo- and atony proventriculus swept up to 30-40, lizuha-30-40, yellowness mucous membranes, increased border liver and her tenderness swept up to 20-30 percent of the animals.

Cows with violence protein metabolism as determined by the state of the immune status, which was characterized by an increase of B-lymphocytes (to 30, 32%) and a decrease in T- lymphocytes (to 15, 1%). Thus there was reduction in the number of T-helper cells (51, 6%) and T-suppressor (23, 5%), an increase in T-killer (15, 8%).

Due to the fact that in case of violation of protein metabolism, along with other prominent pathological changes in the exchange substances were changes that indicate pathology liver, we are in terms of local slaughterhouses and meat stalls in areas which contain experimental cows was conducted organoleptic testing samples liver, the results of which show that the most prevalent pathologies in the liver tissue of cows is a degeneration that under the Samarkand region (adequate - by condition) averages 31,5-38,0, Kashkadarya region (extreme condition)-33,3-44,0, Bukhara region (dramatically an extremal condition) -36,0-48,0%. A sheep infection pecheny dystrophy was under Nurabad district an average of 32, Boysun district -26 percent.

In households where the experiments were carried out, due to a violation of protein metabolism wich hepatogenic effects was observed decrease in the average daily weight gain of cattle by 19, 4%, milk yield – 60%, increase in infertility and the degree of liver tissue rejection 33, 3%, in weight of calves at birth is 8%, the annual economical damage one head of cow in adequate conditions was on average 1723350, in extreme and dramatically extreme conditions 1810416 and 1902800 soums.

Zootechnical feed analysis results and their comparison with normative data [5] shows that in the winter-spring diet of dairy cows on the general insecurity of nutritionally adequate in terms of 7,5%, in the extreme-to 13,75%, and in dramatically extreme-5%, in digestible protein, 6,0%, 12,0% and 3,5%, respectively, the phosphorus- by 20,0%, 28,6% and 22,3%, respectively, sugar –53,2%, 49,0% and 48,6%, respectively, carotone –60%, 41,0% and 40,7%, respectively, and increased security for calcium (30%, 66,8% and 40%, respectively), sugar-protein ratio in it 0,42-0,50 (at a rate of 0,8), calcium-phosphorus – 2,32-3,33 (at a rate of 1,5-2,0), that in our opinion, were the main causes of violations of protein metabolism in cows especially during lactation enhanced.

The analysis of the literature data and the results of our clinical and laboratory studies showed that violations of protein metabolism in productive cows and karakul sheep

can [2] cover definitely a large number of animals in the group and develop in close relationship with impaired glucose and lipid metabolism and for a long period (months and years) can occur hidden clinically manifested only in the form of so called general metabolic syndrome, which is characterized by emaciation, a decrease in milk quality, deterioration of reproductive capacity and lengthening the service period, an increase of detention afterbirth, endometritis, maternity paresis and birth underdeveloped calves, often become ill neonatal dyspepsia, bronchopneumonia, rickets, etc. Such cows and sheep and calves and lambs are often subjected to forced slaughter.

In the absence of effective prevention and treatment of the animals with increasing age of the cow, especially at the peak of lactation and at karakul sheep with the deepening suyagnosti, because of energy supply shortages and plastic material first, with one hand, develop violation formation of volatile fatty acids in the proventriculus towards reducing the amount of propionic, increase- butyric acid, which should be an energy imbalance (violation of cycle tricarbonica acids), on the other hand- a violation of microbial processes and ribosomal protein synthesis, hence the amino acid metabolism. Necessity appears in gluconeogenesis, where in energy metabolism include lipids, which cleavage products are glycerol and fatty acids. Oxidized fatty acids accumulate in the cytoplasm of hepatocytes in the form of fat globules fatty infiltration that is dystrophy.

Violated liver functions, i.e. general metabolic syndrome goes into stage disfunctions liver (hepatogenic consequences), which is clinically accompanied by lizuha, hypotonia and atony proventriculus, increased heart rate and respiration, yellowness of the mucous membranes, pain reaction to palpation of the liver and increases its borders. In decrease blood erythrocyte count, hemoglobin, albumin, urea, glucose, triglycerides, phospholipids and beta-lipoproteids, cholesterol esters, increase – bilirubin, NEFA and total cholesterol. Also, increased activity ALT, AST, SDH, LDH, GGT, reduced- CE. It lowers the immune status of the body.

Sensory Evaluation of liver tissue samples found that the most prevalent pathologies in the liver in cows is a degeneration, an average of cows 31,5-48,0% and karakul sheep-26-32% depending on the geo-ecological conditions. It's necessary to note that the inclusion in the energy metabolism of tissue proteins, except for degenerative lesions of liver, increases the probability of development of cirrotic changes in the body, hence the gepathogenic reverse reaction, which is accompanied by an even more profound impairment of protein-carbohydrate and lipid metabolism of no reverse nature. According to this, in the fight against metabolic disorders, including disorders of liver leading role is olevoted for the early diagnosis.

Table 1: Cartogram of protein metabolism in cows and heifers

Animals type	Indicators, % of animals	Amount of common protein in blood serum, g/l											
		Lactation and pregnancy period, months											
		1	2	3	4	5	6	7	8	8	9		
Adequate condition (in Samarkand province, silage-concentrate type of feeding)													
Heifers	Average	64,0±2,22	64,1±2,0	64,3±2,0	64,5±2,2	65,1±2,2	65,4±2,2	65,6±2,3	66,1±2,0		66,4±1,9		
	Normal	30	30	30	30	30	30	30	30		30		
	Low	70	70	70	70	70	70	70	70		70		
	Strongly low	10	10	10	10								
Cows	calves	1	Average	65,6±2,22	65,4±2,22	64,5±2,2	63,6±2,2	63,1±2,02	63,2±2,03	63,2±2,03	63,8±2,2	64,1±2,04	64,5±2,0
			Normal	30	30	30	30	20	20	20	30	30	30
			Low	70	70	70	70	80	80	80	80	70	70
			Strongly low				10	10	10	10			
		2	Average	65,2±2,0	64,5±2,0	63,5±2,0	63,0±1,8	62,0±1,8	61,5±1,6	62,0±2,0	62,5±2,0	63,1±2,0	63,5±1,8
			Normal	30	30	20	20	20	20	20	20	20	20
			Low	70	70	80	80	80	80	80	80	80	80
			Strongly low						10	10			
		3	Average	64,5±1,7	63,5±1,8	62,0±1,8	61,3±1,8	59,9±1,8	52,5±1,8	56,5±1,8	56,8±1,8	57,2±1,6	59,5±1,7
			Normal	20	20	20	20	10	10	10	10	10	10
			Low	80	80	80	80	90	90	90	90	90	90
			Strongly low		10	10	10	10					
		4	Average	61,5±2,0	61,3±2,02	61,0±2,01	60,6±2,01	60,3±1,44	60,0±1,99	59,5±1,84	60,1±2,02	61,0±2,01	62,0±1,91
			Normal	20	20	20	20	10	10	10	10	20	20
			Low	80	80	80	80	90	90	90	90	80	80
			Strongly low						10	10	10		
		5	Average	62,5±2,0	62,0±2,0	61,5±1,92	61,2±1,9	61,0±1,5	60,6±1,52	60,3±2,02	60,0±1,83	60,6±1,91	61,5±1,84
			Normal	20	20	20	20	10	10	10	10	10	20
			Low	80	80	80	80	90	90	90	90	90	80
			Strongly low					10	10	10	10	10	
Amount of common protein in blood serum, g/l													
Lactation and pregnancy period, months													
Adequate condition (in Samarkand province, hay-concentrate type of feeding)													
Heifers	Average	63,1±1,8	63,3±1,8	63,5±1,9	63,8±1,9	64,0±2,2	64,3±2,0	64,5±2,2	65,1±2,2		65,6±2,1		
	Normal	20	20	20	20	30	30	30	30		30		
	Low	80	80	80	80	70	70	70	70		70		
	Strongly low	20	20	20	20	10	10	10					
Cows	calves	1	Average	65,0±2,0	64,6±2,2	64,1±2,04	63,3±2,03	62,5±2,0	62,2±2,1	62,6±2,0	63,4±2,0	63,5±2,2	64,0±2,04
			Normal	30	30	30	20	20	20	20	20	30	30
			Low	70	70	70	80	80	80	80	80	70	70
			Strongly low			10	10	10	10	10	10		
		2	Average	64,7±1,8	64,2±1,9	63,9±2,0	62,5±1,9	62,0±1,8	61,0±1,6	61,5±1,8	62,2±1,8	62,5±1,8	63,0±1,98
			Normal	30	30	20	20	20	20	20	20	20	20
			Low	70	70	80	80	80	80	80	80	80	80
			Strongly low					10	10	10	10		

Animals type	3	Average	64,1±2,0	63,8±1,8	63,3±1,8	61,1±1,8	59,5±1,8	52,0±1,6	55,5±1,8	56,5±1,8	56,6±1,8	58,2±1,9	
		Normal	20	20	20	20	10	10	10	10	10	10	10
		Low	80	80	80	80	90	90	90	90	90	90	90
	4	Strongly low	10	10	10	10	20	20	10				
		Average	61,2±1,9	60,9±2,0	60,7±2,0	60,2±2,0	60,0±1,9	59,7±1,8	59,3±1,8	59,7±1,8	60,6±2,0	61,5±2,0	
		Normal	20	20	20	20	10	10	10	10	10	20	
	5	Low	80	80	80	80	90	90	90	90	90	80	
		Strongly low					10	10	20	10	10		
		Average	62,0±2,0	61,5±2,0	61,2±2,0	61,0±1,9	60,7±1,9	60,5±1,8	60,0±1,8	59,5±1,6	60,5±1,6	61,0±1,8	
	Animals type	Diet type	Indicators, % of animals	Amount of common protein in blood serum, g/l									
				Lactation and pregnancy period, months									
				1	2	3	4	5	6	7	8	8	9
Extremal condition (in Kashkadarya province)													
Cows of 3- calves	silage-concentrate	Average	63,5±2,1	62,7±2,13	61,0±1,99	61,0±2,0	56,5±1,84	54,6±1,6	54,8±1,6	54,9±1,6	55,0±1,6	56,0±1,8	
		Normal	20	20	20	10	10		10	10	10	10	
		Low	80	80	80	90	90	100	90	90	90	90	
		Strongly low	10	10	20	20	30	30	30	30	20	20	
	hay-concentrate	Average	63,0±2,0	62,0±1,9	61,0±2,0	59,5±2,25	55,5±1,6	51,1±1,58	52,0±1,62	53,5±1,74	54,0±1,58	55,0±2,0	
		Normal	20	20	10	10	10			10	10	10	
		Low	80	80	90	90	90	100	100	90	90	90	
		Strongly low	20	20	30	30	40	40	40	40	30	30	
Sharp-extremal condition (in Bukhara province)													
Cows of 3- calves	silage-concentrate	Average	63,2±2,12	62,5±2,0	61,5±2,14	61,0±1,92	57,5±1,6	52,0±1,48	53,0±1,61	54,2±1,81	55,5±1,89	56,5±2,0	
		Normal	20	20	20	20	10			10	10	10	
		Low	80	80	80	80	90	100	100	90	90	90	
		Strongly low	10	10	10	10	20	30	30	20	20	20	
	hay-concentrate	Average	63,1±2,04	62,3±1,9	61,3±1,94	60,0±1,99	57,0±1,83	51,9±1,64	52,9±1,64	54,0±1,78	55,1±1,62	56,2±1,8	
		Normal	20	20	20	10	10			10	10	10	
		Low	80	80	80	90	90	100	100	90	90	90	
		Strongly low	20	20	20	20	30	40	30	30	20	20	

Conclusion

1. Violation of protein metabolism in productive animals can certainly cover a large number of animals (up to 60-100%) in the group and is developing in close relationship with impaired glucose and lipid metabolism and for a long period (months, years) can take place secretly, clinically manifested only in a so-called common metabolic syndrome.
2. In the absence of effective prevention and treatment of the animals with increasing age of the cows, especially during the height of lactation, and in karakul sheep with the deepening suyagnosti overall metabolic syndrome goes into stage dysfunctions pecheny in the form of dystrophy (gepatogennye consequences), which is accompanied by special gepatoklinicheskimi and gepatobiohimicheskimi changes.
3. Basic etiological factors violation of protein and carbohydrate and lipid metabolism and liver dystrophy in productive animals are deficit diet of sugar, phosphorus and carotene in the excessive content of calcium there, a low ratio of sugar and protein, and a high ratio of calcium and phosphorus. This form of metabolic disorders is more pronounced in adult cows than young. Its emergence contribute to hay-concentrate type of feeding and soil salinity.
4. For the early diagnosis of disorders protein-carbohydrate-lipid metabolism and liver dystrophy in cows and karakul ewes it is advisable to arrange the planned check-up, with taking into account age/, time of lactation, nutritional diet, the degree of soil salinity and total metabolic syndrome (emaciation, decrease in milk yield and milk quality, deterioration of the reproductive capacity and lengthening the service period, the increase in the incidence of detention afterbirth, endometritis, maternity paresis, as well as the birth of underdeveloped calves) to conduct clinical research aimed at identifying the specific gepathoclinical (lizuha, hypo-and atony proventriculus, increased heart rate and respiration, yellow mucous membranes, pain response to palpation the liver and increase its boundaries) and special gepatobiochemical (blood decrease eritricyte count, hemoglobin, albumin, urea, glucose, triglycerides, phospholipids and beta-lipoprotein, cholesterol esters, increase – bilirubin, NEFA and total cholesterol, as well increased activity of ALT, AST, SDH, LDH, GGT, AF and lowering - ChE) changes.

References

1. Aliev AA *et al.* Prevention of metabolic diseases in farm animals. M. Agropromizdat. 1986, 62-80.
2. Bakirov B, Ruzikulov NB, Haitov N. Method of complex dyspancerization of cows and sheep. Certificate the deposit of intellectual property. Registration, 2015, 2273.29.01. Mr.
3. Bakirov B, Ruzikulov NB. Status of protein and carbohydrate metabolism in dairy cows at hepathodystrophy. Proceedings of the international scientific conference on the pathophysiology of animals dedicated to the 200-th anniversary of veterinary education in Russia and the 200-th anniversary of SPBGAVM.St. Petersburg. 2008, 12.
4. Vrzgula L *et al.* Prevention of metabolic disorders in agricultural animals. M. Agropromizdat. 1986, 65-113.

5. Kalashnikov AP, Kleimenov NI. Standarts and ration feeding agricultural animals. M. Agropromizdat. 1985, 202-219.
6. Kondrachin IP. Nutritional and endocrine diseases of animals. M. Agropromizdat. 1989, 140-177.
7. Sharabrin IG, Kondrachin IP, Shayhamanov MH. Methodological guidelines for complex dyspancerization of cattle. M.MVA. 1988, 140.
8. FAO. Amino acid content of food and Biological date on protein. 1976.
9. Bigwood EJ. Protein and amino acid function. Pergamon P. Oxford. 1972.
10. Mc.Donald LE, Pineda MN. Veterinary endocrinology and reproduction. 4-th ed. Philadelphia. Leach Febiger. 1989.