

Level of Protein Metabolism in Cows in Uzbekistan Conditions

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Annotation: The article presents the results of a study of blood serum of heifers and cows of different ages depending on the period of pregnancy, lactation, type of feeding and environmental conditions. The time of the most pronounced disorders of protein metabolism in cows was determined. The parameters of protein metabolism characteristic of healthy and sick cows with protein metabolism disorders under conditions of silage-concentrate and hay-concentrate types of feeding have been established.

Keywords: Metabolic disease. Dairy cows. Metabolic level cartograms. Lactation periods. Environmental conditions. Total protein. Hypoproteanemia. Early diagnosis. Group prevention.

Relevance. In solving the tasks set by the government of the Republic of Uzbekistan to deepen agrarian reforms aimed at providing the population of the republic with livestock products, major obstacles are metabolic diseases in productive animals, including impaired protein metabolism in dairy cows. Thus, the results of our research show that on average 30-70% of cows suffer from metabolic diseases, the main manifestations of which are severe weight loss, a noticeable decrease in milk production, the birth of low-viable young animals, increased feed consumption per unit of production, forced slaughter of sick cows. Based on this, work aimed at developing methods for timely diagnosis of metabolic disorders, including protein metabolism in cows is relevant.

Analysis of the literature data shows that, despite the fact that world scientists (I.G. Shabardin, M.Kh. Shaikhamanov, I.P. Kondrakhin, Kh.Z. Ibragimov, etc.) have achieved significant results in diagnosis and prevention metabolic disorders in productive animals, the development of methods for early diagnosis and group prevention of protein metabolism disorders in cows in the conditions of Uzbekistan, depending on age, type of feeding, lactation period and environmental situations, is considered unresolved.

Materials and research methods. The amount of total protein in the blood serum was determined in heifers and cows of the first, second, third, fourth and fifth kind, fed silage-concentrated and hay-concentrated types of feeding in the conditions of Samarkand farms, where the environmental situation is adequate for the animal's body, as well as Bukhara and Kashkadarya regions, where the environmental situation is extreme for the animal body.

Test results. In the conditions of the Samarkand region, where the ecological situation for the animal body is relatively adequate, in heifers fed silage-concentrate feeding, the amount of total protein in the blood serum in the first month of pregnancy averaged 64.0 ± 0.22 g/l. As pregnancy progressed, a dynamic increase in this indicator was observed and by the end of pregnancy it averaged 66.4 ± 0.19 g/l.

A strongly reduced level of protein metabolism was observed in 1, 2, 3 and 4 months of pregnancy in 10% of animals.

In the hay - concentrated type of feeding, the amount of total protein in the blood serum in the first month of pregnancy averaged 63.1 ± 0.18 g/l; as pregnancy deepened, a dynamic increase was also observed and by the end of pregnancy averaged 68.6 ± 0.21 g/l. A strongly reduced level of protein metabolism was noted in 1, 2, 3, 4, 5, 6 and 7 months of pregnancy, respectively, in 20, 20, 20, 20, 10, 10 and 10% of animals.

In cows of the first kind fed with silage-concentrate type of feeding, the amount of total blood protein in the first month of lactation averaged 65.6 ± 0.22 g/l. With increasing lactation, a noticeable decrease was observed and by the 5th month it averaged 63.1 ± 0.20 g/l. Starting from the 6th month, a dynamic increase was observed and by the 8th month of lactation it averaged 63.8 ± 0.22 g/l, before birth - 64.5 ± 0.23 g/l. A strongly reduced level of protein metabolism was observed in 4, 5, 6 and 7 months of lactation, uniquely in 10% of animals.

In the hay - concentrated type of feeding, the amount of total blood protein in the first month of lactation averaged 65.0 ± 0.20 g/l, and its decrease continued until the 6th month of lactation (62.2 ± 0.21 g/l). A greatly reduced level of protein metabolism was noted starting from the 3rd month of lactation until the beginning of the dry period (in 10% of animals).

In cows of the second kind, both in silage-concentrated and hay-concentrated types of feeding, the amount of total blood protein dynamically decreased until the 6th month of lactation (respectively from 65.2 ± 0.20 to 61.5 ± 0.16 g/l and from 64.7 ± 0.18 to 61.0 ± 0.16 g/l), and then its gradual increase was observed and by the end of lactation it reached 63.5 ± 0.18 and 63.0 ± 0.19 g/l, respectively. A greatly reduced level of protein metabolism under conditions of silage-concentrate type in 5, 6 and 7 months of lactation, and under conditions of hay-concentrate type - in 5, 6, 7 and 8 months of lactation.

In cows of the third kind in both types of feeding, the amount of total blood protein decreased markedly compared to the indicators of cows of the second kind. Thus, in the silage-concentrate type, the amount of this indicator in the first month of lactation averaged 64.5 ± 0.17 g/l and its gradual decrease continued until the 6th month of lactation (52.5 ± 0.18 g/l), and then a dynamic increase until the end of the dry period (59.5 ± 0.17 g/l). In the hay-concentrate type of feeding, a similar phenomenon was also noted (from 64.1 ± 0.20 to 52.0 ± 0.16 g/l and up to 58.2 ± 0.19 g/l). A strongly reduced level of protein metabolism in silage-concentrate was noted in 2, 3, 4, 5 and 6 months (definitely 10% of animals in each period), and in hay-concentrate - in 1, 2, 3, 4, 5, 6 and 7 months (in 10, 10, 10, 10, 20, 20 and 10% of animals) lactation.

In cows of the fourth kind, both under conditions of silage-concentrated and hay-concentrated type of feeding, a noticeable decrease in the amount of total blood protein was observed compared to the previous kind. Thus, in the first month of lactation the amount of this indicator averaged 61.5 ± 0.20 and 61.2 ± 0.19 g/l and its gradual decrease continued until the 7th month (59.5 ± 0.18 and 59.3 ± 0.18 g/l). By the end of the dry period, the amount of this indicator in the silage-concentrate type increased to 62.0 ± 0.19 g/l, in the hay-concentrate type - to 61.5 ± 0.20 g/l. A strongly reduced level of protein metabolism was noted in silage-concentrate - in the 6, 7 and 8 months (10% of animals in each), in hay-concentrate - in 5, 6, 7 and 8 months of lactation and in the first half of the dry period (in 10, 10, 20, 10 and 10% of animals, respectively).

In cows of the fifth kind, although there was a slight increase in the level of protein metabolism compared to the previous kind, a dynamic decrease in the amount of total blood protein continued until the end of lactation (from 62.5 ± 0.20 to 60.0 ± 0.18 g/l in silage-concentrate and from 62.0 ± 0.20 to 59.5 ± 0.16 g/l - in the hay-concentrate type of feeding). A greatly reduced level of protein metabolism (10% of animals in the silage-concentrate type was observed in the 6, 7 and 8 months of lactation and in the first half of the dry period, and in the hay-concentrate type - this level was observed starting from the 5th month of lactation).

Analysis of the study results shows that the lowest level of protein metabolism was noted in the 6th month of lactation in cows of the third kind (52.5 ± 0.11 g/l in silage-concentrate and 52.0 ± 0.12 g/l in hay-concentrated concentrate type of feeding). The dynamic decrease in this level in cows of the first kind under silage-concentrate type conditions lasted up to the 5th month, and under hay-concentrate type conditions - up to the 6th month of lactation. In cows of the second and third kind, the decrease in the level of protein metabolism in all cases lasted up to 6 months, in cows of the fourth kind - up to 7 months, and in cows of the fifth kind - up to 8 months of lactation, which is explained by the lack of supply of the cow's body with plastic material for the growth and development of the fetus, as well as milk production.

In the conditions of the Bukhara region, in cows of the third kind in the silage-concentrate type of feeding, the amount of total protein in the blood serum in the first month of lactation averaged 63.2 ± 0.21 g/l, and then dynamically decreased until the sixth month of lactation (52.0 ± 0.14 g/l). Starting from the seventh month it gradually decreased and before birth averaged 56.5 ± 0.20 g/l. A strongly reduced level of protein metabolism in 1, 2, 3 and 4 months of lactation was observed in 10%, in 5 - 20%, in 6 and 7 - 30%, in the 8th month of lactation and during the dry period, equally in 10% of animals.

In the hay-concentrate type of feeding, the amount of total blood protein also decreased until the sixth month of lactation (from 63.1 ± 0.20 to 51.9 ± 0.16 g/l), and then, until the end of the dry period, it increased noticeably (56.2 ± 0.18 g/l). A greatly reduced level of protein metabolism also covered the entire lactation and dry periods. Thus, animals with a greatly reduced level of protein metabolism in 1 and 2 months of lactation amounted to 10%, in 3 and 4 - 20%, in 5 - 30%, in 6 - 40%, in 7 and 8 - 30%, in the first half dry period - 20%, in the second - 10%.

In the conditions of the Kashkadarya region, in cows of the third kind and in silage-concentrated and hay-concentrated types of feeding, the dynamics of total protein in the blood serum was identical to the data obtained in the conditions of the Bukhara region. A greatly reduced level of protein metabolism in the silage-concentrate type of feeding in the 1st and 2nd month of lactation was noted in 20%, in 3 and 4 - 30%, in 5 - 40%, in 6 and 7 - 50%, in 8 - 40%, in the dry period - 30%. Consequently, noticeable increases in protein metabolism disorders in cows in the Bukhara and Kashkadarya regions are explained not only by increased lactation and increased pregnancy, but also by the negative influences of extreme soil-climatic and environmental conditions.

Conclusions.

1. In the conditions of the Samarkand region, severe hypoproteinemia in cows of the first kind was observed in 5 and 6 months, in the second and third births - in 6, in the fourth kind - in 7, in the fifth kind - in 8 months of lactation, and the most pronounced disorders were observed in the hay-concentrated type feeding (in 10-20% of animals), which is explained by the inadequacy of the plastic material for milk production, growth and development of the fetus.
2. In the conditions of the Bukhara and Kashkadarya regions, a greatly reduced level of protein metabolism in cows in the silage-concentrate type of feeding covered 10-30%, in the hay-concentrate type - 10-50% of animals, which is explained not only by the inadequacy of the plastic material for milk production, growth and development of the fetus, but also the negative impact of extreme conditions on protein metabolism in the body of cows.
3. When conducting medical examinations of cows, it is advisable to take into account the time of manifestation of protein metabolism disorders, depending on age, lactation period, type of feeding and environmental conditions.

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