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QUALITY CONTROL OF CATTLE' HEALTH ON A DAIRY FARM

L. GORDIENKO, E. KULIKOVA, G. GAYDUTSKAYA and N. ELANTSEVA

All-Russian Research Institute of Brucellosis and Tuberculosis of Animals - Federal State Budget Scientific Institution, Omsk, Russian Federation

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Abstract

There is a present possibility of using excreta as a biomaterial for laboratory testing in order to assess the physiological state of the cows. The biochemical indicators of urine and feces can help in detecting the early stages of changes in the functions of vital organs, so in a timely manner to correct diet and exercise control over the level of animal health.

Key world: cows, health, biochemical indicators, control

Introduction

As a result of selective breeding were created the modern breeds of cattle with the presence of the genetic potential, which allows achieving intensive growth of young animals, their early physical maturity and high milk productivity of cows.

For the development of dairy farming with such indicators there was provided a balanced diet with a set of high-quality high-calorie feed, rich in protein and carbohydrates (Usha et al., 2004).

The metabolic processes occur actively with a heavy load on vital organs in the productive period of life in the body of cattle. The analysis of biochemical parameters of blood serum is traditionally used to monitor the physiological state of animals and organ functions. There is carried out sampling of blood from large veins selectively from 5-10 % of the animals of different age and gender groups. This manipulation is labor-intensive, causes stress in the animals, which reduces its productivity.

To assess the usefulness of feeding cows there were controlled zootechnical, physiological and biochemical methods. The zootechnical control includes checking ration on composition, nutritional value, balance, quality and palatability of feed, as well as in terms of milk production, milk composi-

tion, size increments, pay of food, character of the lactation curve, duration of period between calving and period without calving, reproductive ability, fatness and so on.

The status of metabolism in organism of highly productive cows could also be determined by biochemical indicators of colostrum, milk, the contents of the stomach muscle tissue of cows. The biochemical studies of excreta (urine and feces), in our opinion, may be the most simple, accessible, cost-effective and informative method (The study of the urinary system [Electronic resource] URL; Gordienko et al., 2013).

The aim of this study was to determine the possibility of using the excrement of cattle as a biomaterial for biochemical studies and evaluate the level of animal health.

Materials and Methods

The work was carried out on dairy farms in the territory of Siberia.

We did a research of cattle of black-motley breed with an annual milk yield from 4.6 to 5.7 thousand kg of milk.

The biochemical indicators of urine were determined with multifunctional test-strips UROPOLIAN-XN (produced by “Biosensor AN”) with quality visualization of semi quantitative rapid determination in the urine: erythrocytes, hemo-

globin, glucose, ketones, bilirubin, protein, pH, urobilinogen, specific gravity, ascorbic acid, nitrites and leukocytes.

We used a set of reagents for clinical analysis of feces (firm "Clinic-Cal") to determine the main fecal biochemical parameters (latent blood, sterkobelin, bilirubin, digestible fiber, neutral fat, fatty acids, soaps, starch, helminths).

We compared the results with medium-statistical indicators as standards for healthy animals (Smirnov et al., 1981; Laboratory tests of urine [Electronic resource]).

Results and Discussion

We chose cows of second lactation with different periods of pregnancy and divided them into two groups of 15 animals for the research. The observation of animals was carried out in the winter months (February).

The process revealed the indicators, showing violation of metabolic processes in the liver and in the organs of the uri-

nary system as a result of urine biochemical studies in animals of both groups (Table 1).

The presence of ketone bodies in the urine of all animals (100%) of the first group and the majority of cows (75%) of the second group exceeds 1.0 mmol / l. The appearance of increased amounts of ketone bodies in the urine of cattle can be associated with a lack of carbohydrates in the diet, a highly concentrated feeding type.

We found the presence of protein in urine in 43% of the animals of the first group. Its indices ranged from 0.3 to 20.0 g / l.

The proteinuria in producing animals may be associated with the type of concentrated feeding. In some cases high levels of protein in the urine occurs in renal dysfunction, hemodynamic stress, diseases of internal organs.

The bilirubin was found in the urine of all animals (100%) of the first group and 63% of the animals of the second group. Its amount in the cow does not exceed 60.0 mm / l. This indicates abnormal liver function.

Table 1
The biochemical parameters of urine of lactating cows

Groups/ Norms	The number of animals with changes of standards of biochemical parameters (%) to the number of investigated									
	leukocytes	blood	ketones	protein	nitrites	bilirubin	urobilin	glucose	pH	specific gravity
	2-3 within eyeshot	negative	negative	negative	negative	negative	negative	negative	6.0 - 8.7	1,015 - 1,045
1	14	0	100	43	0	100	0	0	0	100
2	13	0	75	0	0	63	0	0	0	100

Table 2
The research results from the feces of cows

Groups/ Norms	Biochemical indicators							leukocytes
	pH	protein	latent blood	sterkobilin/ urobilin	bilirubin			
	5.0 - 7.5	negative	negative	positive	negative	units		
1	0	60	0	0	100	70		
2	0	40		0	60	0		
Groups/ Norms	Microscopic studies							
	muscle fiber	digestible fiber	neutral fat	fatty acids	soap	iodophilic flora / starch	salt	helminths
	negative	negligible quantity	negative	negative	negligible quantity	negligible quantity	negative	negative
1	0	0	60	40	0	0	30	40
2	0	70	70	80	20	10		

The indicators of specific gravity of urine in all the animals of both groups approached the 1.000-1.005 g / l.

The biochemical studies of feces also revealed information about the violation of the metabolic processes in the body of cows under observation (Table 2).

The biochemical indices of feces from animals of the first group indicate the presence of protein in it from 0.3 to 1.0 mg / l in 60% of the cows. We found leukocytes in the feces in the most animals in this group (70%) and the presence of bilirubin in all cows (100%) was revealed.

We also identified neutral fat (60%) and fatty acids (40%) at microscopic examination of feces from half of the animals of the first group.

The results of biochemical studies were similar for the cows in the second group. The content of protein was from 0.3 to 20.0 mg / l in the feces from 40% of the cows and the bilirubin was found in 60% of animals.

There were revealed the digestibility of fiber (70%), fatty acids (80%) and soaps (20%) at microscopic examination of the feces from animals of the second group.

The viability of putrid microflora increases at poor absorption of protein. The imbalance of fermentation and putrefaction in the intestine leads to an increase in the content of organic acids.

It was assumed on basis of these results that metabolic disorders in lactating cows are due to an unbalanced diet or to low-quality forages. The analysis of the feed conducted later revealed the concrete problems in diets and how to

normalize the rations in accordance with existing regulations.

Conclusion

Thus, the use of biological material from the excrement of cattle on dairy farms allows obtaining objective data on the biochemical processes in the body, identifying a metabolic disorder in its early stages and in due time making appropriate adjustments in rations.

The biochemical studies of excrement are low-cost, do not require additional manipulation with animals. They are objective and can be used to control the health of cattle on dairy farms.

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