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FEED ADDITIVE FOR INCREASE OF PRODUCTIVITY AND NATURAL RESISTANCE OF YOUNG AGRICULTURAL ANIMALS

Andrey G. Shakhov¹, Irina V. Cheremushkina² and Anton E. Chernitskiy¹

1. All-Russian Research Veterinary Institute of Pathology, Pharmacology, and Therapy of the Russian Academy of Agricultural Sciences

Voronezh, Lomonosova str., 114 b, Russia

2. Voronezh State University of Engineering Technologies,

Voronezh, Revolution Street 19, 394036, Russia.

Email: irinacher2010@yandex.ru

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Abstract

Gastrointestinal diseases are one of the most popular forms of pathology of digestion of young animals that is observed in all animal husbandries. In many husbandries, gastrointestinal diseases have a full-scale character. Without effective preventing measures, the death rate among sick calves reaches 75-90 %. It should be noted that there are a lot of means of fighting gastrointestinal diseases.

This article studies the possibility if including the feed additive that includes enzymatic agent and pro biotic agent ProLam put on kizelgur in 1:1 ratio and 10% of amaranth presscake.

Key words: calves, feed additive, microbiocenosis, natural resistance, cytokines, gastrointestinal diseases.

The problem of getting and preserving healthy young agricultural animals is among the most topical problem in cattle breeding, solving of which determines its effectiveness. One of the perspective directions is the search for new and harmless drugs and development of effective schemes of application of feed additives that stimulate growth and development of animals and increase efficiency and level of non-specific resistance of the organism.

For the purpose of increasing the effectiveness of calf breeding, there are searches aimed at the use of cheap, harmless, and mass feed additives that increase immune resistance of animals and stimulate their growth and productivity.

The purpose of the research is to study the influence of the feed additive on indicators of productivity and natural resistance of young cattle.

Material and method. Study of the influence of feed additive on immune and clinical status was performed with 40 calves that were divided into two groups. The calves of the test group (n=20) were given the feed additive - 15 grams per day from the 10th day (animal's age to the start of feeding constituted 10 days), control (n=10) drug was not used.

Including into the feed additive the enzymatic agent with high activity of the purpose ferment of β -mannanase (activity in the feed additive at least 600 pcs/g) of pro biotic agent ProLam (manufacturer – Biotechagro LLC) and amaranth presscake allows receiving highly effective complex feed additive for normalization and restoration of micro-flora of youngsters' digestive tract. The ferment agent is a natural composition of such ferments as β -mannanase, cellulase, xylanase, and protease that are produced by genetically unmodified culture of micromycete *Trichoderma harzianum*. β -D-Mannanase hydrolyzes internal β -1,4-glycosidic ties in mannans, which is one of the main natural means of degradation of these polymers. Adsorbents on the basis of mannose connect mycotoxins and protect the bowels from pathogenic bacteria. Pro-biotic agent Prolam, which is widely used in pig breeding and poultry industry, is a suspension that contains living strains of lactic-acid-producing bacteria *Lactobacillus delbrueckii* subsp. *bulgaricus* (B-5788), *Lactobacillus acidophilus* 43c (B-3235) in the volume at least - 5×10^7 KOE/cm³, lactic streptococcus *Lactococcus lactis* subsp. *lactis* 57₄ (B-3145), *Lactococcus lactis* subsp. *lactis* 170₄₋₅ (B-3192)- 5×10^7 KOE/cm³, *Bifidobacterium animal* 8₃ (AC-1248)- 1×10^7 KOE/cm³ and additional agents – water, cane molasses, milk, or milk whey.

Amaranth presscake, a protein, that has high biological and feed value, contains 5 - 9 % of oil that includes an agent that performs in the organism the role of regulator of lipid and steroid exchange and is a predecessor of a range of steroid hormones, cholesterol, and vitamin A.

Results. Table 1 shows examples of articles of exterior and indicators of calves' growth intensity.

Table 1: Livestock measurements and indicators of calves' growth intensity.

Indicator	Group of calves	
	test	control
Body mass at the start of test, kg	43.8±3.49	38.8±2.65
Body mass at the end of test, kg	56.5±2.32*	46.5±3.72
Absolute growth of body mass, kg	12.7±0.66*	7.7±0.83
Relative body mass growth, %	28.9±1.41*	19.8±4.26
Average daily mass growth, grams	635±33.2*	385±41.5
Shoulder height, cm	80.5±1.59*	76.3±1.20
Chest depth, cm	32.7±0.60	32.0±0.20
Chest circumference, cm	86.0±1.44*	80.8±0.52

Note: * - $p < 0.05$ as compared to calves of the control group

At the beginning of the test, the animals' body weight didn't differ much, but on the 30th day the calves of the test group had the body weight by 21.5 % larger than in the control group ($p < 0.05$). Average daily growth of body weight with calves of these groups was by 64.9 ($p < 0.05$) higher, as compared to the control group.

Application of feed additive at 15 g/calf led to increase of general protein and lipids in calves' blood plasma by 11.5% and 53.8%, accordingly ($p < 0.05$), as compared to the level of the intact animals (Table 2).

Table 2: Results of biochemical studied of calves' blood.

Indicator	Calves' group	
	test	control
General protein, g/l	<u>62.0±1.93</u>	<u>63.1±3.87</u>
	60.9±2.42*	54.6±1.89
Urea, mM/l	<u>2.6±0.12</u>	<u>2.4±0.26</u>
	2.8±0.28	3.1±1.16
Creatinine, mcM/l	<u>109.0±12.00</u>	<u>102.8±9.76</u>
	94.3±3.75	96.3±13.25
General lipids, g/l	<u>1.4±0.23</u>	<u>1.4±0.71</u>
	2.0±0.15*	1.3±0.19
Cholesterol, mM/l	<u>1.9±0.16</u>	<u>1.8±0.13</u>
	1.4±0.20	1.5±0.46
Glucose, mM/l	<u>3.7±0.29</u>	<u>3.7±1.36</u>
	2.6±0.24	3.0±0.08
Lactate, mM/l	<u>0.6±0.02</u>	<u>0.5±0.02</u>
	0.6±0.10	0.7±0.09
Pyruvate, mcM/l	<u>219.3±28.25</u>	<u>206.8±96.16</u>
	237.0±24.00	193.7±6.22
Alkaline phosphatase, E/l	<u>224.4±48.08</u>	<u>248.5±32.00</u>
	246.3±36.75	256.0±40.50
Alanine aminotransferase, E/l	<u>12.5±2.78</u>	<u>11.9±5.40</u>
	9.5±0.30*	13.6±1.68
Aspartate aminotransferase, E/l	<u>36.2±3.82</u>	<u>35.3±7.88</u>
	40.2±2.43	39.3±5.33
Gamma glutamine transferase, E/l	<u>103.3±28.84</u>	<u>87.5±20.39</u>
	18.7±3.65	20.1±1.76
Phosphorus, mM/l	<u>2.8±0.04</u>	<u>2.9±0.23</u>
	3.2±0.24*	2.6±0.17
Calcium, mM/l	<u>3.1±0.06</u>	<u>3.0±0.05</u>
	3.0±0.11	2.8±0.15

Note: above the line – on the 10th day, below – on the 30th day; * - $p < 0.05$ as compared to the calves of the control group. Growth of concentration of aspartate aminotransferase in physiological limits proved more effective use of amino acids in bio-synthetic processes in calves' tissue. In the test group, no significant fluctuation of glucose concentration, central metabolite of carbohydrate metabolism, was found, which proves physiological adequacy of implementing the feed additive into the ration for cattle youngsters. Analysis of the results of morphological study of

blood showed that the calves that received redistribution of morphological forms of leukocytes had reduced neutrophils and increased lymphocytes in blood (Table 3).

Table 3: Results of morphological studies of calves' blood.

Indicator	Group of calves			
	test			control
	3	2	1	
Erythrocyte, $10^{12}/l$	<u>6.8±0.30</u>	<u>6.8±0.44</u>	<u>6.6±0.27</u>	<u>6.4±0.56</u>
	6.3±0.12	6.6±0.50	6.0±0.24	6.2±0.66
Leukocyte, $10^9/l$	<u>8.9±1.14</u>	<u>8.5±1.53</u>	<u>7.2±1.55</u>	<u>8.8±0.53</u>
	7.7±1.50	7.7±0.33	5.8±0.90*	8.2±0.83
Neutrophils, $10^9/l$	<u>3.8±0.90</u>	<u>3.6±0.94</u>	<u>3.0±0.55*</u>	<u>4.3±0.47</u>
	2.2±0.59*	2.4±0.51*	2.1±0.60*	3.9±0.68
Monocyte, $10^9/l$	<u>0.19±0.08</u>	<u>0.11±0.09</u>	<u>0.13±0.06</u>	<u>0.17±0.04</u>
	0.35±0.14	0.46±0.10	0.20±0.06	0.40±0.17
Lymphocyte, $10^9/l$	<u>4.8±0.86</u>	<u>4.8±1.05</u>	<u>4.0±1.28</u>	<u>4.4±0.33</u>
	5.1±0.78	4.7±0.25	3.5±0.78	3.9±0.64
Thrombocytes, $10^9/l$	<u>1,193±162.0</u>	<u>1,218±152.8</u>	<u>1,370±170.6</u>	<u>1,347±133.1</u>
	1,938±163.1	1,718±98.1	1,874±196.6	1,710±323.6
Hematoglobulin, g/l	<u>120.4±5.78</u>	<u>116.7±5.75</u>	<u>109.8±3.00</u>	<u>103.8±7.75</u>
	109.2±3.50	108.6±5.00	96.0±4.25	106.9±2.29
Hematocrit, %	<u>25.4±1.03</u>	<u>25.6±4.85</u>	<u>24.9±1.35</u>	<u>24.9±2.87</u>
	22.5±0.40	23.9±3.38	21.2±1.20	22.0±2.56

Note: above the line – on the 10th day, below – on the 30th day; * - $p < 0.05$ as compared to the calves of the control group.

Improvement of mineral exchange is proved by increase of non-organic phosphorus and calcium in blood plasma of the test group's calves by 23.1, 26.9 and 14.3%, accordingly, as compared to the control group. The received results show more intensive bio-synthetic processes than with the animals of the control group.

Thus, application of the feed additive influences positively the intensity of growth and natural resistance of calves.

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