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INFLUENCE OF A COMPLEX FEED ADDITIVE ON THE DIGESTIBILITY OF NUTRIENTS IN THE FATTENING OF KARAKUL SHEEP

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Abstract:

The organization of full-fledged feeding is the main factor in the realization of the genetic potential of farm animals. In this regard, the use of effective feed additives in feeding animals can increase the energy and biological value of diets. This article presents the results of studying the effect of feed additives on the digestibility coefficients of nutrients in the stall fattening of Karakul sheep. In experiments on feeding sheep, feed additives were used in the complex: 1) bentonite as a source of minerals; 2) probiotic "Baktovit" for fodder purposes as a natural biostimulant; 3) carbamide as a source of nitrogen and increasing the protein nutritional value of diets for ruminants, 4) chlorella algae suspension as a source of biologically active substances.

Keywords: Karakul sheep, probiotic, carbamide, bentonite, chlorella, feed digestibility coefficient

INTRODUCTION. The intensive development of agriculture and ensuring the food security of the population are the most important tasks for all countries of the world. Animal husbandry plays an important role in the production of nutritious food for an ever-growing population. Taking into account the natural, climatic and ecological features of Uzbekistan, the development of Karakul sheep breeding is a cost-effective livestock production through the efficient use of pasture fodder resources. Every year, in karakul farms, about 16-17% of the total number of ewes are culled from the herd as an age marriage. These are mainly uterus 6-7 years of age with low reproduction rates. However, stall fattening of this contingent makes it possible to produce mutton meat at a low cost.

The organization of full-fledged feeding, taking into account the physiological needs of animals, allows you to maximize the genetic potential of the body in the animal production. The scientific foundations of full-fledged feeding have a positive effect on metabolic processes with an increase in productivity, improvement of its quality and a decrease in feed resources per unit of production.

Taking into account the fact that Karakul sheep are grazing animals, the transition to stall fattening requires special attention in the organization of feeding and their proper keeping. Lack of contact with the soil, long-term use of the same types of feed in diets and passive exercise are not able to fully satisfy the physiological needs of sheep. The solution to this problem can be achieved through the use of feed additives that increase the energy, protein, mineral and vitamin value of diets. In this regard, the use of feed additives in the complex, in the form of probiotics, bentonite, synthetic nitrogen-containing substances and a suspension of unicellular algae, is relevant.

Probiotics are live microbial supplements that have a beneficial effect on improving the gastrointestinal microbial balance, stimulating metabolic processes. Probiotics are created on the basis of microorganisms that are representatives of the normal microflora of the host organism - lactobacilli and bifidobacteria of the genus Bacillus, which have potential signs of reproduction, have a regulatory effect on pathogenic and conditionally pathogenic microorganisms, by activating specific and nonspecific body defense systems [1,9,10]. In studies [8], it was noted that the use of the probiotic Cellobacterin + (Cb) in the amount of 3 g per head per day has a positive effect on the digestive and metabolic processes in the body of sheep, an increase in feed consumption and an increase in the digestibility of nutrients were established.

Bentonites are widely used as a mineral feed additive in order to increase the productivity of animals and treat and prevent diseases, toxic dystrophy of sheep, prevent microelementosis in animals, restore the acid-base balance of the proventriculus of animals and other disorders of the gastrointestinal tract, are used in

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the production of animal feed, feed mixtures and premixes [5,13].

Under the conditions of Uzbekistan, bentonite of Azkamar origin received a recommendation from scientists for use as a mineral supplement. Industrial studies have shown the suitability and high efficiency of this clay, technical specifications for the crushed clay of Azkamar bentonite, used as mineral additives in the diets of farm animals, have been developed and approved [4].

In the practice of animal husbandry, to increase the protein nutritional value of diets, synthetic nitrogen-containing substances are used, in the form of carbamide (urea) and others. It should be noted that they can only be used in feeding ruminants, which are able to use non-protein nitrogen for the synthesis of their own body by rumen microorganisms. The use of carbamide is the most effective and fastest method of increasing protein nutrition, and has been widely used in the feeding of ruminants, including Karakul sheep breeding. To determine the norms for adding carbamide to the diet, an equivalent equal to the digestible protein is used, i.e. 1 g of carbamide is equal to 2.6 g of digestible protein [3].

Currently, in many countries of the world, microalgae and some photoautotrophic unicellular algae are widely used in animal nutrition as growth promoters and biologically active feed additives. They are rich in protein, microelements, vitamins and other biologically active substances [10, 12]. Chlorella algae has been sufficiently studied as a feed supplement, including in Karakul sheep breeding. In the 70-80s of the last century, chlorella received scientific confirmation of the effectiveness of its use as a feed additive, but a technical solution was not widely used.

Given the above, we can conclude that the use of the above feed additives in the complex when fattening Karakul sheep is of scientific and practical importance.

MATERIALS AND METHODS. We have carried out scientific and production experiments on stall fattening of old-aged Karakul sheep using the above-mentioned feed additives, i.e. probiotic "Baktovit" developed at the Institute of Microbiology of the Academy of Sciences of the Republic of Uzbekistan, bentonite of the Azkamar deposit (Uzbekistan), grade B carbamide with a nitrogen content of at least 46.0%, and a suspension of algae chlorella sp2 strain derived by the algological method from local natural reservoirs.

According to the method of groups of analogues, control and experimental groups of sheep were formed, 25 heads each. The main daily diet of the experimental sheep consisted of 1.0 kg of mixed grass hay, 0.4 kg of wheat straw, 0.5 kg of wheat bran and 0.3 kg of barley grains. Feeding norms were determined on the basis of reference data [2]. The chemical composition of feed, feed residues and feces was determined by the method of zootechnical analysis of feed [6]. Feed consumption, their digestibility with the calculation of nutrient digestibility coefficients according to the generally accepted zootechnical method [12], the results obtained were processed by the method of variation statistics with the determination of the level of reliability of the results [7].

According to the scheme of the experiment, the content and level of feeding in the groups were the same, except that the experimental group additionally included feed additives, bentonite (1 g/kg of live weight), carbamide (10 g per head), probiotic (0.1% of the total ration mass) and drinking chlorella suspension. The fattening of the sheep continued for 60 days.

RESULTS AND DISCUSSIONS. In experiments to determine the digestibility of feed, strict accounting and determination of the actual amount of feed eaten by animals is an important process and indicator. In the second month of fattening, an accounting period was carried out for 8 days to determine the feed intake, where the average amount of food actually eaten by experimental animals per day was determined (Table 1).

Table 1.
Average amount of food eaten per day

Groups	Hay			Wheat straw			Wheat bran			Barley grains		
	Given feed, kg	Eaten feed, kg	Feed consumption, %	Given feed, kg	Eaten feed, kg	Feed consumption, %	Given feed, kg	Eaten feed, kg	Feed consumption, %	Given feed, kg	Eaten feed, kg	Feed consumption, %

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Control	1,0	0,862	86,2	0,4	0,285	71,2	0,5	0,5	100	0,3	0,3	100
Experimental	1,0	0,889	88,9	0,4	0,304	76,0	0,5	0,5	100	0,3	0,3	100

During the accounting period of the experiment, it was determined that in the experimental group the feed intake was higher than in the control group. In this group, the consumption of hay was 88.9% and wheat straw 76.0%, and in the control group 86.2 and 71.2%, respectively. Consumption of concentrated feed (wheat bran and barley grains) in the groups was the same and amounted to 100%.

To calculate the actual amount of nutrient intake, the chemical composition of feed, their residues and feces was determined (Table 2).

Table 2.
Chemical composition of feed, feed residues and feces, % (in dry matter)

Feed	Hay	Wheat straw	Wheat bran	Barley grains	Control group			Experimental group		
					Hay	Wheat straw	Feces	Hay	Wheat straw	Feces
Protein	11,44	3,09	14,90	13,56	9,02	2,39	10,05	8,58	2,39	9,85
Fat	3,24	1,84	4,30	2,21	2,93	1,35	3,34	2,78	1,66	3,18
Fiber	31,41	44,98	11,40	7,96	33,52	46,06	34,39	33,19	44,96	35,56
Nitrogen free extractives (NFE)	46,95	42,17	61,68	70,51	48,18	42,72	42,54	48,38	43,72	40,35

From the data of Table 2 it can be seen that the chemical composition of the feed is of medium quality, harvested in the foothill zone of breeding Karakul sheep. The chemical composition of the feed residues was low compared to the original material, since the residues mainly consisted of low-value plant parts or coarse waste. The chemical composition of the feces in the experimental group was low compared to the samples in the control group, which indicates that the body of the sheep in the experimental group used nutrients more efficiently due to balanced feeding.

Based on the chemical composition of feed, feed waste and faeces, nutrient content was calculated to further determine actual nutrient intake (Tables 3 and 4).

Table 3
Nutrient content in the diet, g

№	Indicators	Hay	Wheat straw	Wheat bran	Barley grains	Total
1	Dry matter	805,59	331,78	441,81	265,68	1844,86
2	Organic matter	749,51	305,51	407,67	250,39	1713,08
3	Protein	92,17	10,25	65,81	36,03	204,27
4	Fat	26,09	6,12	18,98	5,87	57,05
5	Fiber	253,02	149,22	50,39	21,16	473,79
6	NFE	378,23	139,91	272,49	187,33	977,97

As can be seen from Table 2, the content of dry matter in the diet of sheep was 1844.86 g, organic matter 1713.08 g, protein 204.27 g, fat 57.05 g, fiber 473.79 g and NFE 977.97 g.

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Based on the chemical composition of the food and feces, the nutrient content of the food and feces was calculated.

Table 4
Nutrient content of food and feces, g

Indicators	Control group				Experimental group			
	Hay	Wheat straw	Total	Feces	Hay	Wheat straw	Total	Feces
Dry matter	114,28	95,58	209,86	641,34	90,60	79,58	170,19	575,55
Dry matter, corrected				622,89				557,10
Organic matter	107,02	88,44	195,47	579,31	84,20	73,80	158,00	511,93
Organic matter, corrected				560,86				493,48
Protein	10,30	2,29	12,59	64,47	7,78	1,91	9,68	56,71
Fat	3,35	1,29	4,64	21,45	2,52	1,32	3,84	18,30
Fiber	38,31	44,03	82,34	220,57	30,08	35,78	65,85	204,65
NFE	55,06	40,83	95,89	272,82	43,83	34,80	78,63	232,26

During the accounting period, an average of 1476.0 g of feces was excreted per day in the control group and 1437.5 g in the experimental group. Daily feces samples were preserved using tartaric acid in an amount of 5.0 ml and chloroform in an amount of 1.0 ml, or 40.0 ml and 8.0 ml for the entire accounting period, respectively. In this regard, appropriate corrections were made to determine the actual content of dry and organic matter in feces. The table data on the content of nutrients in the remains of feed and feces showed that in the experimental group these indicators are lower in relation to the control.

According to the calculations of the actual feed intake, the nutrient digestibility coefficients were calculated. (Table 5). The results on the digestibility of nutrients showed that in the experimental group these indicators were higher than in the control group.

Table 5
Nutrient digestibility coefficients, %

Indicators	Contained		Actually eaten, g	Excreted in feces, g	Digested, g	Coeff. digestibility, %
	in the diet	in the remainder				
Control group						
Dry matter	1844,86	209,86	1635,00	622,89	1012,11	61,90±0,78
Organic matter	1713,08	195,47	1517,62	560,86	956,76	63,04±0,85
Protein	204,27	12,59	191,68	64,47	127,20	66,36±0,99
Fat	57,05	4,64	52,41	21,45	30,97	59,08±0,92
Fiber	473,79	82,34	391,46	220,57	170,89	43,65±0,82
NFE	977,97	95,89	882,07	272,82	609,25	69,07±1,06
Experimental group						
Dry matter	1844,86	170,19	1674,68	557,10	1117,58	66,73±0,99
Organic matter	1713,08	158,00	1555,08	493,48	1061,60	68,27±1,13
Protein	204,27	9,68	223,34*	56,71	166,62	74,61±1,13

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Fat	57,05	3,84	53,21	18,30	34,91	65,60±1,06
Fiber	473,79	65,85	407,94	204,65	203,29	49,83±0,92
NFE	977,97	78,63	899,34	232,26	667,08	74,17±1,20

*In the diet of the experimental group, due to feed, the actual protein intake is 194.59 g (204.27-9.68), however, the inclusion of carbamide in the amount of 10.0 g with a content of 4.6 g of nitrogen, an additional protein was consumed 28.75 g (4.67x6.25), since 1 g of nitrogen corresponds to 6.25 g of protein. Therefore, the total amount of protein consumed was 223.34 g (194.59+28.75). In this regard, the biggest difference in digestibility with respect to the control group is protein digestibility or more by 8.24% ($p>0.05$). In the experimental group, the dry matter digestibility coefficient was higher than in the control group by 4.83% ($p>0.05$), organic matter - 5.22% ($p>0.05$), fat - 6.52% ($p> 0.05$), fiber - 6.18% ($p>0.05$) and NFE 5.10% ($p>0.05$).

In conclusion, it can be noted that the use of feed additives in the complex in the form of a probiotic, carbamide, bentonite and a suspension of chlorella algae contributed to an increase in the digestibility of nutrients when fattening Karakul sheep.

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