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Influence of Additional Feeding of Sucrose Goat Females on Indicators of Natural Resistance of the Body and Productivity of Kids

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Abstract

The traditional way of breeding pastured animals is year-round pasture keeping without any additional fertilizing. Recently, among adult animals and the resulting offspring, a large number of individuals with low levels of natural resistance have begun to appear, which negatively affects the productivity of adults, and growth and development, as well as the safety of the resulting offspring. In this regard, the aim of the study was to study the effects of full-fledged feeding of females during pregnancy on the level of natural resistance of the received goats. To achieve this goal, a number of modern physiological and biochemical research methods were used. According to the results obtained, it was established that with the organization of full-fledged feeding, the period of suckling of the goat develops normally and the resulting baby goats are born with increased levels of natural resistance and more massive. In the goats of the experimental group, these advantages persist steadily until the age of one year, and to a certain extent ensure the normal preservation of the received goats and their growth and development. This makes it possible for farmers to fatten goats unused in breeding from 8 - 9 months of age and donate them for meat as an additional economic supplement to production.

Keywords

Goats, Goats, Natural Resistance of the Body, Nutrients, Security, Durability

1. Introduction

Currently, the state of desert, foothill and mountain pastures allocated for sheep and goat breeding is characterized on the one hand by a progressive deterioration in the productivity and quality of pasture feed, and on the other, the maxi-

mum concentration of livestock on farm animals on the territory used. The systemless use of pasture lands allocated for the use and breeding of small cattle gradually disturbed the ecological balance, which led not only to a decrease in the botanical composition of the feed species being eaten, but also to the degradation of land, the appearance of wind erosion and overgrowth of weeds and malnourished vegetation [1].

The unsatisfactory state of the fodder base is often aggravated by the farms themselves, which incorrectly use pastures, they allow continuous and irregular grazing of animals and thereby contribute to the reduction of vegetation cover, overgrowing with weeds and non-edible plants [2].

Currently, in our republic, the total area of natural pastures is about 38 million hectares, of which 46% of the total area of pastures is degraded due to unsystematic use and maintenance of animals, as well as due to the limitation of the boundaries of the grazed territory. As a result, there is a "failure" of pastures and a sharp decrease in the amount of biological productivity of the herbage. The main area of degraded lands, as a rule, is confined to settlements, since the bulk of farm animals are in private use. At the same time, the concentration of livestock on these areas turns them into barren areas, since they have been under grazing for decades without any use regime [3].

For a long time, the lack of the animals' body with the necessary nutrients during pasture maintenance led to the appearance of various negative phenomena, such as the instability of their body to the adverse effects of various environmental factors, loss of body weight, productivity, *i.e.* animals did not begin to show their genetic capabilities. In our opinion, the main reason for this phenomenon is the inadequate feeding of pasture animals in the winter and early spring periods of the year, when goats are in a suckling state and lactation.

In recent years, highly productive animals, including dairy goats, have been brought to Uzbekistan in order to provide rural residents with chemically safe, environmentally friendly and high-quality goat milk of the Zaanen breed.

A preliminary study of the effect of pasture maintenance without additional fertilizing on the adaptability and milk productivity of the Siberian goat breeds showed that due to the lack of provision of the females with the necessary nutrients in pasture conditions, they cannot fully manifest their genetic capabilities for milk productivity and the safety of the resulting offspring [4].

In this regard, we planned to study the effect of additional feeding in order to make up for the missing part of the pasture diet during the period of succulence in the first stock of the Zaanen breed.

The aim of the study was "to study the effect of additional feeding with missing parts of pasture feed during the period of suckiness in order to meet the needs of the goats' body with nutrients and natural resistance in the resulting goats".

To achieve this goal, the following specific tasks were performed:

- Determination of the effect of different levels of feeding on the consumption

of the feed mass by the first animals, as well as on the morpho-biochemical composition of blood in connection with sucosity;

- To study the effect of the level of maternal feeding on the live weight of baby goats at birth and weaning them from their mothers, as well as on the level of natural resistance of the body of baby goats up to 10 months of age;
- To determine the influence of the level of feeding of females during their pregnancy on their milk productivity, as well as on the level of profitability of a farm specialized in milk production.

2. Research Methods

Two groups of animals of 15 heads in each were formed, which are analogs in age, live weight, breed, sex, and physiological state [5].

The goats of both groups grazed in the pasture during the day, and in the evening the animals of the 1st group received concentrates (250 g of compound feed per head) and until midnight had free access to a stack prepared for the winter from coarse feed (yantak, solyanka, ferula6 okkuvray, karrak and black wormwood). And the goats of the II-experimental group received additional feeding in the evening, which made up for the missing part of the norm for the pasture diet, corresponding to the feeding standards for wool breeds of goats [6].

In order to determine the amount of foot food consumed, their digestibility in the gastrointestinal tract and the availability of nutrients to the goats in pasture conditions, balance experiments were organized using the method of inert substances [7]. To do this, 3 goats were selected from each of the compared groups and balance experiments were carried out for 30 days: their 20 - 22 days were the preliminary period and 8 - 10 days were the accounting period [8].

Blood samples for laboratory analysis were taken from the jugular vein in the morning before feeding simultaneously from mothers and their goats at the age of 3 - 4 days of the colostrum period and during the beating from mothers [9].

The hemoglobin content, the number of erythrocytes and leukocytes were determined using a Medonic CA 530 hematological analyzer. The total protein in the blood serum, protein fractions were determined on an automatic biochemical analyzer StatFaks 1904.

The level of natural resistance of the primocots and their goats was taken into account according to the following methods:

- The concentration of total protein in blood serum was determined by the refractometric method using a refractometer;
- The total number of erythrocytes and leukocytes was determined by the generally accepted method, by counting them in the Goryaev chamber under a microscope (melange method) [9];
- Hemoglobin content, by the hemoglobin cyanide method [10]; determination of blood hemoglobin by hemiglobin cyanide method. Principle. Hemoglobin, when interacting with iron-cyanide potassium, is oxidized to methemoglobin (hemiglobin), which forms colored hemiglobincyanide with ace-

tone cyanohydrin, the colour intensity of which is proportional to the content of hemoglobin. Blood with anticoagulant is stored for 24 hours at 8˚C, 8 hours at room temperature, 15˚C - 20˚C. Reagents: factory set of reagents; transforming solution (acetone cyanohydrin 0.5 ml, potassium iron cyanide 200 mg, sodium bicarbonate 1 g, distilled water up to 1 litter); stable when stored in a dark glass container for 3 months, if a precipitate appears or discoloration, the solution is not suitable for use; a standard solution of hemiglobincyanide, corresponding to a concentration of hemoglobin in the blood of 15 g% when the blood is diluted 251 times. A decrease in the amount of hemoglobin is observed with deficiency anemia due to a lack of iron, copper, cobalt, vitamin B12, folic acid, proteins and other substances, with chronic intoxication, hepatitis, hepatosis and other liver diseases, ketosis, disorders of the gastrointestinal tract, infectious and parasitic diseases and other diseases. A moderate decrease in hemoglobin is noted with alimentary (iron deficiency) anemia, a more pronounced decrease in mass blood loss, hemolytic and hypoplastic anemia. It should be noted that the decrease in the concentration of hemoglobin and the number of erythrocytes does not always proceed in parallel. More often, the amount of hemoglobin decreases more sharply than the number of red blood cells in the blood. However, in a number of diseases, opposite shifts may occur, so it is necessary to simultaneously determine the color index.

An increase in hemoglobin level is noted with thickening of the blood (diarrhea, profuse sweating), intestinal obstruction, strong muscle load, animals being at an altitude of 1400 m and above sea level.

- The content of protein fractions, albumins and globulins (α, β and γ) was studied by the nephelometric method [10];
- Lymphocytes were determined by isolating a fraction of mononuclear leukocytes from peripheral blood by gradient centrifugation.

Phagocytic activity of leukocytes was determined in the blood, lysozyme and bactericidal activity in the blood serum.

The resulting digital material was subjected to statistical processing using the Microsoft Excel data analysis package [10].

3. Results and Discussions

Some authors [11] came to the conclusion that "...the mechanism of natural resistance is manifested and formed under the influence of various factors, this is the genotype, age, conditions of keeping and feeding of animals. A characteristic feature of the signs of natural resistance is their high variability, which provides wide adaptive possibilities for the animal organism."

The manifestation of productive qualities of animals is 70% related to feeding conditions and only 30% are related to genetic factors. Currently, many researchers have proven the inheritance of natural resistance in farm animals, which allows for targeted breeding based on these characteristics (**Table 1**).

Experimental studies were conducted according to the above scheme, studied the amount of digested and assimilated nutrients from actually consumed feed during the experiments (Table 2).

During the preparation of the first blood for insemination, in order to synchronize the hunting and hunting companies in animals, hormonal preparations (progesterone) were used and after injection, for 3 days, they were inseminated with the seed of goat producers.

According to the data obtained, the phagocytic activity of the blood of newborn goats from the females of the experimental group before receiving colostrum, the indicators of non-specific protective factors were within the level of 31.4%, and after receiving colostrum increased by only 2.0%. As the data in Table 2 shown, before receiving colostrum, the phagocytic activity of blood in the control group of goats compared to the experimental group was 2% higher and amounted to 33.4% and 31.4%, respectively (Table 3).

However, a day after receiving colostrum in the goats of both comparable groups, the phagocytic activity of the blood was almost the same and amounted

Table 1. The experiments were carried out according to this scheme.

Groups	Number of animals	Ration
Control	15	Pasture feed (PF)
Experienced	15	PF + 0.250 g corn shit + 0.5 kg lucerne hay + 0.5 kg wheat straw

Table 2. The biological value of the nutrients actually consumed by the primary cells (M ± m, n = 3).

Indicators	Groups	
	Control	Experienced
Including:		
Pasture grass	0.935	0.490
Additional feeding:		
Bran, g	220.0	-
A mixture of alfalfa hay and straw, kg	-	0.628
Corn shit, kg	-	0.219
Consumed dry matter, kg	1.155	1.337
Nutritional value of the diet:		
Exchange energy, mDj	6.6	8.3
Energy Feed Unit	0.56	0.81
Raw protein, g	80.76	123.03
Digested protein, g	42	78

Table 3. Indicators of nonspecific protective factors in goats after birth, before and after receiving colostrums.

№	Indicators	Groups	
		Control	Experienced
	Before receiving colostrum (on your birthday)		
1	Bactericidal activity, %	14.7 ± 1.31	19.6 ± 1.51
2	Phagocytic activity, %	33.4 ± 0.37	31.4 ± 0.48
3	Number of phagocytes, un.	1.94 ± 0.04	2.25 ± 0.05
4	Phagocytic intensity, un.	2.11 ± 0.07	2.98 ± 0.06
	After receiving colostrum (3 - 4 days after birth)		
1	Bactericidal activity, %	23.7 ± 1.13	31.9 ± 1.43
2	Phagocytic activity, %	32.5 ± 0.36	33.4 ± 0.59
3	Number of phagocytes, un.	2.26 ± 0.07	2.51 ± 0.02
4	Phagocytic intensity, un.	2.35 ± 0.08	3.7 ± 0.06

to 32.5% and 33.4%, respectively.

As can be seen from the data in Table 3, before receiving colostrum, these studied indicators in the control group were the lowest or 25% less than in the experimental group. And after receiving colostrum, the bactericidal activity of the blood in the goats of both groups increased sharply and amounted to 23.7% and 31.9%, respectively, but the difference practically remained at the same level-25.7%. It should be noted that in the goats of both groups compared, the increased level of bactericidal activity of the blood was almost the same. This indicates that when the uterus synthesizes colostrum, all the body's defense systems are fully mobilized to enrich it with all the components that protect the body from the effects of adverse environmental factors and pathogenic microorganisms.

Thus, based on the materials obtained, it can be concluded that when breeding in extreme conditions of Uzbekistan, the organization of full-fledged feeding of the uterine livestock during the period of suckling provides a significant increase in cellular and humoral immunity in the resulting young. All this contributes to a sufficiently high level of natural stability of the body of young animals.

It is known that when young animals stay with their mother, their body's need for nutrients is practically provided by mother's milk. Taking into account this pattern, we conducted observations to study the effect of full-fledged feeding of uterine livestock during pregnancy on the morpho-biochemical and natural resistance of the body of goats from weaning to 9 months of age (Table 4).

As is known, the productivity of animals is directly related to the level of serum proteins in the blood and it is the main link in the knowledge of the biochemical essence of each period of life of growing animals, which is a feature of protein metabolism [12] [13].

The study of the level of total protein and its fractions in the blood of goats

obtained from females kept in different feeding conditions during their pregnancy revealed a number of age-related features of the amount of whey protein and its fractional composition (Table 5).

At the age of one month, albumins and globulins and their fractions were practically the same. However, at the age of 9 months, according to all comparable indicators, the goats of the experimental group had, in total protein-7.53%, albumin-10.57, globulin-5.26% and gamma-globulin-2.32%. This was reflected

Table 4. The influence of additional feeding of females on humoral and cellular factors of protection of the body of goats (9 months of age) (M ± m, п = 5).

Indicators	Groups	
	Control	Experienced
Humoral factors:		
Lysozyme activity, %	0.31 ± 0.09	0.40 ± 0.05
Bactericidal activity, %	0.17 ± 0.17	0.19 ± 0.12
Cellular factors of nonspecific protection:		
Leukocytes, thousand/ml	0.27 ± 0.12	0.42 ± 0.04
Phagocytic activity, %	0.23 ± 0.14	0.30 ± 0.10
Lymphocytes, %	0.43 ± 0.03	0.40 ± 0.05

Table 5. The content of total protein and protein fractions in the blood serum of goats after weaning (9 months of age).

Monthly age:		
Total protein, g/l	63.18 ± 0.476	67.34 ± 0.378
Albumins, g/l	55.99	56.53
Globulins, g/l	44.00	43.46
α-globulins,%	23.5	23.3
β-globulins,%	24.5	25.0
γ-globulins,%	52.05	51.7
Live weight, kg	2.59	2.76
9 months of age:		
Total protein, g/l	65.47 ± 0.202	70.80 ± 0.136 0.136*
Albumins, g/l	27.08 ± 0.442	30.28 ± 0.592
Globulins, g/l	38.39 ± 0.446	40.52 ± 0.456
α-globulins,%	20.52	17.32
β-globulins,%	14.27	15.22
γ-globulins,%	65.20	67.52
Live weight, kg	26.8 ± 1.96	33.6 ± 0.23

in the value of the albumin-globulin coefficient (A/G). Its variability, in our opinion, depends on the degree of provision of the uterus with the necessary nutrients during pregnancy and due to this, in the dairy period, the goats received more full-fledged milk, which to a certain extent contributed to the normal growth and development of the goats in the following months of life.

Apparently, in this regard, the protein index in both groups compared was almost the same at the age of one month −0.93, and at the age of 9 months, 0.92. However, different indicators were obtained for other fractions, so if the goats of the control group had a higher level of α-globulin-20.52%, then the goats of the experimental group had superiority in β- and γ-globulins.

The goats of the experimental group at the end of the experiment had an average live weight of 33.6 ± 0.23 kg or 6.8 kg more than the control group, or 20.24% higher. This indicates that full-fledged feeding of females during their pregnancy contributes to the production of full-fledged viable young, resistant to adverse environmental factors. In addition, at this age, it is possible to organize a preliminary assessment of breeding qualities in goats, and based on this, it is possible to determine the livestock as appropriate and inappropriate for further use for breeding purposes. By separating inappropriate goats from the herd at the age of 9 months, fattening can be organized in order to produce young goat meat. Additionally, the meat obtained to a certain extent increases the economic efficiency of the farm and provides savings in feed resources spent for feeding non-tribal goats up to 1.5 - 2.5 years of age.

4. Conclusions

The organization of normalized feeding of goats during the suckling period contributes to the normal course of the suckling period in females and ensures the production of sufficiently stable, well-developed, and also distinguished safety of offspring.

Confirmation of the above considerations was found in the data obtained on the growth and development of goats from goats in the experimental group under one year of age.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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