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CHANGING OF DAIRY PRODUCTIVITY LEVEL AND PHYSICAL AND CHEMICAL PROPERTIES OF MILK FROM COWS WITH DIFFERENT TYPES OF FEEDING

[1]Z.T. Razhamuradov.,[2]Latofat Huzhanova.,[3]Mamarajabova Matluba

Abstract*---Scientific and economic and physiological experiments to study the influence of silage and hay feeding type in lactating cows of the German generation were carried out in the conditions of the Pastdargom district of the Samarkand region. For this purpose two groups ofcowsin the third lactation of Holstein breed were formed with 6 head of catlle in each group. The animals of the control group received a silage diet, and the cows of the experimental group received the haylage type ofdiet, and in the diets of the compared groups, the nutrient content was almost the same and corresponded to the feeding standards of A.P. Kalashnikov et al. (2003). It was found that when using a haylage-type of diet cows consumed, more nutrients by 2.1% compared with the control group. In this way, the average daily milk yield in cows of experimental groups was greater at 3, 40 kilograms or 23.49 ± 0.37 kg versus 20.09 ± 0.51 kg. In the experimental group, there was an increase in the mass fraction of protein by 5.4 and fat by 10.5% relative to the control group oh. The dry skim milk remnantsin the milk of experimental group made 8.44 %, which was largercompared to the control group at 0.51%. The lowest level of milk density was in the experimental group of 1027.9 kg / cm ^{4}, while the highest fat content was compared to the control group (4.09). The results of studies showed that the use of haylage type of feeding in cows of the Holstein breed to a certain extent improved the state of digestion processes in the paunch and the qualitative properties of raw milk.*

Keywords*---feeding, diet, types of nutrition, silage, haylage, need, nutrients, paunch digestion, digestibility, milk production, physicochemical properties, control and experimental groups.*

I. INTRODUCTION

Improvement of the efficiency of feed used by farm animals with a subsequent increase in the level and quality of products obtained from them is one of the most important problems of agricultural biological science. The productivity of ruminants in the context of adequate nutrition depends critically on the realization of their productivity potential. The constant development of biological sciences, the high growth of animal productivity, the improvement of feeding techniques and the parameters of feeding and feed preparation technologies make it necessary to improve the assessment

[1]*Doctor of Biological Sciences professorofSamarkandState University.,E-mail: rajamurodov@samdu.uz*
[2]*applicant – independent researcher Samarkand veterinary medicine institute.,E - mail : Xujanova-2019@mail.ru*
[3]*Indeipendant researcher Termiz State University., E-mail:Matluba23.12.75@mail.ru*

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and parameters of feeding, to clarify the animal's need for nutrients to satisfy the needs of their body. In the world science, there is a constant review of changes in feeding standards, and a review of methods for evaluating the nutritional value of feeds [Kalnitsky B.D, 2007, Ryadchikov V.G, 2008].

As you know, one of the most important ways to increase the efficiency of nutrient use of feed, is increase of its consumption by animals and digestibility ofnutrients, which can be achieved only having sufficient knowledge about all physiological and biochemical processes of conversion and also about the connection of these with the contents of the diet and physiological condition of the animals[A.V.Kiselev 2005].

In recent years,the studies have been carried out all over the world to prevent a decrease in the productivity of farm animals under the influence of adverse conditions, as well as their natural resistance to various invasive and infectious diseases, deterioration of product quality and reduction of their livestock.

In our Republic, in order to provide the population with high-quality dairy products and the development of animal husbandry in this direction, great attention is paid to the development and implementation of innovative methods in industry aimed at increasing the production of dairy and meat branches. Based on the program activities aimed at the development of cattle breeding, as well as their effective use, certain results have been achieved. The “Development Action Strategy of the Republic of Uzbekistan defines the objectives as”.to.increase the safety of food products in the country, expanding the production of ecologicaly pure products”. Based on these tasks of a comprehensive study of adaptive abilities for extreme conditions of highly productive foreign breeds, determining the effect on physiological and biochemical parameters and the productivity of cow breeds, adapting to the effects of extreme factors, as well as the scientific justification from a biological point of view, the changes that occur in theirbody have important scientific and practical value.

The results of research works on studying the adaptive ability of foreign breeding of highly productive animals, carried out in Uzbekistan, demonstrate the possible ways of solving the problem of conservation of genetic productivity and increase of the volume of milk production by introducing innovative (new) and feeding technology in the new climatic and feed conditions [20.-2018, No. 3 [53] -60 b].

It was found that among many factorsfeed factor isof paramount importance and by definition of many authors, rational organization of feed and the clever use of feed aremain conditions for the development of dairy farming [9- 2013 -s118-122]. Of course, the contents of milk, the intensity of the processes of its synthesis in the mammary gland do not depend on the specifics of only one feed, but on many factors providing proper nutrition and correct formation of the processes of chemical transformations of feed nutrients. Studying the influence of the feed factor on the contents and physico-chemical properties of milk in modern conditions remains quite relevant, since the contents and properties of milk in many respects determine its quality and technological properties [10. , 2003; -20s 8. 2013, -s118-122].

In sharply changing conditions, Uzbekistan does not always make it possible to provide animals with an appropriate diet and feed sets , which increase the productivity of dairy cattle and improve product quality, as market conditions require , by improving the conditions for feeding animals, especially highly productive cows brought from European countries.

Based on the analysis of conditions of feeding dairy cattle in farms ofSamarkand region itmay be noted that by feedingofhigh-producing cows according to the level and type of feeding rations structure is significantly different from

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feedingof local zebu-like cattle. This is due to higher loads on the body of highly productive animals, high tension of metabolic processes, an increasing need for nutrient and biologically active substances, and, consequently, a greater need for standardized indicators.

In order to satisfy completely the needs of highly productive cows for nutrients and other biologically active substances, it is necessary to take into account the chemical contents and nutrition of the main feeds, as well as the degree to which these feeds provide animal needs for normalized substances [18 .- .- 2009.-22 s] .

If we take into account that the chemical contents and nutritional value of feed of plant origin,used in feeding ofdairy cattle depends on climatic, agronomic and other permanently changed factors, it becomes clear that the set of feeds and generating of feed diets should be carried out in each specific region on a scientific basis [17-2000. - S. 35-245].

As zoo technical science and practice show, this is possible by optimizing the structure of the feed base, improving the quality of feed, developing new types of feeding and methods of feeding animals. This issue has been given much attention by, leading scholars of domesticsand foreign countries, but today, more new challenges began to appear. [15-2009 - 155.with] .

It should be noted that so far, there is no consensus on the use of certain types offeeding of highly productive dairy cattle. In addition, a variety of inforeseenindustrial circumstances in keeping this industry requires a new approach and introduction of new innovative technology to the Industrial conditions. In this connection, types of feeding lactating cows, and feeding of methods to feed the animals, require further more detailed study and biological substantiation of received data.

And of a brief literature reviewit can be concluded, that in the period of adaptation to the new conditions, it is necessary to carryout a comprehensive studyofphysiologicaland biochemical parameters in imported animals using in their feeding, improving processes of digestion and increasing milk yicld with the appropriate quality of diets pertaining to different types of nutrition [] .

Withthis it is necessary to study the amount of feed consumed, microbiological and biochemical change rates of paunch contents, coefficient of digestibilityof nutrient diet substances and their effects on morphological and biochemical indices of blood, as well as the immune system of the body and to establish their connection with milk yield and physico - chemical properties of milk of experimental cows. Only studying all these indicators in cows in the period of adaptation, to the new conditions it is possible to obtain the largest milk yield per lactation with the lowest cost to feed lactating cows [1, 1997. - 419s; 16 - 1967-340 c].

At the same time, analysis of the results in the Research and Productions experience with Biologicall point of view, and appropriate explanation in theoretical and practical respect make it possible to determine arising problems in the process of adaptation of the organism cows to new conditions of industrial type[12, - 1997. - pp 25; 6, 1980. - 352s]

Subseguently, according to the results of experiments it can be recommended to produce definite contents of feed in different seasons of the year and the types of feeding in connection with the periods of lactation, as well as the physiological state of the body of cows. In connection with the, the aim of our study was to explore peculiarities of digestion and its connection with milk yield and milkproperties in imported cows of Holstein breed of German generation with different types of feed. To achieve the goal successfully it was necessary to solve the following specific tasks:

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-To make feed rations for imported cows containing necessary amounts of all nutritious substances,butdiffering in the individual components to determine the type of food;

- determine the amount of feed consumed and individual components of diet for experimental cows in comparison groups ;

- to study the processes of paunch digestion and establish changes in biochemical and microbiological parameters of paunch fluid in animals of the compared groups;

- determination of the effect of various types of diets in animals of the compared groups on the amount of nutrients used and their digestibility coefficients from the consumed diet components;

- establishing the influence of various types of nutrition on the level of the milk yield and physico-chemical properties of milk of imported cattle;

- determination of the change in the morphological and biochemical parameters of the liquid in the internal environment of the body and their relationship with the natural resistance of the body of the cows of the compared groups;

- determining the economic efficiency of feeding of various types of feeding rations when adapting to new extreme food and climate conditions.

II. RESEARCH RESULTS AND DISCUSSION

From the data obtained, when studyingthe features of feed intake of the tested diets, it was found that such feed asmaizesilagehayladealfalfawith grasses, wheat straw and alfalfa hay was eaten by experimental cows not completely.

Although all the feed used in the feeding of experimental animals in both groups was of relatively high quality, apparently due to this, the feedseaten by them were also relatively high (wheat straw was eaten by animals on average from 52 to 56%) and during lactation, the consumption of haylagefrom alfalfa with grasses ranged from 90.0% to 94.4%, and maizesilage, respectively, from 93.1 to 95.4%, and mixed feed was completely eaten.

Table 2.Amounts of actual feed consumed per day by experimental lactating cows during lactation

Indicators	Experimentperiod					
	Earlylactationperiod		3 monthoflactation		2nd half l actacy and	
	Groups					
	I	II	I	II	I	II
Alfalfahay, kg	5.8	5.5	7.5	7.0	6.7	6.4
Alfalfa haylage and,grass kg	-	20.5	-	23.6	-	21.6
Maise silage kg	26.7	-	29.8	-	28,4	-
Wheatstraw, kg	2.1	2.0	2.7	2.6	2.2	2.1
Mixed,feedkg	2.5	2.5	3,5	3.3	2.6	2.5
Containedinthem						
Energy feed	12.3	12.0	16,2	16,0	13.0	12.8

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unit						
Exchanged energy, mJ	137.8	143.0	181.5	196.7	151.0	149.6
Drysubstance kg	15.8	16,2	19.1	20,2	17,2	17.1

Notes: I - control group; II - an experimental group.

In the cows of the experimental group, the eatability of the feed diet was 2.1% higher compared to the control group.

The contents of the paunch fluid of lactating cows of the experimental groups 1 hour after feeding is shown in table 3 .

Table 3. Digestive paunch indices for lactating cows with various types of feeding

Indicators	Groups	
	I	II
The number of bacteria, billion in 1 ml	45.88 ± 1.75	52.38 ± 1.81
The number of ciliates, thousand in 1 ml	464.41 ± 10.8 **	597.63 ± 9.82 ***
Thevalueof-pH	5.99 ± 0.01	6.89 ± 0.02 *
Totalnitrogen, mg /%	85.5 ± 0.9	97.7 ± 1.1 **
Proteinnitrogen, mg%	60.17 ± 2.32	68.24 ± 1.85
Non-proteinnitrogen, mg%	25.34 ± 0.79	28.48 ± 0.63
VFA, mol / 100ml	9.18 ± 0.21 ***	10.3 ± 0.3 ***
The ratio of volatile fatty acids,%		
Vinegar	44.89 ± 0.86	58.43 ± 0.83
Propionic	19.35 ± 1.05	21.54 ± 0.79
Oily	16.77 ± 0.77	14.77 ± 0.45
Otherfattyacids	20.94 ± 1.23	6.71.0.82

* -P<0.05; ** - P<0.01; *** - P<0.001.

Judging by the results of laboratory analysis of paunchfluid in experimental animals, it can be seen that, in the paunch of cows of the experimental group, fermentation processes were more active compared to the control group of animals x . From the data of table 3 it can be seen that the concentration of non-protein nitrogen in the paunch fluid of lactating cows of the 2nd experimental group was significantly higher compared to the cows of the control group, which indicates an increase in the synthesis of nitrogenous substances in the paunch by microorganisms - symbionts.

An increase in the concentration of volatile fatty acids in the paunch fluid in cows receiving a hay-type diet indicates the activity of fermentation processes in the rumen of cows of the experimental group, which received hay during the lactation period, consisting of alfalfa with herbs. From the results of a study of paunch digestion in lactating animals of the experimental group, it becomes obvious that the relative high activity of digestion and metabolism in the pancreas of cows are due to receiving a diet consisting of a hay bagetype feeding. The obtained data correspond to the conclusions of some researchesrecived similar results in theconditition of Europe.[4-2014. - No. 97 (03). - S. -1-11; 12. 1997. - S. 25 ; [17.-2000. - S. 35-245]

The digestibility ratios of nutrients in experimental cows are given in table 4.

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Table 4. The amount of nutrients received with the diet and their digestibility in experimental animals, kg

Indicators	Groups	
	I	II
Drysubstances		
Takenwithdiet	19.13	20.24
Discharged withfeces	6.61	6.35
Digested	12.52	13.89
% digestibilityfromtaken	65.5 ± 1.0	68.5 ± 0.8 *
Protein		
Takenwithdiet	2.42	2.62
Dischargedwithfeces	0.82	0.82
Digested	1,60	1.80
% digestibilityfromtaken	66.2 ± 0.5	68.7 ± 0.5 **
Fat		
Takenwithdiet	0.89	0.77
Dischargedhlightedwithfeces	0.41	0.36
Digested taken	0.48	0.41
% of digestibilityfrom	54.3 ±	53.4 ±
Cellulose		
Takenwithdiet	4.20	5.07
Discharged withfeces	1.45	1.78
Digested	2.75	3.28
% digestibilityfromaccepted	65.1 ± 0.8	64.8 ± 0.8
Nitrogen-freeextractive substances		
Takenwithdiet	10,20	10.47
Dischargedwithfeces	3.17	2.87
Digested	7.03	7.60
% of digestibilityfromaccepted	68.9 ± 0.8	72.6 ± 0.7 *

* -P<0.05; ** - P<0.01

As the date in table 4 show, high indicators of consumption of dry substance and essential nutrients of the diet were observed in cows of experimental group and it resulted in improvement of digestive processes in the proventriculus of animals in connection with the feeding rations of haulage type of feeding , and all this has led to increase in the digestibility coefficients of all components of the nutrients of the diet compared with the control group of cows fed with silage types of feeding.

As it is shown by the results of a study of milk productivity and confirming the quality indicators of yield milk; - physio-chemical indicators of milk in cows of the experimental group for the lactation period were obtained from the experimental group .

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Table 5. Milk productivity and live weight of cows of German generationofHolsteinbreed , (n = 6 goal).

Indicators	Groups	
	Control	Experimental
Continuation of the entire lactation period, day	367.1 ± 3.9	3 6 9.0 ± 4.9
Milk yield per 305 days of lactation period, kg	6636 ± 90.3	8009 ± 120.7
The total amount of milk for the entire lactation period, kg	7409 ± 94.3	8490 ± 132.9
Milkfat, kg	2 67.46 ± 2.9	283.91 ± 2.9
Milkprotein, kg	200.9 ± 1.7	253.38 ± 2.2
The average daily milk yield , kg	20.09 ± 0.51	23.49 ± 0.37 *
Milk index of experimental cows	1312 ± 21.6	1555 ± 13.91 ***
The average live weight of cows, kg	534.4 ± 3.2	536.3 ± 3.5

The data in Table 5 show that on study of milk production in cows of experimental groups differing by feeding type (haylage and silage), it was found that a comparatively high yield of milk of a lactating period cow was in the experimental group being on Silage type of feeding. At the same time relatively low milk yield was found in animals of the control group, which were on the silage type of feeding.

Table 6. Physico-chemical properties of milk in cows of various types of feeding

Indicators	Groups	
	Control	Experimental
Density, kg / cm3	1029.7 ± 0.003	1027.9 ± 0.008
Titratable acidity, ^{0}T	16.5 ± 0.10	16.8 ± 0.10
Substanse	6.74 ± 0.03	6.83 ± 0.1
Dry%	11.9 ± 0.09	12, 4 1 ± 0.09
Massfractionof fat,%	3.7 ± 0.03	4 , 09 ± 0.02
Massfractionof protein,%	4.23 ± 0.02	4.46 ± 0.02
Freezingtemperatures, ^{0}C	0.527 ± 0.01	0.526 ± 0.12
Somatic cells, cm / thousand	143 ± 26	125 ± 22
Dry fat free dairy remants (DSMR),%	8, 23 ± 0.12	8, 4 4 ± 0.10

The experimental groups of animals differed in milk not only in terms of milk level, but also in milk contents and properties. If the cows of the control group on the silage diet exceeded the cows of the experimental group in the fat

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content in milk, then the content of protein in the experimental group of cows on haylage type of feeding exceeded their peers from the control group.

Densityof milk is formed by densities of its components, irrespective of their condition and it is one of the most important indicators of natural milk , ie, one of the physical properties of milk, and it should not be less than 1027 kg / cm^3 = 27^0A . As you know, when the fat content in milk rises , its density naturally decreases. And in our experiments, regardless of the type of feeding, the density of milk in both compared groups of animals corresponded to the requirements of SST(state standard)31449-2013 and were in the range of 1.029.7 - 1027.9 kg / cm^3. The lowest level of milk density was revealed in the experimental group of cows that were in the hay type of feeding, and amounted to about - 1027.9 kg / cm^3.

Titratable and active acidity refers to the chemical properties of milk. The titrated acidity of fresh milk is equal to 16-18 ^{0}T, the permissible value for normal milk ranges from 15.9 to 20.9 ^{0}T

The practice of dairy farming shows that the accumulation of lactic acid in milkaffirms experiment in dependent the activity of lactic acid bacteria, using dairy sugar in fermentation reactions. In our experiences is not dependent on the type of feeding in both compared groups of animal, was in the normal range of 16.5 and 16.8 ^{0}T that met the above mentioned norm of SST(state standard)31449-2013 .

In normal milk dry content of the substance is from 11 to 14% . Both the density of milk and the dry substansce content are mostly affected by the percentage of milk constituents, especially of fat. Thus, the dry substance content in milk of the experimental group of cows exceeded the control group by 0.51%.

The dry skim milk remnants (DSMR) content in the milk of the cows of the experimental group was 8.44%, which is 0.21% higher than the level of the control group. It should be noted that its amount in milk in both comparable groups was within the established standards in accordance with GOST 31449-2013, and at the request of the latter, the content of DSMR in milk should not be lower than 8.2% .

From the data obtained, it can be stated that the use of dairy cows brought from European countries to the new, by climatic and feed conditions, haylage type diets not only preserves the genetic productivity of animals but improves certain qualitative properties of milk. In addition, in the conditions of Uzbekistan, it is not always possible to prepare high-quality silage containing all the necessary nutrients. Along with this preparation of silage is relatively easy,its composition and properties are close to the green mass, transport ationand preservation of the readyproduct are relatively convenient and use in the feeding of dairy cows of the diet is more profitable for farms.

III. Conclusion

The use of haylage made from alfalfa and with various herbs in feeding of dairy cows makes it possible to conclude that during lactation it increases the amount of nutrients consumed and their digestibility, stimulate the body to form milk.Compared to haylage feeding cows, the cows that were in the silage type significantly improve the qualitative characteristics of raw milk.

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