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The Most Important Digestion Indicators of Highly Productive Cows, Depending on The Concentration of Fat in The Dry Matter of The Feeding Ration.

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ABSTRACT

Lately, interest of researchers of animals lipid metabolism increases. For a long time the main attention was paid only to protein and nucleic acids among organic compounds, although it is already known that lipids play an important role in the origin of life and the development of organic forms. Metabolic processes are very active of highly productive cows bodies, a large amount of energy and nutrients are used for the synthesis of milk, all systems work with a high voltage. So it require to enter the body an energy and all nutrients, including lipids. Lack of nutrients leads to a disruption of metabolic disorder, a decrease in productivity, a deterioration in the health of animals. At present, in Russian and foreign literature there is no consensus on the optimal fat content in the dry matter of the diet of lactating cows, especially highly productive. Researchers recommend rather wide limits of the maintenance of fat in their rations. The influence of different levels of fat on the processes of cicatricial digestion, the pH of the contents of the rumen, the content of volatile fatty acids in it, the activity of symbiotic microorganisms, their quantitative and species composition in the digestive tract, and the basic indices characterizing the digestion of highly productive cows remain a little studied.

Keywords: lipids, ration, cows, pre-intestine, microflora, microfauna.

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INTRODUCTION

Lipids are a large group of different in composition and functions of organic substances which contain long aliphatic chains, which have fat-like and other general physicochemical properties. These organic substances are widely distributed in nature, they are integral components of living cells, tissues and body fluids [1,2].

The exchange of lipids in the pancreas is a complex process. It is carried out by the system of food - microorganisms - a macroorganism and it has a significant effect on the nature of intermittent lipid metabolism and on the productivity of ruminants. The pre-intestine is a single cicatricial-cavity cavity that digests the food in a content consisting of four fractions: bacteria, infusoria, coarse food residues and cell-free liquid. The role of microbial fermentation in the metabolism and transformation of lipids is big, but the role of animal`s body is bigger. Neurohumoral regulation and adaptation-genetic feature is carried out by the interaction of particles of food, microflora, fauna and the host animal organism [3].

Ruminants have a very complex digestion in the. It interacts with many factors, including the level of feeding and the concentration of fat in the diet. In domestic and foreign literature it is impossible to complete all information about the influence of various sources and levels of fat in the diet on the parameters of metabolic processes in the rumen of cows.

The anatomical structure of the rumen and the conditions therein fully meet the requirements of bacterial fermentation. The temperature in the rumen is constant (39C). Saliva is rich in carbonate and phosphate buffer. This stabilizes pH and the buffer system rumen [4]. Favorable conditions for the life of anaerobic microbes is constant supply of nutrients, accumulation CO_2 and transition oxygen of water in a compound form.

Microorganisms actively participate in the cleavage of nutrients and break apart under the influence of enzymes and hydrochloric acid. As a result, proteins, fats and carbohydrates are absorbed by the body. The microorganisms of the pre-intestines supply vitamins (B, C and K) for ruminants [5,6].

The microorganisms of rumen can change lipids of feed, so this determines the characteristics of lipid metabolism in ruminants [7].

According to Gram, the most of proteolytic bacteria that stand out from the rumen have a positive color, and some bacteria have a negative color [8].

According to Gram, the most of cellulosolytic bacteria have a negative color [9,10].

Therefore, optimization of their lipid nutrition promotes more active use of energy and nutrients. So people get better milk from cows.

The researchers studied the effects of different concentrations of fat in the rations of high-yielding cows on the main indices of digestion in the rumen.

MATERIALS AND METHODS

Cows of Holstein breed with high productivity potential served as objects of research. All animals were clinically healthy.

The scientific experience was carried out on three groups of animals (10 heads each), formed according to the method of para- analogues or mini-flocks.

The difference in live weight and productivity between groups on average did not exceed 5%. Cows on average had a living weight of 600 kg, a daily yield of 27 kg of milk, a fat content in milk of 3.29%, a productivity for the previous lactation of 6773 kg of milk, a milk yield of 1.9-2.2 kg / min.

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In comparable groups of cows were fed in accordance with the research scheme, in the conditions of the «Azanovsky» breeding enterprise, rations balanced in terms of energy content, nutrients and biologically active substances. They consisted of clover hay, hay grass, beet fodder, beet molasses, clover grass, sunflower meal, wheat bran and mixed fodder. The specific weight of haylage was 30%, the specific weight of concentrated fodder was 40% in the structure of rations, on average for the period of the experiment. At the same time, in spite of the fat concentration in the rations, a kilogram of dry matter contained an average of 10 megajoules (MJ) of exchange energy. The cows of the control group received a diet containing 3.2% fat in accordance with Russian detailed feeding standards. The increase in the level of fat in the rations of cow II and III groups to 4.2 and 5.2% of dry matter was due to stabilized vegetable oil, which is introduced into the compound feed.

On the basis of zootechnical, biochemical, hematological studies it was established that the concentration of fat in the dry matter of cow rations at 3.2% was insufficient, 4.2% was optimal, and 5.2% was excessive.

RESULTS

The intensity and depth of cicatricial fermentation increases in cows of experimental groups. An analysis of the rumen`s digestion indicates that they are within the physiological norm, however, with an increase in the fat content in the dry matter of the diet, there has been a tendency to reduce the concentration of hydrogen ions (Table 1).

Table 1: Concentration, ratio of volatile fatty acids and cellulosolytic activity of bacteria which content in rumens of cows.

Indicators	Groups		
	I	II	III
pH	6,48±0,27	6,33±0,01	5,9±0,17
Cellulosolytic activity of bacteria, %	17,69±0,59	18,88±0,29	17,97±0,24
total VFA, Mmol / l	97,23±1,91	104,53±0,51	98,81±0,67
Including : acetic acid, % propionic acid % butyric acid, %	68,9±0,81 18,30±1,24 12,80±0,75	71,59±0,84 16,10±0,99 12,31±1,22	66,3±1,41 19,20±0,72 14,50±0,56

Acetate increased in rumen fluid. Acetate is involved in the metabolism of fat, especially in the production of milk fat. The destruction of fat in the rumen occurs under the influence of microbial lipases.

As a result of the transformation of lipids, high-molecular fatty acids and volatile fatty acids are formed. Replenishment of fat deficiency have a positive effect in cow`s ration 2 group of VFA 7,51 % ($P<0,01$) and less in cow`s ration 3 group (1.63 %).

In connection with the increase in the cellulolytic activity of bacteria, the amount of acetic acid increases by 2.69% ($P <0.01$), and the propionic acid decreases by 2.2%. Therefore, the ratio of acetic and propionic acids increases from 3.8: 1 to 4,5: 1. The increase in fat in the diet from 3.2 to 4.2% had no significant effect on the content of butyric acid.

Cows have some decrease in the content of total volatile fatty acids (by 1.62%), a significant and reliable (by 2.6%) acetic acid in conditions of excess fat intake. At the same time, propionic acid is increased by 0.9% and the amount of butyric acid is increased by 1.7%. So the excess fat stops acetic acid fermentation, stimulates propionic acid and oleaginous fermentation.

The cellulolytic activity of the symbiotic microflora increases by 6.73% due to the increase in the percentage of fat in the rations of the cows of group II.

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Nitrogen-containing substances in the contents of rumen of ruminant are represented by a protein of microorganisms, a non-decomposed protein of the feed, final and intermediate products of nitrogen metabolism.

It is known that the concentration of nitrogenous substances in the scar's fluid directly depends on the composition of the diet, as well as some fodder factors, which may be, for example, a different fat concentration in the dry matter of the diet.

The indicators of nitrogen metabolism in the rumen indicate that, the activity of the bacteria that destroy the protein feed increases and synthesizes the microbial protein with an increase in the fat content in the diet (Table 2).

Table 2: Concentration of nitrogenous fractions in the contents of the rumen, g / l

Indicators	Groups		
	I	II	III
Total nitrogen	0,891±0,01	0,952±0,01	0,920±0,01
Non-protein nitrogen	0,371±0,01	0,377±0,005	0,361±0,009
Protein nitrogen	0,520±0,01	0,574±0,006	0,558±0,005

In comparison with Group I, the amount of total nitrogen in the scar tissue increases by 6.73% ($P < 0.05$) with an increase in the amount of fat in the dry matter of the diet to 4.2%. The protein in the diet is better digested (Table 2), because the easily soluble proteins of the feed turn into scar tissue and microbial protein is formed. A further increase in the fat concentration to 5.2% led to a decrease in the total nitrogen content in the rumen by 3.5% relative to the second test group, but was higher by 3.14% compared to the control. The nitrogen-containing compounds of the protein and non-protein nature that have entered the rumen are destroyed with their subsequent deamination. Accordingly, in the rumen of the heifers of group II, the level of non-protein nitrogen increased (by 1.62%). Rumen microflora uses non-protein nitrogen and, in particular, ammonia for protein synthesis, which led to a significant ($P < 0.05$) increase of protein nitrogen in the rumen of the cows of group II by 10.39%, and group III by 7.31%. This testifies to the activation of metabolic processes in the rumen.

The condition of the microfauna in the rumen is usually characterized by the species composition of the infusorians and their quantity. Protozoans are very sensitive to changes in the environment. An attempt was made to trace how different levels of fat in the cows' rationing diets affect the density and generic composition of the infusorial fauna (Table 3).

Table 3: Density and generic composition of the infusorial fauna in the contents of the cortex of cows, thousand cells in 1 ml

Type of protozoa in rumen	Groups		
	I	II	III
Entodinium	183,20±4,27	191,43±4,04	184,05±7,70
Diplodinium	57,45±2,80	56,21±4,59	53,57±5,17
Epidinium	17,83±1,18	18,21±1,93	18,44±1,42
Ophryoscolex	8,71±1,49	7,9±1,33	6,13±1,27
Isotricha	8,62±0,60	8,52±1,01	7,58±0,59
Total	275,82±3,96	281,88±5,66	268,26±5,51

Regardless of the level of fat in the diet, the infusorial fauna in cows of all groups was represented on average by the genus Entodinium (87.8%) and by the genus Diplodinium (20.2%). Our results are consistent to the following literature sources. Pivnyak I.G. and Tarakanov B.V. (1982) noted that the protozoans of the genus Entodinium often predominate in the rumen of ruminants and often amount to 90% or more of the total number of infusorians.

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At the optimal level of fat in diets of cows (4.2%) the content of infusorians of the genus Entodinium increases by 4.2% and of the genus Epidinium increases by 2.1 %. The content of infusorians of the genus Diplodinium decreases by 2.2% and of the genus Ophryoscolex decreases by 9.7%.

Excess fat in the diet causes a poorly significant decrease in the content of infusorians of the genus Ophryoscolex by 29.6%, Isotricha by 12.1% and Diplodinium by 6.8%. For other infusoria, excess fat does not have a particular effect.

Bacteria are a necessary group of microorganisms that participate in the transformation of nutrients in the gastrointestinal tract of ruminants (Table 4).

Table 4: The shape and color of bacteria in the contents of the cortex of cows (billion in 1 ml.)

Indicators	Groups		
	I	II	III
Total	21,76±2,18	16,87±1,2	16,92±0,68
Micrococci	7,22±0,55	7,36±0,86	7,39±0,66
Diplococci	6,22±0,69	4,89±0,39	5,87±0,21
Streptococci	1,76±0,43	1,03±0,24	1,080,17
Tetracoccus	0,01±0,01	0,26±0,89	-
Staphylococci	1,61±0,39	1,32±0,10	1,24±0,16
Sticks	4,92±0,51	1,32±0,10	1,24±0,16
Grammpositive			
Total	9,37±1,21	5,54±0,35	4,60±0,33
Micrococci	3,24±0,33	2,67±0,19	2,40±0,34
Diplococci	2,79±0,40	1,76±0,12	1,63±0,01
Streptococci	0,73±0,32	0,23±0,04	0,07±0,01
Tetracoccus	-	0,08±0,05	-
Staphylococci	0,41±0,19	0,57±0,11	0,31±0,13
Sticks	2,19±0,32	0,21±0,1	-
Gram-negative			
Total	12,39±1,14	10,66±1,21	12,32±0,48
Micrococci	3,98±0,25	4,68±0,73	5,01±0,53
Diplococci	3,43±0,32	3,12±0,28	4,25±0,20
Streptococci	1,02±0,10	0,80±0,23	1,01±0,16
Tetracoccus	0,01±0,01	0,18±0,10	-
Staphylococci	1,19±0,25	0,75±0,07	0,81±0,10
Sticks	2,73±0,39	1,11±0,09	1,24±0,16

Currently, questions about lipid metabolism in the rumen of ruminants have not been adequately studied. With an increase in the fat concentration in the diet to 4.2 and 5.2% in the dry matter of the diet, the total number of bacteria in the II and III groups decreased by an average of 15.9%.

When the level of fat in the rations of cows increases, then a significant and reliable decrease in the total number of Gram-positive bacteria occurs. With an increase in fat in the dry matter of the diet to 4.2%, their number decreases by a factor of 1.7, and to 5.2% by a factor of 2.0. The number of streptococci varies most strongly among gram-positive bacteria.

At a fat level of 4.2%, their number decreases by 3.2 times, and at its level of 5.2% - by 10 times; Rod-shaped forms 2 times; diplodocus - in 1.6 – 1.7 times; Micrococci by 17.6 – 25.9%; Staphylococci at a level of 4.2% increases by 24.4%, and at a level of 5.2% - decreases 24%.

The total number of Gram-negative bacteria changes to a lesser degree than Gram-positive bacteria. The content of micrococci increases with a fat level of 4.2% by 17.6%, and tetracocci is increased 18-fold, the content of the remaining bacterial species decreases markedly: diplodocus by 9.0%, streptococci by 21.6%, staphylococci by 37%, sticks 2.5 times.

With an excessive intake of fat in the diet (5.2% of the dry matter of the diet), the total amount of gram-negative bacteria does not change, the content of micrococci increases by 25%, the diplodocus rises by 23.9%. Simultaneously, the number of staphylococci decreases by 31.9%, rods decreases 2.2 times, and tetracocci are completely absent in the liquid part of the rumen, while the level of dry matter is 4.2 and 5.2%.

The ratio of Gram-positive to Gram-negative bacteria at a fat level of 3.2% is 0.75, with 4.2% fat-0.52, with 5.2% fat-0.37.

Thus, the increase in fat in rations of lactating cows has a certain effect on the reduction in the total number and the number of gram-positive and gram-negative bacteria, as well as their ratio in the liquid part of the rumen.

A different concentration of fat in the diet had a certain effect on the change and color of bacteria.

In particular, the total number of bacteria in the liquid part of the mesh content increases with the increase in fat in the rations of cows to 4.2% by 47.0, and to 5.2% by 43.5%. At the same time, the content of micrococcus rises by 2.5 times, diplococci - by 17.5 and 39.2%, staphylococci - by 95.5 and 38.0%. The number of rods varies insignificantly. Tetracocci at 3.2% are absent, at 4.2% are contained in the amount of 0,4 billion in 1 ml and continue to be held at this level and at 5.2% fat in the diet.

Gram-negative bacteria predominate in the coloring method. The total number of them with the optimal and excess level of fat in the diets increases approximately equally by 44.4 – 39.2%.

When the fat content in the dry matter increases to 4.2%, we can see an increase in the content of micrococci of this method of staining by 81.7%, and to 5.2% - by 1.3 times, staphylococci, respectively, by 2.1 and 2.0 times, diplococci 40.6 and 36.2%, rod-shaped 17.9 and 4.5%. Streptococci in small amounts were observed only at a fat level of 3.2%.

The content of gram-positive bacteria in diets under the influence of different levels of fat varies in a different way. Their total number increases with 71.6 and 68.7% as the level of fat increases, the content of micrococcus is 2.7 and 2.8 times, diplococci by 37.1 and 29.8%, staphylococci in 2.1 and 1.8 times, the rod-shaped forms do not change significantly. Tetracocci were not found in any levels of fat.

The ratio of Gram-positive to Gram-negative bacteria in the mesh content is significantly lower than in the liquid part of the rumen at 3.2% fat in the dry matter of the diet - 0.42, approximately the same, at 4.2% - 0.50, and significantly higher at 5.2% - 0.51.

There are more bacteria in the third stomach than in the second stomach. The total number of bacteria in diets of high-yielding cows is altered due to increased levels of fat. When fat increases in the diet from 3.2 to 4.2%, it increases by 15.0%, when fat increases to 5.2% - it decreases 1.8 times. At a normal fat level, the content of micrococci increases by 38.3%, Tetracocci by 3.7 times, staphylococcus by 2.2 times, and the number of diplococci decreases by 6.7% and rod-shaped forms by 7.5%, streptococci by 21.7%. The amount of staphylococci increases only by 49.3% with an excess of fat in the diet. The tetracocci disappear. The content of other types of bacteria is significantly reduced: micrococcus by 26.0%, Tetracocci 2.5 times, streptococcus 3.1 times, rod-shaped 3.4 times.

Gram-positive bacteria of the contents of the third stomach respond to changes in fat levels of cows` diets significantly less than gram-negative. Tetracocci in the liquid part of the contents of the third chamber of the cows` stomach were absent in all groups.

The increase in the fat level in the dry matter of the diet from 3.2 to 4.2% has no significant effect on the total number of gram-positive bacteria, which contributes to an increase in the content of micrococci by

31.1%, staphylococci 1.8 times. Diplococci are reduced by 24.7%, streptococcus 2.2 times, rod-shaped forms at 48.9%.

When there is a lot of fat in the diet, the number of all gram-positive bacteria decreases, but except of staphylococci.

Gram-negative bacteria are more likely to feel a change in the level of fat in the diet. With an optimal level (4.2%), the total number of bacteria increases by 31.7%, micrococci by 43.6%, tetracocci in 3.7 times, staphylococcus by 39.0%, rods by 26.1%. The content of diplococci and streptococci does not change significantly.
Tetracocci disappear in the first stomach when the fat content in the diet is increased to 5.2%. The total number of gram-negative bacteria decreases in 1.8 times, micrococcus in 1.6 times, dicococci in 2.9 times, streptococcus in 2.1 times, rod-shaped in 2.6 times, and staphylococci increases in 1.6 times.

The ratio of Gram-positive to Gram-negative bacteria at the studied levels of fat in the cows` rations the liquid part of the contents of the book is 0.86: 0.65 and 0.76, respectively.

The ratio of Gram-positive and Gram-negative bacteria in the three dietary groups in the liquid part of the contents of the third stomach is 0.86: 0.65 and 0.76, respectively.

The total number of bacteria in the contents of the abomasum is approximately the same as in prematurity. When the level of fat in the rations of cows increases from 3.2 to 4.2%, the total number of bacteria is reduced by 21.9%, and at 5.2% fat, almost 2 times. The content of micrococcus decreases, respectively, by 19.2% and 1.9 times, streptococci 2.9 and 7.8 times, rod-shaped forms 1.4 and 2.8 times. When the diet contains 4.2% of fat, tetracocci decreases 2.6 times, and at 5.2% - disappear. When the fat level is optimal (4.2%), the content of diplococci in the dry matter of the diet does not change significantly. And at an excess fat level, the content is reduced 1.8 times.

The content of gram-positive bacteria in the abomasum slightly increases (by 14.7%) with a fat level in the diet of 4.2%. Since the number of constituents of this group of micrococci and diplococci increases insignificantly. Tetracocci is absent in all studied levels of fat. The content of other bacteria in this group varies more. Thus, the number of staphylococci increases 3.7 times, rod-shaped forms 43.7%, streptococci decreases 2.7 times. When fat in the diet is equal to 5.2%, this leads to a decrease in the content of micrococci by 16.1%, diplococci 2.2 times, streptococcus 15.7 times, the disappearance of rod-shaped, staphylococcus increase 13.1 times.

When the fat concentration in the dry matter of the diet is increased from 3.2 to 4.2%, the total number of gram-negative bacteria decreases by 36.3%, and at 5.2% - by 2.1, micrococcus, respectively, by 34.2% and 3.2 times, diplococci 14.2 and 39.1%, streptococci 2.8 and 6.8 times, tetracocci 2.6 times and disappearance, rod-shaped 1.8 and 2.3 times. At the optimal level of fat, the content of staphylococcus is reduced by 47.1%, and at excess it increases by 30.1%.

The ratio of Gram-positive to Gram-negative bacteria at a fat level in the dry matter of a diet of 3.2% is 0.42, with 4.2% fat is 0.75, and at 5.2% is 0.61.

Chyme has an acidic reaction when it comes from the abomasum to the small intestine. In it, under the action of pancreatic juice and intestinal walls, bile, which have an alkaline reaction, it is neutralized and acquires a slightly alkaline reaction. These changes should affect the life, quantity and species composition of microorganisms. Different levels of fat should affect them differently.

The results of the studies show that the bacteria contain significantly less in the chyme of the small intestine than in the prednies and abomasum. The ratio and composition in the group gram-positive to gram-negative bacteria changes markedly. And the effect of different levels of fat in the rations of cows remains approximately the same. When the level of fat in the dry matter ration rises from 3.2 to 4.2%, the total number of bacteria increases by 29.2%, and when it rises to 5.2%, the total number of bacteria increases by 42.8%.

The amount of each type of bacteria varies in different ways when the level of fat in the diet rises. Replenishment of its deficiency contributes to an increase in the content of micrococci 1.8 times, diplococci 1.7 times, staphylococcus a 2.8 times, a decrease in streptococci 4.9 times, the rod-shaped forms completely disappear.

Excess fat in the diet increases the amount of micrococcus only by 19.6%, dicococci by 65.0%, tetracocciby 4.4 times, rod-shaped by 15.3 times. It reduces the number of streptococci 2.3 times. When the fat level rises from 3.2 to 4.2%, the total number of bacteria in the first group does not change. The number of micrococci increases by 34.4%, diplococci remains constant, streptococci is reduced by 10.9 times, staphylococci increases 3.3 times, tetracocci and rod-shaped forms are absent. When the fat level is 5.2%, the total number of Gram-positive bacteria decreases by 2 times, micrococci by 24.0%, diplococci by 2.1 times, staphylococcus by 1.8 times, and the rod-shaped forms increase by 2.4 times.

The total amount and content of most species of Gram-negative bacteria increase, if the level of fat in the diet increases greatly. Their sum increases at its level of 3.2% of the dry matter of the ration in 1.8 times, and at a level of 5.2% - 2.8 times, the content of micrococci, respectively, 2.4 and 1.8 times, diplococci in 2 , 1 and 3.8 times, tetracocci in 1,2 and 3,6 times, staphylococci in 2,3 and 3,8 times. If the fat is 4.2% in the dry matter of the diet, then the number of streptococci decreases 2.7 times and the rod-shaped forms disappear. At a level of 5.2% the content of streptococci is the same as at 3.2%, the number of rod-shaped forms is increased by 21.2 times.
When the level of fat in the diets rises, the ratio of Gram-positive to Gram-negative bacteria is greatly reduced. At 3.2% fat it is 1.51, with 4.2% fat is 0.85, and at 5.2% is 0.26.

The number of bacteria is much greater in the contents of the thick intestine, than in the thin section chyme. Various factors affect it, including the dose of fat that enters the body.

If the amount of fat in the dry matter of the diet increases from 3.2 to 4.2%, then the total number of bacteria studied increases 1.8 times. At the same time, the content of micrococci increases 2.8 times, diplococci 1.5 times, staphylococcus 3.4 times, rod-shaped bacteria 1.9 times. Streptococci decreased by 33.5%, tetracocci by 2.2 times.

The increase in fat levels to 5.2% has a significantly lower impact. The total number of bacteria increases only by 18.9%, micrococci by 59.5%, staphylococci 7.9 times. The rod-shaped forms decrease by 27.17% and streptococci 3.0 times. The content of diplococci and tetracocci does not change significantly.

The change in the level of fat in the ration has a relatively small effect on Gram-positive bacteria. Raising it to 4.2% leads to an unreliable increase in the amount of such bacteria by 15.6%, and to 5.2% - to a decrease of 10.9%. Certain types of bacteria in a quantitative way change to a much greater extent than their sum. The content of micrococci increases by 2.1 and 1.6 times, respectively.

The amount of diplococcus is reduced by 1.4 and 2.0 times, streptococcus is 2.2 and 3.9 times. The content of rod-shaped bacteria increases slightly at normal fat levels and It sharply (in 2 times) decreases at the raised level of fat in a ration.

The amount of gram-negative bacteria under the influence of different levels of fat in the diet varies very much. When the fat level rises to 4.2%, the number of bacteria increases twofold, the content of micrococci 4.0 times, dicococci 3.7 times, staphylococcus 2.0 times, rod-shaped forms 3.2 times; Streptococcus is reduced by 21.0%, tetracocci is 2.2 times. If the fat level is 5.2%, then the amount of gram-negative bacteria almost does not change. Their sum increases in 1.6 times, the quantity of micrococcus in 1.8 times, staphylococcus in 3.4 times, rod-shaped forms in 1.6 times. The number of streptococci decreases 2.7 times.

The ratio of Gram-positive to Gram-negative bacteria in the contents of the large intestine with an insufficient level of fat in the diet of highly productive cows is 1.45, with an optimum level is 0.60, with an excess level is 0.80.

CONCLUSION

Thus, the microflora of the contents of each department of the gastrointestinal tract differs in its unique response to different fat levels in diets of highly productive cows. The best positive effect on the amount, composition and activity of microorganisms in the contents of the digestive tract has a fat level in the dry matter of the diet equal to 4.2%, which should be considered optimal. This should help improve digestion and assimilation of nutrient and biologically active feed substances.

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