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EFFECT ON NONSPECIFIC IMMUNOLOGICAL PARAMETERS IN THE USE OF PROBIOTICS AND ANTIBIOTICS AGAINST COLIBACTERIOSIS OF LAMBS

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Annotation: The aim of the study was to compare the effect of probiotics (Maxlac/DW, innoprovet) and antibiotics (enrofloxacin) used for the prevention and treatment of colibacteriosis in lambs on non—specific immune parameters (phagocytic index, bactericidal activity, lysozyme activity, complement system-CH50) in preventive and therapeutic conditions.it consists of a definition.b research — to compare the effect of probiotics (Maxlac/DW innoprovet) and antibiotics (enrofloxacin) used for the prevention and treatment of colibacteriosis in lambs on non-specific immune parameters (phagocytic index, bactericidal activity, lysozyme activity, complement system-CH_{50}) in preventive and therapeutic conditions.it consists of a definition. In an experimental study, probiotics were injected into water/milk for 14 days in both preventive and curative regimens; while enrofloxacin was administered for 3-5 days of oral treatment; The groups were organized according to control and combined schemes. Phagocytosis, bactericidal activity, dynamics of lysozyme and CH_{50} were measured and statistically analyzed in blood samples for 1-28 days. The results showed that with the prophylactic use of the drug " Maxlac/ DV", the indicators of nonspecific immunity increased significantly: phagocytosis was ~50%, bactericidal activity ~64%, lysozyme ~ 34-35%, and the level of CH_{50} reached ~121-122 units; in infected control animals, these indicators decreased sharply. For therapeutic purposes, the combination of enrofloxacin and probiotics proved to be the most effective, restoring immunity and promoting clinical recovery; Probiotics have demonstrated superiority in immunostimulation when probiotics or antibiotics are used separately.

Key words: Lambs, colibacteriosis, Escherichia coli, probiotics, Maxlac/DW, innoprovet, enrofloxacin, nonspecific immune parameters, phagocytosis index (PhI), bactericidal activity (BASK), lysozyme activity, the complement system (CH_{50}).

Introduction. Among the diseases of bacterial etiology found in young animals in the livestock industry, colibacteriosis is one of the most important factors causing economic damage. Especially among lambs, infection associated with enteropathogenic bacteria of the genus Escherichia coli is accompanied by high morbidity and mortality. The disease not only disrupts the functioning of the gastrointestinal system, but also weakens the body's natural defenses. As a result, lambs have decreased immunological parameters — the phagocytic activity of leukocytes, the activity of the lysozyme and complementary systems, as well as the level of immunoglobulins, which increases the risk of secondary infections and creates prerequisites for the transition of the disease to chronic forms.

In recent years, the use of probiotic drugs has become an urgent trend in the fight against colibacteriosis, in addition to antibiotics. Because although antibiotics destroy microorganisms in the short term, they can disrupt the natural balance of the intestinal microflora, causing the appearance of drug-resistant strains. In recent years, the use of probiotic drugs has become an urgent trend in the fight against colibacteriosis, in addition to antibiotics. Because although antibiotics destroy microorganisms in the short term.

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in lambs has been studied. This study used the German probiotic Maxlac/DW 3 G × 25 (Lactobacillus spp. and Bifidobacterium spp. The effect on immunological parameters when used against colibacteriosis in lambs has been studied. The probiotic was added to the diet for 14 days, assessing its effect on non—specific immune parameters - phagocytic activity, the state of the lysozyme and complementary systems, as well as the level of immunoglobulins. The results of the study are aimed at establishing that probiotics have safer, immunostimulating and preventive therapeutic effects for the body compared to antibiotics.

It is known from the literature that usually bifidobacteria and lactic acid bacteria predominate in the intestinal microflora of young animals. They prevent the development of pathogenic bacteria entering the intestine as a result of the formation of organic acids, increasing the active acidity of intestinal contents, producing antibiotics, fighting for epithelial sites and activating the body's own defenses. [9; 93-95-p., 10; 76-79-p.]

The homeostatic balance between a living organism and the microflora is such that in moderation, due to the intestinal barrier and immune tolerance to deep anaerobic residents (Bacteroides, eubacterium, Bifidobacterium, etc.), specific markers are very present in the systemic circulation. This condition changes with a violation of the barrier or a severe intestinal infection [3; 1270–1272-p., 7; 315–319-p.]. Primary colonization by intestinal microflora, especially in the neonatal period, determines the "tuning" of the local and general immune system; microbial signals received during this period form a balance of pro- and anti-inflammatory cytokines, determining the "normal" range of immune responses in the following days of life. [1; 129–133-p., 2; 539–543-p.]. The intestine is the main link in digestion, and the composition of the microflora in it changes dramatically depending on the age, diet, and immune status of the animal; however, in ruminants, these differences are constantly changing throughout ontogenesis and during nutrient exchange [4; 1–3-b., 5; 1039-p.].

The formation of the microbiota begins from the moment the lambs are born, and the main source is the mother. Through the birth canal, skin, and through colostrum or milk, the microflora of the mother's body quickly migrates into the newborn's body. Since the immune and enzyme systems have not yet matured, the predominance of beneficial or harmful microbes during this early colonization determines the subsequent balance of the microbiota [8; 181-195-p.].

For this reason, newborn animals are the most important tool when using probiotic drugs. However, in order to maintain an ecological balance in the digestive system, it is necessary to determine and evaluate the composition of the natural intestinal microflora of not only adults, but also young animals. Based on these data, prevention and treatment strategies can be scientifically selected [6; 266-272-p.].

Aims and objectives of the study. Comparative determination of the effect of probiotics (Maxlac/DW, innoprovet) and antibiotics (enrofloxacin) used for the prevention and treatment of colibacteriosis in lambs on non—specific immune parameters - phagocytic activity, bactericidal activity, lysozyme activity and complement system activity.

To achieve this aim, the following tasks were set.

- Comparative study of the effect of probiotics and antibiotics used to prevent colibacteriosis in lambs on non-specific immune parameters;
- A study comparing the effect of probiotics and antibiotics on the prevention of colibacteriosis in lambs on specific immune parameters.

Research materials and methods. The study was directed in two directions: 1-the preventive effectiveness of the use of probiotics in colibacteriosis of lambs (in which a probiotic is administered from the first days of life of lambs) and 2-the effectiveness of treatment (with appropriate damage to lambs) in combination with an innate (nonspecific) and specific (specific)

immune response.

In the preventive direction, the groups were defined as Experiment 1 for preventive purposes "Maxlac/DW 3 g × 25" (Lactobacillus spp., Bifidobacterium spp.) a group that received probiotics for 14 days in a ratio of 0.03 g/l per water/milk, control groups that are expected to be susceptible to the disease from the 14th day of study 2, and healthy control groups 3.

And in the direction of treatment, experimental group 1-a multicomponent probiotic of German production "Maxlac/DW 3 G × 25" (Lactobacillus spp., Bifidobacterium spp.) was given water or milk in a ratio of 0.03 g / l for 14 days. For treatment, experimental group 1-a multicomponent probiotic of German production "Maxlac/DW Gx25" (Lactobacillus spp., Bifidobacterium spp.) was given water or milk in a ratio of 0.03 g/l for 14 days. The insects of the 2nd experimental group, a domestic probiotic drug of domestic production Innoprovet (Bacillus subtilis strain), were given 10 ml of suspension mixed with 1 liter of water or regular milk once a day, individually for 10-15 days. Experimental group 3-enrofloxacin 10% was administered orally as an antibiotic at a dose of 5 mg/kg for 3-5 days. Experimental group 4 - combined treatment (first enrofloxacin for 3-5 days, then maxlac/DW probiotics for 10 days). However, group 5 was retained as the affected control. On the 14th day of the experiment, lambs in all experimental and control groups were in the state of E. coli o78: oral cavity damage by strain K80 at a dose of 1× 10 CFU.

Enrofloxacin 10% (oral solution) is an antibiotic of the fluoroquinolone group with a wide spectrum of action, produced by Belvitunipharm for oral administration. The drug was given for 3-5 days, mixed with drinking water in an amount of 0.25–0.5 ml / 10 kg of body weight.

The drug is rapidly absorbed through the intestine, reaches its maximum concentration in blood plasma in 1.5–2 hours and remains at the therapeutic level for 24 hours. It refers to both gram-negative and gram-positive microorganisms, especially Escherichia coli, Salmonella spp., Haemophilus spp. and Klebsiella species. it has a high activity against. Eparate is rapidly absorbed through the intestine, reaches a maximum concentration in blood plasma in 1.5–2 hours and remains at the therapeutic level for 24 hours. It refers to both gram-negative and gram-positive microorganisms, especially Escherichia coli, Salmonella spp., Haemophilus spp. and Klebsiella species. it has a high activity against. During the treatment period, animals are given only water or milk with a medicinal solution, the solution was prepared fresh daily and kept for no more than 24 hours. Sampling from lambs in each experimental and control group, blood is taken from the jugular vein and immediately distributed into three vessels: a tube without anticoagulants (serum) into vessel 1-nonspecific immune blood parameters (PhI, BASK, lysozyme, CH_{50}) of the experiment in the preventive direction 1-, 7-, 14-, 21- and on the 28^{th}, and in the direction of treatment 14-, 15-, 16-, 21- and we checked on the 28^{th}.

The results obtained and their analysis. Colibacteriosis is a common infectious disease in lambs, in the clinical course of which an important role is played not only by intestinal damage, but also by disorders of innate and acquired immune mechanisms. With colibacteriosis, there is a decrease in the phagocytic activity of leukocytes, a decrease in the activity of lysozyme and the complement system, and a decrease in the level of immunoglobulins. Olibacteriosis is a common infectious disease in lambs, in the clinical course of which an important role is played not only by intestinal damage, but also by disorders of innate and acquired immune mechanisms. With colibacteriosis, there is a decrease in the phagocytic activity of leukocytes, a decrease in the activity of lysozyme and the complement system, and a decrease in the level of immunoglobulins. Therefore, the use of probiotics in the prevention and treatment of the disease not only normalizes the intestinal microflora, but is also an important factor in strengthening the immune system. The experiments used probiotic "Maxlac/DW 3 G X 25" of German production

(Lactobacillus spp. and Bifidobacterium spp. within 14 days. This is important because the probiotic is able to restore the intestinal microflora of lambs, enhance immunity and provide a preventive and curative effect against colibacteriosis.

Table-3.3.1.1.

Dynamics of the effect of probiotics on nonspecific immune parameters in the prevention of colibacteriosis in lambs (M ± m)

Indicators	Day	Groups		
		Healthy control	Control expected to be damaged	Prophylactic probiotic
Phagosite Index PhI (%)	1	41.2 ±1.5	41.0 ±1.6	41.5 ±1.4
	7	42.0 ±1.6	41.5 ±1.5	44.3 ±1.5
	14	43.5 ±1.5	42.8 ±1.4	47.8 ±1.6
	21	44.0 ±1.4	35.0 ±1.5	49.5 ±1.7
	28	44.2 ±1.3	34.5 ±1.6	50.1 ±1.5
Bactericidal activity BASK (%)	1	54.0 ±2.1	53.9 ±2.0	54.2 ±2.1
	7	55.3 ±2.0	54.0 ±2.1	59.5 ±2.2
	14	56.2 ±2.1	55.1 ±2.0	62.1 ±2.0
	21	56.5 ±1.9	44.0 ±1.8	63.4 ±1.9
	28	56.8 ±2.0	43.1 ±1.9	64.2 ±1.8
Lysozyme activity (%)	1	28.4 ±1.0	28.3 ±1.1	28.2 ±1.1
	7	29.2 ±1.1	28.9 ±1.0	31.5 ±1.2
	14	29.5 ±1.2	29.0 ±1.0	33.2 ±1.2
	21	29.8 ±1.1	22.5 ±0.9	34.0 ±1.1
	28	30.0 ±1.0	22.0 ±1.0	34.5 ±1.2
Complement system activity-CH_{50} (units)	1	104 ±3.5	103 ±3.2	105 ±3.1
	7	106 ±3.4	105 ±3.3	112 ±3.2
	14	108 ±3.3	106 ±3.0	118 ±3.5
	21	109 ±3.2	88 ±2.9	121 ±3.3
	28	110 ±3.1	86 ±3.0	122 ±3.2

The immune status of the body was assessed by non-specific indicators as a result of the administration of the probiotic Maxlac to newborn lambs for preventive purposes. In our studies, various periods of formation and changes in the phagocytosis index, bactericidal activity, lysozyme activity, and complement system activity were analyzed. Each indicator was studied in groups receiving healthy control, expected damage control, and probiotic, and compared between them.

The phagocytosis index initially showed the same indicator in all groups (41-43%). Even on day 7, there was no significant improvement in the control groups, which were healthy and expected to become infected. However, in the probiotic-treated group, this figure increased slightly to 44%. By the 14th day of our study, the probiotic was given for preventive purposes, and although the lambs in the affected control group were infected, the rate in the affected control group maintained a result close to that in the healthy control group, since it would take at least 24-48 hours to register immune responses in laboratory tests. However, by days 21-28 of the experiment, these differences began to vary dramatically. In particular, in the affected control

group, the phagocytosis index dropped to 33-35%, while in the healthy control group, this indicator remained stable (44%), while in the group receiving the probiotic Maxlac, it increased to 50%. This demonstrated the stimulating effect of the probiotic on phagocytic defense mechanisms.

Bactericidal activity, expressed in the ability to neutralize bacteria in body fluids and kill them, is an important indicator of non-specific humoral defense mechanisms. In the early days, the bactericidal activity was the same in all groups — about 54%. This stage reflects a background that has not yet been affected by infection. Tericidal activity, expressed in the ability to neutralize bacteria in body fluids and kill them, is an important indicator of non-specific humoral defense mechanisms. In the early days, the bactericidal activity was the same in all groups — about 54%. This stage reflects a background that has not yet been affected by infection. In the control groups that were healthy and expected to become infected on the 7^{th}-14^{th} day of the experiment, the indicators remained at the same level (55-56%), which indicates a stable state of the immune response. However, in the group receiving probiotics, an increase of up to 62% was observed, which, in turn, indicates that the body's humoral defense against bacterial agents is being formed.

By the 21^{st} and 28^{th} days of our study, the differences became more apparent. In the affected control group, bactericidal activity decreased sharply (43-44%), which indicates a weakening of the body's defenses caused by infection. However, in the experimental group, where lambs were given probiotics from birth, there was a steady increase of up to 64%. Healthy control maintained background productivity at 56%. By the 21^{st}-28^{th} days of our study, the differences became more apparent. In the affected control group, sharply.

At the initial stage of our research, the activity of lysozyme, an enzyme called lysozyme, which has the property of destroying the bacterial cell wall and is considered an important non-specific indicator representing the natural protection of the body's mucous membrane, showed a balanced physiological background in the range of 28-29% in all groups. The activity of lysozyme, an enzyme called lysozyme, which has the property of destroying the bacterial cell wall, is considered an important non-specific indicator representing the natural protection of the body's mucous membrane., At the initial stage of our research, it showed a balanced physiological background in the range of 28-29% in all gto shells.

By the 21^{st} and 28^{th} days of our study, the picture began to change dramatically. In the affected control group, the lysozyme level decreased to 22%, indicating a weakening of the body's mucosal defenses due to infection. However, in the probiotic-treated group, this figure increased to 34-35%, which is higher than in the healthy control (30%). On days 21-28 of our study, the picture began to change dramatically. In the affected control group, the lysozyme level decreased to 22%, indicating a weakening of defenses.

The activity of the complement system (CH_{50}, units) is the central link of humoral immunity and participates in the lysis of bacterial cells through antigen-antibody complexes and the intensification of inflammatory reactions. On the first day of the experiment, the activity of the complement system in all groups was recorded at the level of 103-108 units, representing an overall stable background. The activity of the complement system (CH_{50}, units) is the central link of humoral immunity and participates in the lysis of bacterial cells through antigen-antibody complexes and increased inflammatory reactions. On the first day of the experiment, the activity of the complement system in all groups was recorded at the level of 103-108 units, representing an overall stable background. In the experimental group that received Maxlack's probiotic on days 7 to 14, CH_{50} levels were 118 units higher than in the healthy control group. However, in the control group where infection was expected, during this period, indicators close to the still

healthy group (106 units) were recorded, since the effect of infection had not yet been fully demonstrated at the laboratory level.

However, on the 21st-28th day of the experiment, small differences in this indicator began to appear. In the affected control group, CH_{50} levels dropped to 85-86 units, indicating a violation of the mechanisms of humoral protection against infection. However, in the group receiving the probiotic, the indicator was constantly increasing and amounted to 121-122 units. However, on the 21st-28th day of the experiment, small differences in this indicator began to appear. In the affected counter.

The probiotic maxlack has shown a significant advantage in terms of nonspecific immune mechanisms when used prophylactically. The phagocytosis index was 50.1% by day 28 in the probiotic-treated group, which is 1.13 times higher than in the healthy control (44.2%) and 1.45 times higher than in the affected control (34.5%).Robiotic maxlak has shown a significant advantage in terms of nonspecific immune mechanisms when used prophylactically. The phagocytosis index was 50.1% by day 28 in the probiotic-treated group, which is 1.13 times higher than in the healthy control (44.2%) and 1.45 times higher than in the affected control (34.5%). The bactericidal activity increased to 64.2% in the probiotic group, which is 1.12 times higher than in the healthy control (56.8%) and almost 1.5 times higher than in the damaged control (43.1%). Lysozyme activity increased to 34.5% in lambs treated with probiotics, 1.15 times compared with the healthy control (30.0%) and 1.56 times compared with the damaged control (22.0%). Lysozyme activity increased to 34.5% in lambs treated with probiotics, 1.15 times compared with the healthy control (30.0%) and 1.56 times as compared to the damaged control (22.0%). The activity of the complement system was recorded in the probiotic group by 122 units, which is 1.11 times higher than that of the healthy control (110 units), and 1.42 times higher than that of the damaged control (86 units). These results convincingly showed that the probiotic strongly stimulates non-specific cellular and humoral mechanisms, forming stable protection against colibacteriosis in lambs by restoring and strengthening immune parameters reduced due to infection.

In the group in which the probiotic was used for preventive purposes, non—specific immune mechanisms — phagocytosis, bactericidal activity, lysozyme, and the complement system - were constantly enhanced, despite the effects of infection. In the healthy control, the indicators remained stable at the background level, while in the affected control, a decrease was observed as a result of infection. In the group in which the probiotic was used for preventive purposes, non-specific immune mechanisms — phagocytosis, bactericidal activity, lysozyme, and the complement system — were constantly enhanced, despite.

The severe course of colibacteriosis in lambs is very difficult in the treatment process, since the disease occurs not only in the intestine, where the causative agent E. E. coli multiplication is also accompanied by a violation of the mechanisms of innate immune defense. Clinical observations show a decrease in phagocytosis, a decrease in bactericidal and lysozyme activity, and a sharp decrease in the level of the complement system and immunoglobulins. The severe course of colibacteriosis in lambs is very difficult in the treatment process, since the disease occurs not only in the intestine, where the causative agent E. E. coli multiplication is also accompanied by a violation of the mechanisms of innate immune defense. Clinical observations show a decrease in phagocytosis, a decrease in bactericidal and lysozyme activity, and a sharp decrease in the level of the complement system and immunoglobulins. Although antibiotics suppress pathogenic microbes in the short term, they often further suppress the intestinal microflora and fail to adequately restore the immune response. In this regard, the therapeutic value of using probiotic agents is growing. Multicomponent probiotic maxlac/DW 3 g × 25“ produced in Germany (Lactobacillus spp. and Bifidobacterium spp. For 14 days after the call, the experimental patient

was given water or milk in a ratio of 0.03 g / l.Due to this, the therapeutic value of using probiotic agents is growing. Multicomponent probiotic maxlac/DW 3 g × 25“ produced in Germany (Lactobacillus spp. and Bifidobacterium spp. For 14 days after the call, the experimental patient was given water or milk in a ratio of 0.03 g / l. And the lambs in the experimental group were given the local probiotic innoprovet (based on Bacillus subtilis) for medicinal purposes according to the established scheme. As an antibiotic, 10% enrofloxacin was administered orally to lambs at a dose of 5 mg/kg for 3-5 days.. In combination therapy with antibiotics and probiotics, an antibiotic was first administered (3-5 days), followed immediately by a course of probiotics (14 days). This approach allowed the probiotic to restore the intestinal microflora, strengthen the immune system and increase the effectiveness of treatment in combination with antibiotics.

Table-3.3.1.2

Dynamics of nonspecific immune indices in lambs when antibiotics and probiotics are used for treatment (M ± m)

Indicators	Day	Groups				
		Pest control	Experiment 1 Probiotic (Maxlac/DW)	Experiment 2 (Innoprovet)	Experiment 2 Antibiotics (Enrofloksatsin 10%)	Experiment 3 Antibiotic + Probiotik (Maxlac/DW)
Phagosite Index PhI (%)	14 *	40.5 ±1.4	41.0 ±1.3	40.7 ±1.4	40.8 ±1.5	41.2 ±1.4
	15	33.0 ±1.5	37.5 ±1.4	36.5 ±1.5	36.2 ±1.6	38.0 ±1.5
	16	32.5 ±1.6	41.5 ±1.5	39.0 ±1.6	39.8 ±1.7	43.2 ±1.6
	21	33.1 ±1.5	48.5 ±1.6	44.5 ±1.5	42.0 ±1.5	49.8 ±1.5
	28	34.0 ±1.4	49.5 ±1.5	46.0 ±1.5	40.8 ±1.6	50.5 ±1.4
Bactericidal activity BASK (%)	14	45.0 ±2.0	46.5 ±2.1	45.8 ±2.0	45.5 ±2.0	46.8 ±2.2
	15	43.0 ±2.0	50.0 ±2.0	48.0 ±2.0	53.0 ±2.0	55.0 ±2.1
	16	42.0 ±2.0	56.0 ±2.1	53.0 ±2.0	57.0 ±2.0	60.0 ±2.1
	21	42.2 ±1.9	58.5 ±2.1	55.0 ±2.0	54.0 ±2.0	60.2 ±2.1
	28	42.0 ±2.1	62.0 ±2.0	57.0 ±2.0	51.8 ±2.0	64.0 ±2.1
Lysozyme activity (%)	14	23.0 ±1.0	24.5 ±1.1	23.6 ±1.0	23.8 ±1.0	24.9 ±1.1
	15	22.0 ±1.0	28.0 ±1.1	26.0 ±1.0	27.0 ±1.0	29.0 ±1.1
	16	21.0 ±1.0	31.0 ±1.2	28.5 ±1.1	30.0 ±1.1	33.0 ±1.2
	21	21.5 ±0.9	31.8 ±1.2	29.5 ±1.1	29.0 ±1.1	33.5 ±1.2
	28	21.2 ±1.0	34.0 ±1.1	30.0 ±1.0	28.0 ±1.0	34.8 ±1.2
Complement system activity CH_{50} units	14	105 ±3.2	106 ±3.2	105 ±3.1	105 ±3.2	106 ±3.2
	15	87 ±3.0	98 ±3.2	95 ±3.1	102 ±3.1	105 ±3.1
	16	85 ±3.0	110 ±3.2	104 ±3.1	106 ±3.1	112 ±3.1
	21	85 ±2.9	116 ±3.3	108 ±3.1	109 ±3.1	118 ±3.2
	28	84 ±3.0	121 ±3.1	110 ±3.0	107 ±3.2	123 ±3.0

Note: Day 14 — indicators obtained before damage

In studies for the purpose of treatment, non-specific immune parameters were evaluated against the background of damage, starting from the 14th day of the experiment. The phagocytosis index was initially at the level of 35-36% in all groups, and the difference was practically not felt.

Treatment studies evaluated non-specific immune parameters against the background of the lesion, starting from the 14th day of the experiment. The phagocytosis index was initially 35-36% in all groups, and in studies for treatment, non-specific immune parameters were assessed against the background of the lesion, starting on the 14th day of the experiment. The phagocytosis index was initially at the level of all groups, and the difference was practically not felt. By 21-28 days of the experiment, however, lambs from experimental group 1 (Maxlac) and experimental group 4 (combined), who were given probiotic, showed a sharp increase in this indicator (49-50%). In the 2nd experimental group (Innoprovet) significant recovery was also noted (41-43%), while in the 3rd experimental group, where an antibiotic was used, partial recovery remained at the level of 40-42%. However, the affected control group maintained a low rate (32-33%).

The bactericidal activity was initially about 45-46% in all groups, while higher results were observed in lambs of experimental group 1 and experimental group 4 on days 21-28, increasing to 61-62% and 63-64%, respectively.The bactericidal activity initially amounted to about 45-46% in all groups, while higher results were observed in lambs of the experimental group and experimental group 4 on days 21-28, increasing to 61-62% and 63-64, respectively. In the 2nd experimental group, the bactericidal activity was restored at the level of 54-56%, and in the 3rd experimental group by a stick.

Lysozyme, considered the main component of mucosal protection in the body, activity was in the range of 28-29% in all groups before infection with the pathogen on the 14th day of the experiment. On the 15th and 16th day after infection, the indicator decreased to 21% in the control group. Ocim, considered the main component of mucosal protection in the body, activity was in the range of 28-29% in all groups before infection with the pathogen on the 14th day of the experiment. On the 15th and 16th day after infection, the indicator decreased to 21% in the control group. Partial recovery was observed in the antibiotic group (27-30%), in experimental group 1, which received the probiotic Maxlac, this indicator increased to 30-31%, while in the group receiving a combination of antibiotic and probiotic, the highest result was noted (33%). In the group receiving the Maxlac probiotic on days 21-28, the lysozyme level reached 32-34%, in the group receiving the innoprovet probiotic-29.5-30%, and in the group receiving a combination of antibiotics and probiotics - about 33-35%. However, in the antibiotic group, limited recovery was observed in 28-29% of cases, while in the control group, this figure remained within 21-22%. The lysozyme level reached 32-34% in the group receiving the Maxlac probiotic on days 21-28, 29.5-30% in the group receiving the innoprovet probiotic, and 29.5-30% in the group receiving the antibiotic combination.

The activity of the complement system (CH_{50}) as the main component of humoral immunity was almost the same (105-106 units) in all groups at the beginning of the experiment. In the affected control group, the index dropped to 85 units on days 15-16. In the group receiving the antibiotic, the indicator was 102-106 units during this period, and in the group receiving the probiotic, it increased to 110 units. The reactivity of the complement system (CH_{50}) as the main component of humoral immunity was almost the same (105-106 units) in all groups at the beginning of the experiment. In the affected control group, the index dropped to 85 units on days 15-16. In the group receiving the antibiotic, the index was 102-106 units during this period, and in the group receiving the probiotic, it increased to 110 units. In the combined group of antibiotics and probiotics, the highest score was recorded — 112 units. In experimental group 1, which was given a probiotic on September 21-28, CH_{50} reached the level of 116-121, and in experimental group 3, which received a combined antibiotic and probiotic, the level of 118-123 approached the level of a healthy norm. In the 2nd experimental group, where the antibiotic was administered, 106-109 units were recorded, while in the control group this indicator remained at a low level (84-85 units).experimental group 1, which was given a probiotic on September 21-28,

CH_{50} reached the level of 116-121, and in experimental group 3, which received a combined antibiotic and probiotic

If we compare the results of the experimental and control groups, the phagocytic index showed almost the same indicator (40–41%) in all groups on day 14. Since E. coli infection had not yet occurred during this period, the immune system was functioning at a normal background level. On days 15–16 after infection, the indicator in the control group decreased sharply to 32–33%, which is explained by intoxication and inflammatory load. In the group given antibiotics, a partial recovery was observed (36–40%), while in the group using the Maxlac probiotic, a significant increase was observed, amounting to 37–41%. In addition, in the group using a single-component local probiotic, phagocytic activity of 36.5–39% was observed, which was lower than in the multi-component foreign agent, and the results of the group using antibiotics were similar. The highest rate was demonstrated in the antibiotic and probiotic combination group (43–44%). On days 21–28, the phagocytic index in the Maxlac probiotic and antibiotic and probiotic combination groups increased to 48.5–50.5%, while in the antibiotic group, the recovery was limited and remained at 40–42%. During the same period, the Innoprovet group showed an average high result of 44.5–46%. The infected control remained consistently low at 33–34%.

From the data obtained as a result of the experiment, it can be seen that the multicomponent probiotic proved to be more effective than the antibiotic when used alone. However, the content of the local probiotic was slightly lower than that of the foreign probiotic, even due to its one-component nature, while the antibiotic showed a higher result than in this group. Although the antibiotic partially restored the immune system, it was unable to reach its peak. However, in the combined group of antibiotics and probiotics, the result was better than in the probiotics used separately, which means that both mechanisms together showed increased protection.

Conclusions.

1. When using the probiotic Maxlak for preventive purposes, the phagocytosis index was about 50 percent, the bactericidal activity was 64 percent, lysozyme was 34 to 35 percent, and the complement system was 121 to 122 units.. When using the probiotic Maxlak for preventive purposes, the phagocytosis index was about 50 percent, the bactericidal activity was 64 percent, lysozyme was 34 to 35 percent, and the complement system was 121 to 122 units. These indicators are significant.

2. According to the final analysis of the treatment results, the combined use of the antibiotic and the probiotic Maxlak provided the highest immunological parameters (phagocytosis 50-51%, bactericide 64%, lysozyme 34-35%, complement 123 units), the probiotic provided excellent antibiotic efficacy even with individual use, while the affected control remained at the lowest level in all indicators.

Studies have shown that in lambs infected with colibacteriosis, on days 21-28, nonspecific immune indicators decrease by 33-34%, bactericidal activity-by 41-42%, lysozyme-by 21-22%, and complement activity-by 84-85 units, and when using the probiotic Maxlak during these periods, nonspecific immune indicators in relation to it The average is 1.49%. it has doubled. And in the combination of antibiotics and probiotics, the highest results were noted, increasing by 1.54 times, the probiotic Maxlak proved to be the most effective means of restoring a non-specific immune response, especially when used in combination with an antibiotic.

List of used literature

1. Belkaid Y.; Hand T.W. Role of the microbiota in immunity and inflammation // Cell. — 2014. — Vol. 157, No. 1. — P. 121–141.

2. Gensollen T.; Iyer S.S.; Kasper D.L.; Blumberg R.S. How colonization by the microbiota in early life shapes the immune system // Science. — 2016. — Vol. 352. — P. 539–544.
3. Hooper L.V.; Littman D.R.; Macpherson A.J. Interactions between the microbiota and the immune system // Science. — 2012. — Vol. 336. — P. 1268–1273.
4. Jami E.; Mizrahi I. Composition and similarity of bovine rumen microbiota across individual animals // Journal of Animal Science. — 2012. — Vol. 90 (Suppl. 1). — P. 1–3.
5. Mackie R.I.; Sghir A.; Gaskins H.R. Developmental microbial ecology of the neonatal gastrointestinal tract // American Journal of Clinical Nutrition. — 1999. — Vol. 69 (Suppl.). — P. 1035S–1045S.
6. Martínez-Vazquez A.V.,. Rivera-Sanchez G, Lira-Mendez K., Reyes-Lopez M.A., Bocanegra-García V., Prevalence, antimicrobial resistance and virulence genes of Escherichia coli isolated from retail meat in Tamaulipas, Mexico, J. Glob. Antimicrob. Resist. 14 (2018) 266–272.
7. Round J.L.; Mazmanian S.K. The gut microbiota shapes intestinal immune responses // Nature Reviews Immunology. — 2009. — Vol. 9. — P. 313–323.
8. Xie W.Y.,. Shen Q, Zhao F.J., Antibiotics and antibiotic resistance from animal manures to soil: a review, Eur. J. Soil Sci. 69 (1) (2018) 181–195.
9. Латышев С.Н., Кононов А.Н. Влияние некоторых факторов риска при возникновении желудочно-кишечных заболеваний ягнят // Актуалные проблемы ветеринарного акушерства, гинекологии и биотехники размножения животных. Материалы международной научно-практической конференции. - Ставропол, 2007. -С. 93-95.
10. Латышев С.Н., Кононов А.Н. Определение роли E.coli в этиологии желудочно-кишечных болезней ягнят // Овцы, козы, шерстяное дело. Ставропол, 2008. -№3. -С. 76-79.