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ABSTRACT

of the dissertation for the degree of Doctor of Philosophy

APPLICATION OF SERIES OF ANTI-DIARRHEA MEDICINAL PLANTS IN COMPLEX WITH CHEMICAL PREPARATIONS IN CALVES

Speciality: 3209.01 – Pharmacology, clinical pharmacology

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INTRODUCTION

Relevance and development of the topic. One of the reasons that affects the growth rate of animals in livestock farms is the high incidence of diseases among newborns. Non-communicable diseases of various etiologies are often the cause of death in newborns in the first two weeks of life. Among these diseases, diarrhea (diarrhea) has a special place, which is observed with gastrointestinal disorders. Acute digestive system syndrome in newborn calves is one of the most complex problems facing veterinary practice and science.

One of the main indicators of increasing the productivity of cattle on farms, especially in the early postnatal period, is the increase in the survival rate of newborn calves, ensuring the health of young animals.

An analysis of the literature shows that in the first week of life, 70-80% of newborn calves die as a result of digestive dysfunction in the early postnatal period. At the same time, along with the number of deaths among newborn calves, the number of dead and weak calves is also increasing. The results of epizo-otiological monitoring conducted by researchers show that diarrhea, which is observed in the first 10-15 days of life of newborn calves with signs of gastrointestinal disease, leads to the death of 20-30% of young animals. In general, among the diseases that cause the death of newborn calves, deaths from diseases with symptoms of gastrointestinal diseases account for 40-50% of deaths of calves from common diseases.[1,2]

An analysis of the literature shows that gastrointestinal diseases are the most common disease in animals in terms of the sequence or

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[1] Амосова, Л.А. Экспериментальные исследования по разработке технологии изготовления и применения вакцины поливалентной с адгезивными антигенами против колибактериоза (эшерихиоза) телят / Л.А.Амосова, Ю.В.Ломако, О.Н.Новикова [и др.] // Эпизоотология, иммунобиология, фармакология, санитария. - Минск: - 2015, - №1, - с.3-7.

[2] Гулюкин, М.И. Разработка и внедрение в практику эффективной системы диагностики и профилактики вирусных желудочно-кишечных болезней крупного рогатого скота / М.И.Гулюкин, Л.А.Мникова, Т.А.Ишкова [и др.]. // Труды Всероссийского НИИ экспериментальной ветеринарии им. Я.Р.Коваленко. Москва: - 2015, т.78, - с.179-186.

frequency of occurrence. In any farm, each newborn calf, lamb, and pig, etc. At least once a year he is diagnosed with non-communicable diseases. Affected babies are stunted and underdeveloped, and thus lose their fertility potential during puberty. Such large losses are recorded on most farms almost all year round.[3]

According to Oleynik, the death of a newborn calf costs the farm 1.5-4.5 thousand rubles (lost profits), and in adulthood - 20-80 thousand rubles. The cost of a newborn calf in breeding farms is about 4 thousand rubles.[4]

In veterinary medicine, despite the research on the problem of acute digestive diseases of newborn calves for the past century, the various treatments and schemes have been proposed, the disease has not yet been completely eradicated. Despite attempts to present diarrhea as an infectious disease, the treatment and prevention of this disease is still relevant, despite the development of various control measures using various chemical and biological drugs and herbs for treatment.

The prevalence of gastrointestinal diseases among farm animals, especially young animals, and the economic damage they cause to farms require the search for new drugs for treatment, as well as the development of new treatment regimens and the constant improvement of existing treatment regimens.

The object and subject of the research.

The object of the research is the local Black-white and Simmental calves, and the subject is the dynamics of growth and development, hematological and biochemical indicators of blood during and after complex treatment of diarrhea with medicinal plants and antibiotics of calves of different ages.

Objectives and tasks of the research. The aim of the study is to develop treatment regimens for the prevention and treatment of diar-

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[3] Батчаев, Р.И., Гочияев, Х.Н. Болезни молодняка: Методические указания к практическим занятиям по дисциплине студентам специальности 11801.65 Ветеринария, - Черкесск: БИЦ СевКавГГТА, - 2014, - 40 с.

[4] Олейник, А.А. Неонатальные диареи телят // - Балашиха: Молочное и мясное скотоводство, - 2009. № 2, - с.26–28.

rhea in young cattle by using some herbs in combination with antibiotics. In order to achieve the set goal, the following issues are to be addressed:

–To determine the clinical and morphological features of diarrhea among calves in Ganja-Gazakh region, farms;

–To determine the therapeutic and prophylactic effectiveness of medicinal plants in the treatment of calf diarrhea;

–To develop a scheme of complex application of medicinal plants together with medicines for the treatment of calf diarrhea;

–Study of the morphological composition of the blood during the complex treatment of calf diarrhea with antibiotics and herbs;

–Study of blood biochemical parameters during complex treatment of calf diarrhea with antibiotics and herbs;

–Study of weight dynamics of calves treated for diarrhea.

Research methods. 20 hybrids from Gapanli farm (Shamkir region) and 25 black-white animals from Suliddinoglu farm (Samukh region) were involved in solving this problem. Among the general methods used in hematology to determine the morphological parameters of the blood (number of erythrocytes and leukocytes, hemoglobin, leukocyte count, blood color), total protein in serum refractometry, protein fractions by nephelometric method, ALT-EC.2.6.1.2. and AST - EC.2.6.1.1. enzyme activity dinitrophenyl hydrazine (according to Wrightman and Frenkel), de -Vaard method for determination of calcium, photometric method for determination of phosphorus. The amount of sugar (glucose) in the blood was determined by the color reaction with orthotoludin. To determine the weight gain of the animals, absolute weight gain, average daily weight gain, relative growth and relative growth rate, and relative growth were calculated.

Microsoft Excel 2016 software package was also used in the statistical processing of the survey results.

The main provisions of the defense:

– Complex treatment and prevention measures in the treatment of calf diarrhea;

– Biochemical and morphological status of animal blood during complex treatment of diarrhea of calves with herbs and chemothera-

peutic drugs;

– Changes in the weight gain of calves after complex treatment of diarrhea.

Scientific novelty of the research. For the first time in Ganja-Gazakh region, morphological and biochemical indicators of blood, weight dynamics of calves after treatment were studied against the background of complex treatment of diarrhea of meat and dairy calves fed on farms with chemotherapeutic drugs and herbs. In the treatment of calf diarrhea, complex treatment regimens with herbal medicines have been proposed.

Theoretical and practical significance of the research:

–As a result of the research, complex treatment schemes have been developed for the treatment and prevention of calf diarrhea.

–Data obtained as a result of the use of herbs in combination with chemotherapeutic drugs for the treatment of calf diarrhea can be used in the implementation of measures for the treatment and prevention of calf diarrhea.

–The scientific results of the dissertation can be used in the preparation of proposals for the treatment and prevention of diarrhea of newborn calves.

–The results of the dissertation can be used as additional material in the teaching process of lectures, laboratory and practical classes in agricultural universities. The results of the research can also be used by specialists in the study of pathologies of non-communicable etiology.

Approbation and application. The main results of the dissertation in different years in prestigious scientific journals of the Republic and foreign countries, scientific seminars of the Department of Pharmaceutical and Veterinary Sanitary Examination of the Faculty of Veterinary Medicine and Zooengineering of Azerbaijan State Agrarian University, international conferences (Инновационные разработки молодых ученых-развитию агропромышленного комплекса. Ставрополь. 2015; Beynəlxalq Elmi-Praktik Konfrans. Naxçıvan. 2015; Материалы конференции, посвященной 120-летию м.ф. томмэ. Дубровицы. 2016; Gənc alimlərin II beynəlxalq

elmi konfransı. Gəncə, 2017; Инновационные разработки молодых учёных-развитию агропромышленного комплекса. Ставрополь, 2018; I Collection of Theses on sources of medical sciences. Bakı. 2023; V International Scientific Conference. Toronto. Canada, 2023) were discussed, the results of the research were published in the conference materials.

17 scientific works were published based on the dissertation materials. 9 of them are articles, 5 are theses, and 1 is a recommendation.

The results of the study are applied in Gapanli farm of Shamkir region and Suliddinoglu farm of Samukh region.

Name of the organization where the dissertation work was carried out: The dissertation work was carried out at the Department of Pharmacy and Veterinary Sanitary Examination of the Faculty of Veterinary Medicine and Zooengineering of the Azerbaijan State Agrarian University.

Volume and structure of the dissertation. The dissertation is 168 pages (excluding tables, figures, graphs and the list of the used literature, 232119 characters in total), "Introduction" (9632 points), "Information about literature" (38062 points), "Research material and methodology" (34350 points), Chapter III (109370 points), Chapter IV (114679 points), Chapter V (15290 points), " It consists of "Conclusions" (5750 characters), "Recommendations" (1416 characters) and "Reference literature". When writing the dissertation, 234 sources were cited in Azerbaijani, English, Russian and other foreign languages. 25 tables, 4 original photographs, 4 graphics are given in the thesis.

CHAPTER I
LITERATURE INFORMATION

This chapter summarizes the characteristics of calf diarrhea, physiological features of the digestive system of newborn calves, treatment and prevention of calf diarrhea, prospects for the use of medicinal plants in livestock, the results of research in our country and around the world to study biochemical and physiological changes in diarrhea and its treatment.

CHAPTER II
MATERIAL AND METHODS OF RESEARCH

The experimental part of the dissertation was conducted in 2011-2018 in "Gapanli" farms of Shamkir region and "Suliddinoglu" farms of Samukh region.

In the treatment and prevention of gastro-intestinal disorders accompanied by diarrhea of calves, willow (*Salix L.*), oak (*Quercus* L.), cornel (*Cornus mas L.*), sage (Salvia L.), horsetail (*Rumex confferus*), bistorta (*Polygonum carneum*), St. John's wort (*Hypericum perforatum*) and yarrow (*Achillea mullefolium*) plants, together with these plants, Oletetrin, Tetracycline and Ceftriaxone preparations were used for complex treatment. Calves were treated in farms according to the following scheme: in the Suliddinoglu farm, black-white calves included in group I oak + willow bark decoction, Oletetrin and Ceftriaxone, calves included in group II cornel+sage decoction, Oletetrin and Ceftriaxone, calves included in group III horsetail + bistorta infusion, Oletetrin and Ceftriaxone, calves included in group IV St.John's wort + yarrow infusion, Oletetrin and Ceftriaxone, calves included in group V with Oletetrin and Ceftriaxone; the first group of hybrid calves raised in the Gapanli farm was oak + willow bark decoction, Tetracycline and Ceftriaxone, the calves included in group II cornel + sage decoction, Tetracycline and Ceftriaxone, the calves included in group III horsetail + bistorta infusion, Tetracycline and Ceftriaxone, the calves included in group IV St. John's wort+yarrow infusion, Tetracycline and Ceftriaxone, and calves included in group V were treated with Tetracycline and Ceftriaxone. In contrast to the treatment scheme carried out on farm Suliddinoglu, in the treatment of animals on farm Gapanli, Tetracycline was injected intramuscularly at a dose of 1 g for 4 days, then tetracycline was replaced by Ceftriaxone and Ceftriaxone was injected intramuscularly for 4 days. In total, the treatment lasted 8 days

The amount of hemoglobin (HGB) in the blood was deter-mined by the Sali method, erythrocytes (RBC) and leukocytes (WBC) were counted under a microscope in Goryayev's chamber. Leukoform was determined by counting the shaped elements of white blood in the

smear, blood color index was calculated.[5]

Albumin and globulin fractions by nephelometric method[6], activity of alanine aminotransferase (ALT-EC.2.6.1.2.) And aspartate aminotransferase (AST-EC.2.6.1.1.) By dinitrophenylhydrazine method[7], the amount of calcium and phosphorus in the blood was calculated[8], the amount of glucose was determined by the color reaction of orthotoludin.[9]

Absolute weight gain, average daily weight gain, relative growth, relative growth rate and relative growth of animals were calculated.

Excel-2016 program was used in the statistical processing of all quantitative indicators obtained as a result of the research. The statistical validity of the difference between the groups was checked by the Student's t-criterion, and it was assumed that the changes that occurred when $P \leq 0.05$ were statistically correct.

CHAPTER III
DYNAMICS OF MORPHOLOGICAL COMPOSITION OF BLOOD AND SOME BIOCHEMICAL INDICATORS IN THE TREATMENT OF DIARRHEA OF NEWBORN CALVES

3.1. Scheme of treatment of calf diarrhea

In Gapanli and Suliddinoglu farms, infusions and decoctions of herbs in the treatment of diarrhea in a ratio of 1:10, animals in all

[5] Кондрахин, И.П. Методы ветеринарной клинической диагностики: справочник. / И.П.Кондрахин, А.В.Архипов, В.Н.Левченко, - Москва: КолосС, – 2004. – 520 с.

[6] Кононский, А.И. Биохимия животных. / А.И.Кононский, - Москва: Колос, – 1992. – 187 с.

[7] Колб, В.Г. Клиническая биохимия / В.Г.Колб, В.С.Камышников – Минск: Беларусь, – 1976, – с.5-112.

[8] Запруднова, Е.А. Практикум по биохимии / Е.А.Запруднова, А.Г.Гладилкина. - Владимир: Изд-во Владим. гос. ун-та. – 2011. – 56 с.

[9] Биохимический практикум: Пособие для самостоятельной аудиторной работы студентов, обучающихся по специальности 020400.62 - Биология, профиль Микробиология. [в 2-х частях] / Камилов Ф.Х. [и др.]. – Уфа: Изд-во ГБОУ ВПО БГМУ Минздрава России, – 2014, ч.2, – 99 с.

groups 15 minutes before feeding, twice a day at 12-hour intervals, oletetrin 2g, ceftriaxone 1g, tetracycline 1g 12 hours interval injected intramuscularly 2 times.

3.2. Feed ration of experimental animals

During the first two hours after birth, newborn calves were given 750 ml to 1 liter of oral milk, repeated 4 times during the first day. During the day, 2.0-3.0 liters of oral milk was drunk twice a day. Starting from the second week, calves were given a specially prepared feed mixture along with milk. Treatment was started as soon as the disease was diagnosed.

3.3. Comparative analysis of different treatment schemes used in the treatment of diarrhea of newborn calves

3.3.1. Clinical and physiological indicators of calves during diarrhea

A comparative analysis of the data revealed that the combined use of herbs, Oletetrin and Ceftriaxone for the treatment of calf diarrhea on the Suliddinoglu farm ensures that body temperature is maintained at a normal level compared to treatment with single drugs.

It was found that during the experiment, on the 1st and 3rd days in the treated groups, the greatest decrease in the number of heartbeats of calves occurred in groups III and IV, and the least decrease in groups I and V. Depending on the treatment regimens used to treat calf diarrhea on days 7 and 10, the least reduction was recorded in groups I and III, which can be explained by the effectiveness of the applied herbs.

The number of heartbeats of calves treated at the closed farm increased from 89 to 98 in groups I and V, from 86 to 94 in group II, and from 88 to 89 in group IV compared to the corresponding indicators of the previous days. In group III, there is no change in the number of heartbeats.

A comparison of the number of respiratory movements of the treated calves in the surveyed farms shows that in Suliddinoglu and Gapanli farms, in the treated groups, the highest number of respiratory movements was in group I in both farms (37.6 and 38.9, respectively). The difference between this indicator and the control group was not statistically significant (P>0.05).

The recovery period of calves treated in Suliddinoglu and Gapanli farms is 3-5 days in group I, 5-6 days in group II, 4-5 days in group III, 5-6 days in group IV, but only in groups treated with Oletetrin + Ceftriaxone or Tetracycline + Ceftriaxone in group V it lasted 6-8 days. As can be seen, the complex use of medicinal plants in combination with herbs for therapeutic purposes shortens the duration of treatment. The highest efficiency was recorded in groups I and II.

Based on the results, it can be concluded that the complex anti-diarrheal nature of herbs in combination with drugs has a higher therapeutic and curative effect than traditional methods.

3.3.2. Assessment of the morphological status of blood in the treatment of calf diarrhea

Compared to the relevant indicators of the control group in Suliddinoglu farm, the number of RBCs increases by 0.5x1012L in each of the I and III groups, 0.40.5x1012L in the II group, 0.70.5x1012L in the IV group, and 0.10.5x1012L in the V group.

In calves with diarrhea in the first days, an increase in the number of RBC in the blood due to the disease, in turn, leads to an increase in the amount of HGB. This increase was 0.2 g% in group I, 0.6 g% in group II, 0.4 g% in group III, and in group V, on the contrary, the amount of HGb decreased by 0.6 g%.

The number of WBCs in the blood of treated newborn calves was found to be below the physiological norm.

In the blood of diurnal calves, the amount of young neutrophils was on average 4 times higher than the norm (0-1) in all experimental groups ($P < 0.001$). In the following days, the number of young neutrophils began to decrease. In group I, the number of young neutrophils in 1-day calves was 4.33 ($P < 0.001$), in group II 4.30 ($P < 0.001$), in group III 4.32 ($P < 0.001$), in group IV 4.91 ($P < 0.001$). and 4.32 ($P < 0.001$) in group V, a decrease in the blood of 3-day calves. A statistically significant increase in the number of rod-nucleated neutrophils in the blood of treated 1-7-day calves was found to be statistically significant ($P < 0.01$).

Changes in the number of lymphocytes, basophils, eosinophils, monocytes and segmented nucleated neutrophils in the blood of

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treated calves were found to be at the level of physiological norm, and the amount of neutrophils in young and rod nuclei was higher than normal in 1-3 day calves.

It was found that the number of WBCs in the blood of treated 1-10-day calves increased in comparison with the control group in Gapanli farm.

On the 1st day in treated calves, the amount of HGB in group I was 11.30 ± 0.02 g%, in group II 10.70 g%, in group III 10.5 g%, in group IV 10.10 g%, in group V 9.55 g% was. Treatment with tetracycline and ceftriaxone the reason for the low level of HGB in group V can be explained by the fact that animals are not given herbs in addition to medicines. During the complex treatment of diarrhea of newborn calves in these farms, the number of lymphocytes, the number of eosinophils and monocytes was within the physiological norm during the experiment.

In experimental groups, the number of young and rod-shaped neutrophils in the blood began to decrease from day 3. In experimental group I, the amount of young neutrophils in the blood of 10-day calves was 3.72 (P <0.01), in group II 3.70 (P <0.01), in group III 3.73 (P <0.01), in group IV 3.72 (P <0.05), in group V, it was up to 3.73 (P<0.01), and the number of rod-shaped neutrophils was 8.00 (P<0.001), 7.98 (P<0.001), 7.98 (P<0.001), respectively, decreased to 8.01 (P<0.001) and 7.99 (P<0.001).

The amount of segmented nucleus neutrophils was within the norm (20-35) in all experimental groups.

Among the experimental groups, in group III, the maximum amount of this type of neutrophils (30.71) was recorded in the blood of 1-day calves, and the minimum amount (26.88) was recorded in the blood of 10-day calves. In other groups, the indicators of monocytes with segmental nuclei were similar, and the changes recorded at this time were not statistically honest. In the leukogram, the increase of young and rod-shaped neutrophils, the number of lymphocytes and monocytes with segmental nuclei in the upper and middle limits of the normal indicator indicate the presence of signs of immunodepression. An increase in the amount of eosinophils can occur due to the presence of allergic reactions in the body.

A comparative analysis of the results of our research in Suliddinoglu and Gapanli farms shows that there is no statistically significant change in the amount of hemoglobin in the blood of 1-10-day animals treated for diarrhea. An increase in the number of leukocytes, especially young and rod-shaped neutrophils, was recorded. It was determined that although the amount of neutrophils in the blood of calves fed on both farms increased in animals of all ages in the experimental groups, the amount of rod-shaped neutrophils was found in the blood of 1-7-day calves in the Suliddinoglu farm, and in the hybrid calves raised in the Gapanli farm during the entire experimental period (1-10 day) increases.

It was determined that the number of erythrocytes and the amount of hemoglobin in the blood of animals fed in both farms had a tendency to increase. This increase was more evident in calves from the experimental groups, 1 month. Compared to the index of 10-day calves in Süliddinoglu farm, the number of erythrocytes in 1-month calves treated for diarrhea was 0.27×10^{12} L in group I, 0.24×10^{12} L in group II, 0.11×10^{12} L in group III, 0.40×10^{12} L in group IV, in group V, 0.02×10^{12} L increased. Similar results were obtained in the number of erythrocytes and the amount of hemoglobin in the blood of 1-month calves in the closed farm. From the experimental groups, the erythrocyte and leukocyte counts in the blood of black-white hybrid calves kept in the Suliddinoglu farm and hybrid calves kept in the Gapanli farm and treated for diarrhea were similar, and the amount of hemoglobin was higher in the blood of the hybrid calves in the Gapanli farm. In the 1-month control group at the Suliddinoglu farm, the number of erythrocytes and leukocytes in the blood of black-white calves, the amount of hemoglobin, was lower than the corresponding indicators of the control calves of the same age kept at the Gapanli farm. In both farms, it was determined that the indicators recorded in all experimental groups were lower than the indicators of the control group. Analogous results were recorded during the study of relevant indicators of the blood of 6-month calves. In the control groups, the differences recorded in the number of erythrocytes and leukocytes and the amount of hemoglobin in the blood of black-white and hybrid calves were 0.31×10^{12} L, 0.78×10^9 L,

0.04% in 1-month calves and in 6-month calves respectively $1.0^9 \times 10^{12}$L, 0.09×10^9L and amounted to 0.02%. At the end of the experiment, an increase in the amount of hemoglobin in the blood was recorded after the animals treated in different schemes were transferred to a common group.

In general, the increase in the number of erythrocytes on the first day of life of the calves in the control groups reflects the physiological processes taking place in their body. In accordance with the treatment schemes applied during the treatment period, the exchange processes in the body are accelerated, and at the same time, the process of adaptation to the drugs used for treatment is underway.

In the general background, the increase in the number of erythrocytes in the blood of the studied 1-day black-white and hybrid calves compared to the control group suggests that water loss due to increased defecation due to increased intestinal peristalsis during diarrhea leads to blood clotting, which in turn causes an increase in the number of erythrocytes per unit volume. Changes recorded in the number of leukocytes in the blood of treated 3-10-day black-white and hybrid calves were within the physiological norm. The number of leukocytes in the blood of sick day calves was higher than the corresponding indicator of the control group, and the results were statistically honest. The number of leukocytes in all the treated groups was higher than that of the control group.

The number of leukocytes in the blood of calves of both sexes increases from birth to 6 months of age. While the number of leukocytes in the blood of day animals in Suliddinoglu farm is 8.00×10^{12} L, this indicator is 8.11×10^9L in 6-month calves, and from 7.80×10^{12}L to 8.02×10^{12}L in Gapanli farm. rises. In all treated groups, the number of leukocytes also increases compared to the indicators of the previous days. As a result of the research, the increase in the number of red blood cells and the amount of hemoglobin in the blood of calves in the experimental groups, along with the increase in the number of leukocytes, proves that the applied treatment schemes have an activating effect on the activity of hematopoietic organs.

The fact that the number of leukocytes in the treated groups does not increase statistically in the first days can be evaluated as a pro-

cess of adaptation of the calves to the disease and to the treatment. An increase in the number of leukocytes can be seen as an indicator of high reactivity of the body. Thus, the increase in the number of leukocytes in the blood indicates the presence of infectious diseases in the body. Clinical signs of the disease observed in animals also confirm the degree of changes in hematological indicators of blood.

On the third day of treatment in both farms, weak changes in the number of leukocytes and erythrocytes were recorded in the experimental groups. Statistically dishonest changes in blood parameters in experimental groups (saturation of erythrocytes with hemoglobin, changes in the amount of neutrophils) prove the stability of hemostasis in calves.

Thus, based on the morphological parameters of the blood of black-white and hybrid calves, the number of erythrocytes and leukocytes, the amount of hemoglobin, the leukocyte formula, it can be shown that the dosages of medicinal plants and medicinal preparations used for the purpose of treatment are safe and have a positive effect on the hemopoiesis process in early ontogeny. At the end of the experiment, recording the trend of increasing the number of erythrocytes in the experimental groups, as well as in the control groups, indicates the activation of oxidation-reduction processes in the calf's body.

Complex treatment of calves with herbal mixtures and medicinal preparations causes an increase in their appetite. After infusions and decoctions of plant mixtures are administered to sick calves, and medicinal preparations are simultaneously injected into muscles in different doses, the clinical symptoms of the disease begin to disappear, the sucking reflex increases, and diarrhea stops.

Thus, based on the morphological parameters of the blood of calves in both farms, it can be shown that the doses of herbs and drugs used for therapeutic purposes are safe and have a positive effect on the process of hematopoiesis in early ontogeny.

3.4. Dynamics of biochemical parameters of blood in the treatment of diarrhea of calves

Complex treatment of calves at Suliddinoglu farm revealed changes in the amount of total protein, albumins and α-globulins in

the blood within the norm, the amount of β-globulins in group I was 102.43%, in group II 45.25%, in group III 60.38%, in group IV 47.69 %, An increase of 48.56% in group V, and a decrease in the amount of γ-globulins by 37.20%, 16.36%, 21.68%, 18.24% and 19.16%, respectively.

On the first day of treatment of diarrhea in the blood of calves, the amount of total protein was 4.01% in group I (P <0.05), 3.85 g% in group II (P<0.01), 3.76 g% in group III (P<0.01), 4.95 g% (P<0.05) in group IV, 3.55 g% (P <0.01) in group V, the amount of albumin was 41.79%, 41.91%, 41.61%, 41, respectively, 79%, 41.75%, the amount of α-globulins from globulin fractions 17.16%, 17.21%, 17.08%, 17.30%, 17.23%, the amount of β-globulins 20.09%, respectively (P<0.01), 20.15% (P <0.01), 21.46% (P<0.01), 19.79% (P<0.01), 19.71% (P<0.01), the amount of γ-globulins was 20.97% (P<0.01), 20.74% (P<0.01), 19.85% (P<0.001), 21.11% (P<0.01), 21.31% (P <0.01)

A comparison of these values with the norm showed that the changes in total protein, β-globulins and γ-globulins were not statistically significant in all experimental groups, and the changes in albumin and α-globulins were not statistically significant.

It was determined that there is a gradual increase in the amount of β-globulins in all experimental groups in the Gapanli farm. The highest amount of β-globulins (31.17%) was recorded in group III. In groups II, IV and V, the amount of β-globulins in the blood of 10-days calves was 28.82%, 28.99% and 28.28%, respectively (P<0.001). In group I, the amount of β-globulins in the blood of calves was lower compared to the indicators of groups II, III, IV and V (Table 3.4.3 and 3.4.4).

The low amount of β-globulins in group I of the experimental groups can be explained by the effect of the biologically active substances contained in the oak+willow bark applied for the purpose of treatment.

We believe that the decrease in γ-globulin levels at the end of treatment was due to the cessation of medicinal plants given to calves. Because in the coming days, the amount of β-globulins begins to rapidly approach the level of the norm.

Table 3.4.3

Dynamics of biochemical parameters of calf blood in Suliddinoglu farm

Ndicators	Groups				
	group I	group II	group III	group IV	group V
Before treatment					
Sugar mg%	43,0±2,45	45,0±3,27	45,63±1,27	46,73±2,38	44,45±2,70
Calcium, mq%	17,1±0,02	16,8±0,01	17,0±0,02	16,5±0,01	17,1±0,01
Phosphorus, mq%	8,6±0,03	8,7±0,02	8,2±0,02	8,0±0,01	8,2±0,01
Ca/P	2,14 : 1,08	2,10 : 1,09	2,13 : 1,03	2,06 : 1,00	2,14 : 1,03
ALT, mkmol / ml hour	0,171±0,01	0,170±0,02	0,169±0,01	0,168±0,02	0,167±0,01
AST, mkmol / ml hour	0,381±0,01	0,382±0,01	0,380±0,01	0,382±0,02	0,381±0,01
AST/ALT	2,23	2,25	2,25	2,27	2,28
Treatment period					
Sugar mg%	56,0±0,02[2]	58,0±0,02[2]	60,0±0,02[2]	54,0±0,02[2]	58,0±0,03[2]
Calcium, mq%	15,5±0,02[1]	16,9±0,01	17,6±0,03	15,1±0,03	15,0±0,03[1]
Phosphorus, mq%	7,9±0,01	8,1±0,01	8,3±0,02	7,6±0,02	7,7±0,01
Ca/P	1,94 : 0,99	2,11 : 1,01	2,20 : 1,04	1,89 : 0,95	1,88 : 0,96
ALT, mkmol / ml hour	0,172±0,01	0,170±0,01	0,171±0,01	0,169±0,01	0,168±0,01
AST, mkmol / ml hour	0,385±0,01	0,386±0,01	0,378±0,01	0,380±0,01	0,380±0,01
AST/ALT	2,24	2,27	2,21	2,25	2,38
After treatment					
Sugar mg%	58,0±4,89	62,0±4,32	63,0±4,89	56,0±3,27	48,15±3,85
Calcium, mq%	14,8±0,02	15,6±0,02	16,2±0,01	14,4±0,01	14,5±0,01
Phosphorus, mq%	7,2±0,02	7,0±0,02	7,4±0,02	6,8±0,02	6,8±0,02
Ca/P	1,85 : 0,90	1,95 : 0,88	2,03 : 0,93	1,80 : 0,85	1,81 : 0,85
ALT, mkmol / ml hour	0,181±0,01	0,183±0,01	0,179±0,01	0,173±0,01	0,170±0,01
AST, mkmol / ml hour	0,391±0,01	0,390±0,01	0,393±0,02	0,391±0,01	0,390±0,01
AST/ALT	2,16	2,13	2,20	2,27	2,29

Note: [1] P≤0,05, [2] P≤0,01

During treatment, the blood sugar levels of calves in all groups increased, while the amount of potassium and phosphorus increased in some groups treated and decreased in others. The increase in blood

sugar during treatment was found to be statistically significant (P<0.01) and not statistically significant after treatment.

Table 3.4.4

**Dynamics of biochemical parameters of calf blood
in Gapanli farm**

Indicators	Groups				
	I qrup	II qrup	III qrup	IV qrup	V qrup
Before treatment					
Sugar mg%	45,34±0,05	47,53±0,06	44,67±0,05	44,54±0,05	46,12±0,05
Calcium, mq%	16,3±0,02	17,5±0,02	16,0±0,02	15,4±0,02	16,7±0,02
Phosphorus, mq%	8,1±0,01	8,8±0,01	7,9±0,01	7,4±0,01	8,3±0,01
Ca/P	2,03 : 1,01	2,19 : 1,10	2,00: 0,99	1,93 : 0,93	2,09 : 1,04
ALT, mkmol / ml hour	0,152±0,01	0,140±0,01	0,153±0,01	0,154±0,01	0,153±0,01
AST, mkmol / ml hour	0,360±0,01	0,351±0,01	0,351±0,01	0,352±0,01	0,349±0,01
AST/ALT	2,37	2,51	2,29	2,29	2,28
Treatment period					
Sugar mg%	60,53±0,02[3]	64,12±0,02[3]	58,89±0,02[2]	54,56±0,05[2]	61,35±0,01[3]
Calcium, mq%	16,0±0,03	18,0±0,03	17,0±0,01	15,0±0,02	16,0±0,03
Phosphorus, mq%	7,3±0,02	8,2±0,02	7,6±0,01	6,8±0,03	7,8±0,01
Ca/P	2,00 : 0,91	2,25 : 1,03	2,13 : 0,95	2,25 : 0,85	2,00 : 0,98
ALT, mkmol / ml hour	0,162±0,01	0,160±0,02	0,163±0,02	0,163±0,01	0,194±0,01
AST, mkmol / ml hour	0,365±0,02	0,357±0,01	0,358±0,01	0,358±0,01	0,357±0,01
AST/ALT	2,25	2,23	2,20	2,20	1,85
After treatment					
Sugar mg%	67,0±0,02[2]	69,0±0,02[3]	68,0±0,03[2]	65,0±0,02[2]	63,0±0,04
Calcium, mq%	14,3±0,02[2]	14,9±0,01[2]	14,5±0,01[2]	13,8±0,01[2]	16,4±0,01
Phosphorus, mq%	7,8±0,02	8,2±0,01	7,6±0,01	7,4±0,01	7,9±0,01
Ca/P	1,79 : 0,98	1,86 : 1,03	1,81 : 0,95	1,73 : 0,93	2,05 : 0,99
ALT, mkmol / ml hour	0,173±0,01	0,175±0,01	0,173±0,01	0,171±0,01	0,171±0,01
AST, mkmol / ml hour	0,362±0,01	0,360±0,01	0,360±0,01	0,361±0,01	0,359±0,01
AST/ALT	2,09	2,06	2,08	2,11	2,10

Note: [1] P≤0,05, [2] P≤0,01, [3] P≤0,001

There was a decrease in Ca / P value in groups I, IV and V during treatment, and the changes in groups II and III were very small.

Changes in the activity of ALT and AST enzymes were within the physiological norm. It was found that in all experimental groups, regardless of the treatment regimen, changes in blood sugar, calcium and phosphorus follow a similar mechanism.

Thus, a comparative analysis of the results of studies conducted on Suliddinoglu and Gapanli farms shows that small changes in blood sugar levels were observed in the blood plasma of both black and hybrid calves before treatment. Thus, the amount of sugar in the blood plasma of black-white calves in Sullidinoglu farms varied between 43.0-46.73 mg%, and in the blood plasma of calves raised in Gapanli farm between 44.54-47.53 mg%. In both calves kept on both farms, blood sugar levels increase during and after treatment, regardless of the treatment regimen and the chemicals used.

We believe that the differences between the morphological and biochemical parameters of calf's blood in Suliddinoglu and Gapanli farms depend on the course of the disease, the sex of the animals and the conditions of keeping them. Because the results of our research show that in the experimental groups organized on both farms, the changes in the biochemical and morphological parameters of the blood of calves before, during and after treatment go in the same direction.

CHAPTER IV
DYNAMICS OF LIVER WEIGHT AND GROWTH INTENSITY OF CALVES

4.1. Live weight dynamics of experimental animals

During the treatment of calf diarrhea at Suliddinoglu farm, an increase in calf weight was recorded in all groups. Absolute weight gain in 3-month calves ranged from 37.7 to 40.6 kg. Highest absolute weight gain (40.6 kg) in group IV, lowest absolute absolute weight gain (37.7 kg) in group II, high daily average weight gain (676.0 g) in group IV, lowest daily average weight gain in group II was. The highest value of relative growth rate (53.6%) is in group IV, the lowest value (51.7%) is in group V, the highest value of relative growth

rate (42.3%) is in group IV, the lowest value (41.1%). Was recorded in group V (Table 4.1.1).

Daily live weight of newborn calves in Gapanli farm was between 27.2-28.0 kg. The average weight of calves in groups I, II, III, IV and V was 28.0 kg, 27.4 kg, 27.8 kg, 27.2 kg, 27.5 kg, respectively.

Table 4.1.1
Weight dynamics of calves on Suliddinoglu farm

Indicators	Practice groups				
	Group I	Group II	Group III	Group IV	Group V
Newborn					
Live weight, kg	27,50±0,62	26,69±0,54	28,50±0,61	27,30±0,45	28,30±0,55
During treatment					
Live weight, kg	33,76±0,87	32,79±0,98	34,35±0,99	32,9±1,12	33,50±0,10
Absolute weight gain, kg	6,26±0,95	6,10±0,80	5,85±0,75	5,60±0,60	5,20±0,55
1 month					
Live weight, kg	51,0±1,02	48,0±1,03	53,5±2,08	50,3±1,11	49,5±0,90
Absolute weight gain, kg	23,5	21,3	25,0	23,0	21,2
Daily average weight gain, gr	783,0	710,0	833,0	766,0	707,0
Relative growth rate, %	85,4	79,8	87,7	84,2	74,9
Relative growth	1,9	1,8	1,9	1,8	1,7
Relative increase, %	59,9	57,0	61,0	59,2	54,5
3 months					
Live weight, kg	91,1±3,06	85,7±2,43	93,1±1,29	90,8±3,20	89,2±2,14
Absolute weight gain, kg	40,1	37,7	39,6	40,6	39,7
Daily average weight gain, gr	668,0	628,0	660,0	676,0	661,5
Relative growth rate, %	78,6	78,5	74,0	80,7	80,2
Relative growth	1,8	1,8	1,7	1,8	1,8
Relative increase, %	56,4	56,4	54,0	57,5	57,2
6 months					
Live weight, kg	138,8±2,15	131,1±2,13	141,5±2,02	139,6±2,03	135,3±1,99
Absolute weight gain, kg	47,7	45,4	48,4	48,7	46,1

Daily average weight gain, gr	795,0	757,0	806,0	812,0	769,0
Relative growth rate, %	52,4	53,0	51,9	53,6	51,7
Relative growth	1,5	1,5	1,5	1,5	1,5
Relative increase, %	41,5	41,9	41,2	42,3	41,1
9 months					
Live weight, kg	173,2±3,32	167,2±3,21	176,2±2,89	175,8±4,01	170,7±2,06
Absolute weight gain, kg	34,4	36,1	34,7	36,2	35,4
Daily average weight gain, gr	573,0	601,0	579,0	604,0	590,0
Relative growth rate, %	24,8	27,5	24,6	26,0	26,2
Nisbi böyümə	1,2	1,3	1,2	1,3	1,3
Relative increase, %	22,0	24,2	21,9	23,0	23,1
12 months					
Live weight, kg	204,6±3,32	196,6±2,25	211,8±1,69	209,1±2,66	202,2±3,01
Absolute weight gain, kg	31,4	29,5	35,6	33,3	31,4
Daily average weight gain, gr	524,0	491,0	593,0	555,0	524,0
Relative growth rate, %	18,2	17,6	20,2	18,9	18,4
Relative growth	1,2	1,2	1,2	1,2	1,2
Relative increase, %	16,6	16,2	18,3	17,3	16,9

Absolute weight gain of calves during treatment was 7.2 kg in group I, 7.8 kg in group II, 6.5 kg in group III, 6.3 kg in group IV, 5.95 kg in group V. The average daily weight gain of 1-month calves was between 416.7-690 g. The highest absolute weight gain and average daily weight gain were in group I. The absolute weight gain in this group was 20.7 kg, and the average daily weight gain was 690.0 g. The relative growth rate, relative growth and relative growth rates of group I were higher than those of groups II, III, IV and V. In group I, the relative growth rate was 75.3%, the relative growth rate was 1.8, and the relative growth was 54.7%.

In groups II, III, IV and V, respectively, absolute weight gain

12.5-13.9 kg, daily average weight gain 416.7-463.0 g, relative growth rate 45.5-50.7%, relative growth 1, 5-1.8, the relative growth coefficient varied between 37.0-40.5%. As can be seen, these figures are significantly lower than those of group I (Table 4.1.2).

<div align="right">**Table 4.1.2**</div>

Weight dynamics of calves on Gapanli farm

Indicators	Groups (n=5)				
	Group I	Group II	Group III	Group IV	Group V
Newborn					
Live weight, kg	28,0±1,25	27,4±1,32	27,8±1,37	27,2±1,24	27,5±1,11
During treatment					
Live weight, kg	35,2±0,97	35,2±0,88	34,3±0,59	33,5±0,78	33,5±0,98
Absolute weight gain,kg	7,2±0,90	7,8±1,10	6,5±0,85	6,3±0,90	5,95±0,95
1 months					
Live weight, kg	48,2±1,99	41,3±1,96	41,0±1,36	40,1±1,04	40,0±1,29
Absolute weight gain,kg	20,7	13,9	13,2	12,9	12,5
Daily average weight gain, gr	690,0	463,3	440,0	430,0	416,7
Relative growth rate, %	75,3	50,7	47,5	47,4	45,5
Relative growth	1,8	1,5	1,5	1,5	1,5
Relative increase, %	54,7	40,5	38,4	38,3	37,0
3 months					
Live weight, kg	97,2±2,30	84,5±1,36	83,8±1,52	82,9±1,58	82,0±1,87
Absolute weight gain, kg	49,0	43,2	42,8	42,8	42,0
Daily average weight gain, gr	816,7	720,0	713,3	713,3	700,0
Relative growth rate, %	101,7	104,6	104,4	106,7	105,0
Relative growth	2,0	2,0	2,0	2,1	2,1
Relative increase, %	67,4	68,7	68,6	69,6	68,9
6 months					
Live weight, kg	143,3±2,54	127,3±1,99	121,7±1,3	103,3±1,5	118,7±1,72
Absolute weight gain,kg	46,1	42,8	37,9	20,4	36,7
Daily average weight gain, gr	768,3	713,3	631,7	340,0	611,7
Relative growth rate, %	47,4	50,7	45,2	24,6	44,8
Relative growth	1,5	1,5	1,5	1,2	1,4
Relative increase, %	38,3	40,4	36,9	21,9	36,6

	9 months				
Live weight, kg	182,0±2,60	165,8±1,36	140,5±1,8	141,1±1,9	152,1±1,52
Absolute weight gain,kg	38,7	38,5	18,8	37,8	33,4
Daily average weight gain, gr	645,0	641,7	313,3	630,0	556,7
Relative growth rate, %	27,0	30,2	15,4	36,6	28,1
Relative growth	1,3	1,3	1,2	1,4	1,3
Relative increase, %	23,8	26,3	14,3	30,9	24,7
	2 months				
Live weight, kg	219,3±1,69	200,3±2,76	174,2±1,6	173,9±2,1	182,5±2,06
Absolute weight gain,kg	37,3	34,5	33,7	32,8	30,4
Daily average weight gain, gr	621,7	575,0	561,7	546,7	506,7
Relative growth rate, %	20,5	20,8	24,0	23,2	20,0
Relative growth	1,2	1,2	1,2	1,2	1,2
Relative increase, %	18,6	18,8	21,4	20,8	18,2

After treatment, a study of the weight dynamics of 1-month calves showed that the performance of hybrid calves on Gapanli farm, compared to the performance of calves bred on Suliddinoglu farm in all groups, calves live weight, absolute and daily weight gain, relative growth rate and relative growth rate. is taken.

We believe that this decrease is due to the effects of Tetracycline used for therapeutic purposes in the post-treatment period.

Thus, it was found that the combination of medicinal plants for the treatment of newborn calves and those diagnosed with diarrhea has a positive effect on the relative growth rate and relative growth intensity of the absolute and daily average weight gain of calves.

4.2.Calculation of economic efficiency of research results

As a result of studying the level of profitability, it was determined that the level of profitability in Suliddinoglu farm is 22.4%, and in Gapanli farm - 21.6%. As can be seen, the level of profitability in Suliddinoglu farm was 0.8% higher than the level of profitability in Gapanli farm.

Calculations show that the average daily weight gain in the experimental group was higher than in the control group and amounted to 719.9 g. In the control group, this indicator was 691.9 g. This is

28g less than the experimental group. During the experiment, the total live weight gain of 1 head was 4.23 kg higher in the experimental group compared to the control group. Additional products were 3.5 kg in the experimental group, 45 kg for the whole group, no additional income was observed in the control group. 1 kg live weight was sold for 4.0 manat in the experimental group. The value of my additional increase in the experimental group of animals was 210.0 manat. There were no deaths among calves.

RESULTS AND THEIR DISCUSSION

In this chapter, the results of the research are compared with the available literature.

RESULTS

1. It was determined that the complex application of willow (*Salix L.*), oak (*Quercus* L.), cornel (*Cornus mas L.*), sage (Salvia L.), horsetail (*Rumex confferus*), bistorta (*Polygonum carneum*), St. John's wort (*Hypericum perforatum*) and yarrow (*Achillea mullefolium*) plants together with Oletetrin, Tetracycline, and Ceftriaxone in the treatment and prevention of gastrointestinal disorders accompanied by diarrhea of calves leads to shortening of the healing period of diarrhea of calves, increase in the weight gain of animals, and elimination of deaths.
2. It was determined that calves with a dose of 150 ml twice a day, decoction with a mixture of sage + willow bark, and intramuscularly injected with 2 g of Oletetrin and Ceftriaxone, the recovery time is 3-5 days, 100 ml twice a day, decoction cornel + sage and intramuscularly injected in a dose of 2 g Oletetrin and Ceftriaxone, the recovery time is 5-6 days, twice a day, in a dose of 100 ml of infusion horsetail + bistorta, and intramuscularly in a dose of 2 g Oletetrin and Ceftriaxone the recovery time is 4 - 5 days, twice a day, in a dose of 100 ml of infusion St. John's wort + yarrow, and intramuscular injection of 2 g Oletetrin and Ceftriaxone the recovery time is 5-6 days, intramuscular injection of 2 g Oletetrin +

Ceftriaxone or Tetracycline + Ceftriaxone 2 g twice a day lasts 6-8 days in injected groups. A comparative analysis of the data shows that the treatment of calf diarrhea in groups treated with Oletetrin+Ceftriaxone and Ceftriaxone +Tetracycline lasts 6-8 days, the combined use of these drugs with herbs for the treatment of diarrhea in group I 3 days, in groups II and IV 1-2 days, In group III it takes 2-3 days less time. The highest efficacy in the treatment of diarrhea with the combined use of herbs in combination with drugs was recorded in groups I and II.

3. In calves diagnosed with diarrhea, on the first day, there was a partial decrease in appetite, a decrease in body temperature, a decrease in the number of respiratory movements and heart rate per minute. Body temperature of black-white calves (norm 38.7^0C) to 38.3-37.9^0C, number of heartbeats per minute (norm 138) to 97-91, number of recorded respiratory movements per minute (norm 40.3) to 36.0-32.0, body temperature of hybrid calves (norm 39.6^0C) to 38.0-38.1^0C, number of heartbeats per minute (norm 100) to 86-90, recorded in 1 minute the number of respiratory movements (norm 48.3^0C) decreases to 36.9-35.0^0C. From the first days of treatment, positive progress was recorded in the parameters.

4. It was determined that the complex use of herbs in the treatment of diarrhea of calves, in combination with drugs, increases the number of erythrocytes in the blood of black and hybrid calves (8.28-$8.39x10^{12}$L and 8.03-$8.75x10^{12}$L, respectively) and the amount of hemoglobin. (9.1-9.8 g% and 9.48-9.80 g%, respectively) causes changes within the norm. The number of leukocytes returns to normal.

5. During the treatment, the amount of young and rod-nucleated neutrophils in the leukocyte formula of black-white calves increased between 2.07-2.63% and 8.25-8.27%, and the amount of young and rod-shaped neutrophils in the leukocyte formula of hybrid calves. were found to vary between 3.79-3.80% and 8.25-8.27%, respectively.

6. It was determined that the complex application of herbs and drugs in the treatment of diarrhea of black-white calves on Suliddinoglu farm, changes in the amount of total protein, albumins and alpha

globulins in the blood within the norm, and the amount of beta globulins in group I, 102.43%, II 45.25% in group, 60.38% in group III, 47.69% in group IV, 48.56% in group V, and the amount of gamma globulins increased by 37.20%, 16.36%, 21.68%, respectively, causing a decrease of 24% and 19.16%.

7. It was determined that the complex application of herbs and drugs in the treatment of diarrhea of hybrid calves in Gapanli farm, changes in the amount of total protein, albumins and alpha globulins in the blood within the norm, the amount of beta globulins in group I 29.19%, group II 47.25 %, 73.19% in group III, 46.56% in group IV, 45.25% in group V, and the amount of gamma globulins increased by 9.24%, 19.12%, 21.44%, 4.76% and causes a decrease of 16.4%.

8. At the Suliddinoglu farm, during the complex treatment of black-white calves (1-10 days) diagnosed with diarrhea, the amount of sugar in all experimental groups was higher than before treatment, and returned to normal after treatment. In the closed farm, during the treatment of hybrid calves diagnosed with diarrhea (1-10 days), the amount of sugar in all experimental groups was higher than before treatment, did not return to normal after treatment and continued to increase.

9. In Suliddinoglu farm, during the treatment of calves diagnosed with diarrhea, the amount of calcium in the blood decreased by 1.6 mg% in group I, 0.4 mg% in group IV, increased by 0.1 mg% in group II, 0.6 mg% in group III, It was determined that the amount of phosphorus increased by 0.7 mg% in group I, 0.1 mg% in group III, and decreased by 0.6 mg% and 0.4 mg% in groups II and IV, respectively. In group V, the amount of calcium was reduced by 2.1 mg%, and the amount of phosphorus by 0.5 mg%. In a closed farm, during the complex treatment of calves, the amount of calcium in the blood decreased by 0.3 mg% in group I, 0.4 mg% in group IV, increased by 0.5 mg% in group II, 1.0 mg% in group III, the amount of phosphorus in group I 0.8 mg%, 0.6 mg% in group II, 0.3 mg% in group III, and 0.6 mg% in group IV. In group V, the amount of calcium decreased by 0.7 mg%, and the amount of phosphorus decreased by 0.5 mg%.

10. It was found that the complex use of herbs in the treatment of diarrhea increases the activity of ALT and AST enzymes in the serum of calves.
11. It was found that the complex treatment of calves diagnosed with diarrhea, infusion and decoction of herbs from the first day in combination with drugs, has a positive effect on their weight gain in the later stages of ontogeny. In animals treated with antibiotics, the live weight gain for 12 months, depending on the treatment regimen, varied between 169.9-183.3 kg in Suliddinoglu farm and 173.9-119.3 kg in Gapanli farm.
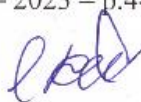
RECOMMENDATIONS

1. In the treatment and prevention of gastrointestinal disorders accompanied by diarrhea of calves, infusion and decoction of mixtures of willow (*Salix L.),* oak (*Quercus* L.), cornel (*Cornus mas* L.), sage (*Salvia* L.), horsetail (*Rumex confferus),* bistorta (*Polygonum carneum*), St. John's wort (*Hypericum perforatum*) and yarrow (*Achillea mullefolium*) the together with Oletetrin, Tetracycline, Ceftriaxone, shortens the recovery period of diseases of newborn calves and increases mass growth, so in order to improve the growth and development of calves during the lactation period, they are given plants we suggest giving mixtures.
2. The most effective in the treatment of diarrhea is the combination of oak + willow bark, intramuscular injection of Oletetrin and Ceftriaxone and cornel + sage infusion, and intramuscular injection of Oletetrin and Ceftriaxone. It is advisable to use these mixtures as they cause a shortening of 2-3 days.
3. Treatment should be started as soon as the first clinical signs of the disease are observed, and regular clinical observations should be made on sick animals. Treatment should be comprehensive, and in severe forms of the disease should be treated individually
4. The results of experimental research can be used by veterinarians in the teaching process in veterinary higher education institutions, in livestock farms.

List of published scientific works on dissertation

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