

SCIENTIFIC HORIZONS

Journal homepage: <https://sciencehorizon.com.ua>

Scientific Horizons, 27(8), 47-58



UDC 636.2:616.39

Doi: 10.48077/scihor8.2024.47

Treatment of functional disorders of gastrointestinal tract of calves with complex phytomineral preparation

Nurgul Montayeva

PhD, Acting Associate Professor

West Kazakhstan Agrarian and Technical University named after Zhangir Khan
090009, 51 Zhangir Khan Str., Uralsk, Republic of Kazakhstan
<https://orcid.org/0000-0003-2614-1592>

Sarsenbek Montayev

Doctor of Technical Sciences, Professor

West Kazakhstan Agrarian and Technical University named after Zhangir Khan
090009, 51 Zhangir Khan Str., Uralsk, Republic of Kazakhstan
<https://orcid.org/0000-0001-5072-8989>

Aruzhan Montayeva

Master of Science

West Kazakhstan Agrarian and Technical University named after Zhangir Khan
090009, 51 Zhangir Khan Str., Uralsk, Republic of Kazakhstan
<https://orcid.org/0009-0008-8706-2525>

Article's History:

Received: 15.02.2024

Revised: 25.07.2024

Accepted: 28.08.2024

Abstract. Significant economic losses due to diarrhoea morbidity in newborn young animals lead to a decrease in the profitability of the sector in the structure of agricultural production. Therefore, the purpose of this study was to create and investigate the therapeutic effect of application of complex phytomineral preparation using local components: opoka of Taskala deposit and decoction of camelthorn (*Alhagi maurorum*) for treatment of diarrhoea in calves. The therapeutic effect of the preparation was studied in the conditions of dairy farm in Kyzylorda region on 5-7-day-old calves. The effect of the preparation was studied in a comparative aspect with an analogous preparation of imported production and the results obtained from healthy animals. Clinical, haematological, and biochemical methods of investigation were employed. The findings obtained suggest a high therapeutic effect of the created preparation. Its application allowed reducing the duration of the treatment period by 5-7 days compared to the imported preparation and restoring the positive dynamics of average daily gain as early as on the 5th day after the start of treatment. Haematological studies indicate stimulation of the immune system in animals that was manifested by a 14% increase in the count of lymphocytes and a 37% increase in the proteins of the γ -globulin fraction compared to healthy animals. These indices

Suggested Citation:

Montayeva, N., Montayev, S., & Montayeva, A. (2024). Treatment of functional disorders of gastrointestinal tract of calves with complex phytomineral preparation. *Scientific Horizons*, 27(8), 47-58 doi: 10.48077/scihor8.2024.47.



Copyright © The Author(s). This is an open access article distributed under the terms of the Creative Commons Attribution License 4.0 (<https://creativecommons.org/licenses/by/4.0/>)

*Corresponding author

suggest an increase in the activity of the humoral part of the immune system in animals after treatment with the preparation. Another positive therapeutic effect of the preparation was observed in the protective effect on the liver of diseased animals. Despite the present effect of both preparations, the decrease in the activity of markers characterising hepatocyte destruction was higher with the Kazakh preparation. Thus, the created preparation is characterised by a higher therapeutic effect in comparison with the imported preparation and allow recommending it for treatment and prevention of diarrhoea in young animals

Keywords: diarrhoea; camelthorn; opoka of Taskala deposit; therapeutic effect; Diastatin

INTRODUCTION

One of the key manifestations of morbidity of young cattle, in the first days of life, both in Kazakhstan and worldwide, are disorders of functional activity of the gastrointestinal tract (GIT) with the manifestation of diarrhoeal syndrome. Such symptomatology is inherent in many infectious and non-infectious diseases in newborn calves and young animals in the first months of life. Therefore, this pathology is especially common in industrial cattle breeding, when many animals are concentrated in a limited area, which contributes to the spread of morbidity. In this regard, the level of calf morbidity depends largely on the quality of veterinary care, the immune status of the animals, and the sanitary and hygienic rules established on the farm for the care and feeding of calves (Saribayeva *et al.*, 2015).

D. Wilson *et al.* (2023) indicate that diarrhoea occurs in 5-23% of calves in farms that raise dairy and beef cattle. The effects of diarrhoea on young animals are extremely diverse, depending on the intensity and duration of the process and can lead to both a reduction in growth and development rate and, consequently, a decrease in the genetic potential of the animals, as well as lead to the death of calves. Thus, the disease of young animals with the manifestation of diarrhoeal syndrome leads to a decrease in the profitability of the livestock industry and underproduction of economic profit by the farm. Due to such circumstances, the problem of disease incidence in young cattle in Kazakhstan and the economic consequences of this problem are significant for the economy of the country and need constant research and search for effective treatment methods to reduce the consequences of this problem (Kirimbayeva *et al.*, 2023; Turmagambetova *et al.*, 2017).

Modern methods of treatment of diarrhoeal syndrome in calves in Kazakhstan, according to K. Norboyev and S. Fayziyeva (2024), are based on the aetiopathogenetic principle, and are aimed at normalising digestion, eliminating dysbacteriosis, dehydration, and intoxication. But despite the complexity of the recommended treatment protocols, in general, most of the procedures to eliminate diarrhoea, Kazakh veterinarians are reduced only to the use of antimicrobial preparations to suppress the negative impact of pathogenic and opportunistic microflora in the body of calves. This is indicated by A. Zhylgeldieva *et al.* (2024), who note that broad-spectrum antibiotics, in most cases, can

reduce the manifestation of clinical signs of disease in calves, but at the same time their use is accompanied by negative socio-economic consequences, which are manifested by an increase in the count of antibiotic-resistant strains of microorganisms, which reduces the effectiveness of treatment procedures in medical and veterinary practice and is a threat to national security for any country, including Kazakhstan.

Therefore, the relevant area of scientific developments for the livestock industry of the country is the search for alternative preparations, including those of plant origin, for the treatment of animal diseases of bacterial aetiology. This explains the considerable increase in the number of articles in specialised and scientific journals aimed at the use of substances with a pronounced antimicrobial effect for the treatment of various animal diseases. For this purpose, probiotics are used – S. Fayzieva *et al.* (2024); medicinal plants – Zh. Abirbekkyzy *et al.* (2024) (opuntia fruits, birch leaves, chamomile flowers), Kh. Azizov *et al.* (2023) (St. John's wort, sage, elecampane, althea); and others – S. Smulski *et al.* (2020) (lactoferrin and bacteriophages). But a one-sided approach, considering only the antimicrobial effect, does not allow to obtain prominent treatment results, as indicated by C. Eibl *et al.* (2021), and therefore the prospect belongs to complex preparations. This approach guarantees a systemic effect on the whole calf organism and will ensure action not only on the causes of the disease but will also have a stimulating effect on all systems and internal organs.

Taking as a basis this approach to the treatment of diseases of young cattle with signs of diarrhoeal syndrome, the purpose of this study was to create a complex preparation for the treatment and prevention of dyspepsia of calves, using natural mineral and plant substances characteristic of the territory of Kazakhstan. For this, the study of investigated the therapeutic effect of the developed preparation in diarrhoea of calves, as well as its influence on qualitative and quantitative indicators of the blood system in animals after its application.

LITERATURE REVIEW

Diarrhoeal syndrome in calves develops in many diseases in newborn animals. This, according to A. Nikkhah and M. Alimirzaei (2022), is due to the failure of the immune system in newborn animals. Therefore,

diarrhoea is most often a consequence of infectious diseases of bacterial aetiology – salmonellosis, escherichiosis, clostridiosis, campylobacteriosis (Kasa *et al.*, 2020); of viral nature – consequences of rota and corona viruses, bovine viral diarrhoea virus, etc. (Castells & Colina, 2021); or of parasitic agents – cryptosporidiosis and giardiasis of calves (Kim *et al.*, 2021). However, vaccination of breeding stock against these diseases, according to G. Maier *et al.* (2022), have a low impact on the subsequent incidence of diarrhoea in young animals. Apart from microbiological nature, disorders in housing and feeding of calves were also frequent causes of diarrhoea (Kara, 2020; Maliuk *et al.*, 2024). Considering this polygenic nature of the disease, according to C. Eibl *et al.* (2021), the majority of veterinarians and livestock breeders, more than 52% of the total number of respondents, use the latest generation of antibiotics to treat this pathology. This approach, according to W. Du *et al.* (2023) has a series of disadvantages and leads to an increase in the number of resistant microorganisms before the action of antimicrobials, as well as to the accumulation of antibiotics in the muscle tissue of animals. Therefore, through the use of antibiotics, the studies of X. Zhang *et al.* (2022) indicate that the number of resistant microorganisms causing diarrhoea is much higher than among microorganisms – causative agents of pneumonia in calves. Furthermore, according to C. Bernal-Córdoba *et al.* (2022), there are no methods in the scientific literature that allow an objective assessment of the effectiveness of antibiotics for the treatment of diarrhoea in calves.

With most antibiotics becoming less effective, S. Wang *et al.* (2022) recommend that attention should be paid to alternative treatments for animals. Authors recommend adding herbal extracts from medicinal plants used to treat gastrointestinal diseases to such solutions. This approach cured 82% of sick calves, compared with only 62% of recovered animals when antibiotics were used. In this case, the use of an innovative approach in the treatment of calves, reduced the recovery period to 3.9 days against 6.62 days ($p = 0.001$) with antibiotic therapy. Such results encouraged further research to find effective treatment approaches for calves using topical substances with therapeutic effects. Thus, a series of studies have examined the use of different medicinal plants and their derivatives for the treatment of animals with diarrhoeal syndrome. Italian scientists S. Madeddu *et al.* (2021) examined the effect of essential oils obtained from plants grown on the island of Sardinia to treat the effects of bovine diarrhoea virus on the organism. Algerian researchers S. Torche *et al.* (2024) conducted a series of experiments on the effect of desert wormwood, common pomegranate, common oregano, red-fruited juniper and carob tree on treatment lines and its effectiveness. Analogous studies were conducted by L. Shen *et al.* (2023), using polysaccharides of *Pueraria lobata* as a raw material for calf treatment, which has a

pronounced anti-inflammatory effect and helps to eliminate dysbiosis. M. Ansari *et al.* (2022) used ether-containing plant material for the treatment of calves in their study. Fennel seed powders and oregano leaves substantially reduced the duration of the disease period in animals. B. Stefańska *et al.* (2021) indicated that the applied phytobiotics, apart from the therapeutic effect, showed a positive effect on the growth characteristics of calves in terms of average daily weight gain.

Furthermore, reports on the high efficacy of other substances of non-plant origin for the treatment of diarrhoea in animals have been found, specifically the alkaloids isoquinoline – F. Mendonça *et al.* (2021) and racecadotril – B. Tras *et al.* (2023). But most attention has been given to the use of sorbents to partially or completely bind the toxins produced in the body by dispersion. For this, both mineral rocks with high adsorbing effect, zeolites, and commercially produced sorbents were used (Davis, 2022). These preparations are used both independently to treat animals and in combination with other preparations. In addition, some researchers recommend the use of other preparations with proven therapeutic effects. Most studies point to the use of probiotics, prebiotics, synbiotics, and other biological preparations (Bondarenko *et al.*, 2023). M. Alomari *et al.* (2021) indicate that the use of such biologics and bacteriophages can also be an effective substitute for antibiotic therapy in diarrhoeal syndrome.

Thus, the conducted literature search indicates the prevalence of studies focused on the search for preparations to treat dyspepsia in calves with the use of local minerals and plant materials with prominent antibacterial and immunomodulatory effect.

MATERIALS AND METHODS

Studies investigating the therapeutic effect of complex phytomineral preparation, created from mineral and plant components obtained in Kazakhstan, were conducted in 2022–2023 at the dairy farm “Kazyna” in the Kyzylorda region and the Institute of Veterinary Medicine and Animal Husbandry West Kazakhstan Agrarian and Technical University named after Zhangir Khan.

The preparation was prepared in the laboratory of the Institute of Veterinary Medicine and Animal Husbandry of West Kazakhstan Agrarian and Technical University named after Zhangir Khan. To make the complex preparation, 10 g of pharmacy preparation of camelthorn (*Alhagi maurorum*) produced by pharmaceutical company “Zerde” were poured with 200 ml of hot (80°C) boiled water in an enamelled dish. Subsequent extraction was carried out on a boiling water bath for 15 minutes. After cooling and filtering the decoction, its volume was brought to 200 ml with boiled water. When preparing the mineral basis of the preparation, siliceous rock – opoka of Taskala deposit of West Kazakhstan region was preliminarily subjected to drying at temperature 90–100°C to constant weight and subsequent

grinding using laboratory jaw breaker 6 to particle size of 20-30 mm. Subsequently, the milled substrate was transferred to a muffle furnace at 350-400°C and incubated for 1 hour, and then milled in a porcelain ball mill MSL-1 to the consistency of fine powder of pink colour. In the last step of preparation, 200 ml of camelthorn decoction and 50 g of fine opoka powder were mixed and left to settle for 2 hours. After settling, the liquid portion was poured into glassware and brought to the level of isotonic solution by adding sodium and potassium chlorides. The obtained preparation was stored at +4°C in the refrigerator. Shelf life of the ready preparation is not more than 3 days.

Clinical trials of the prepared preparation were conducted in conditions of dairy farm "Kazyna". For this, two groups of 10 calves of 4-5-days-old weighing 35-40 kg were formed, with signs of gastrointestinal tract dysfunction in the form of diarrhoeal syndrome, as well as a group of healthy calves, which were not amenable to therapeutic procedures. Sick calves of the experimental group were administered a complex phytomineral preparation at a dose of 10 ml/kg body weight twice a day for 5 days, calves of the control group were administered a pharmacological preparation of analogous action of industrial production Diastatin in the same dosage. During the study, all experimental animals were kept under the same housing and feeding conditions adopted by the farm. During this period, daily clinical examination of sick calves was performed, as well as monitoring of changes in their weight and blood system parameters. Haematological and biochemical studies were conducted at the end of the treatment period in the biochemistry laboratory of the Institute of Veterinary Medicine and Animal Husbandry of West Kazakhstan Agrarian and Technical University named after Zhangir Khan. Blood was collected from the jugular vein into Vacusera vacuum tubes with anticoagulant as ethylenediaminetetraacetic acid. Indices were determined using a BC-2800 Vet Mindray and Chem Well 2910 (C) haematological and biochemical veterinary analyser. The obtained haematological and biochemical indices were mathematically processed in TIBCO Statistica® 14.1.0 software, for further statistical analysis to form conclusions and suggestions for production.

RESULTS

Manifestations of diarrhoeal syndrome in calves and lambs in the southern regions of Kazakhstan are quite common, and in some farms the incidence can reach 20-40% of all newborn animals. Considering the significant percentage of lethal outcomes in the development of such pathological process in calves, this disease makes provision for the search for effective approaches in the treatment and prevention of diarrhoea of young animals in farms of different forms of ownership. The use of local natural fossils and herbal raw materials from plants growing in Kazakhstan for treatment will

reduce the costs of animal husbandry and increase its profitability. In this area, the research conducted within the framework of this study is relevant and has practical value for livestock farming in Kazakhstan.

The preparation developed and created at the Institute of Veterinary Medicine and Animal Husbandry of West Kazakhstan Agrarian and Technical University named after Zhangir Khan, in the conditions of field trials, showed a higher therapeutic effect in comparison with industrial pharmacological preparation and at the same time helped to reduce the period of treatment. The findings of the experiments suggest that the created phytomineral preparation in comparison with the analogous preparation of industrial production Diastatin had more pronounced therapeutic effect on the organism of diseased calves. Daily clinical examination of sick animals helped to reveal that in calves of the experimental group, which were treated with the synthesised phytomineral preparation, the manifestation of diarrhoea symptoms began to decrease as early as on Day 3 after the beginning of treatment. At the same time, the positive effect of Diastatin application was observed only after Day 5, when the signs of diarrhoea in calves had already stopped with the use of phytomineral preparation. When using the preparation synthesised at the Institute of Veterinary Medicine and Animal Husbandry of West Kazakhstan Agrarian and Technical University named after Zhangir Khan, the signs of dyspepsia stopped on Day 3-5, and complete recovery in more than 90% of animals was observed after Day 7. In the group of animals, where treatment procedures were performed with Diastatin, improvement of general condition was observed only on Days 5-7, and cessation of diarrhoea was observed on Days 8-9, while the effectiveness of treatment was 80%. Apart from symptoms of diarrhoeal syndrome in sick animals, changes in the dynamics of live weight gain were also observed compared to healthy calves. Indicators of changes in live weight of calves of different groups are presented in Figure 1.

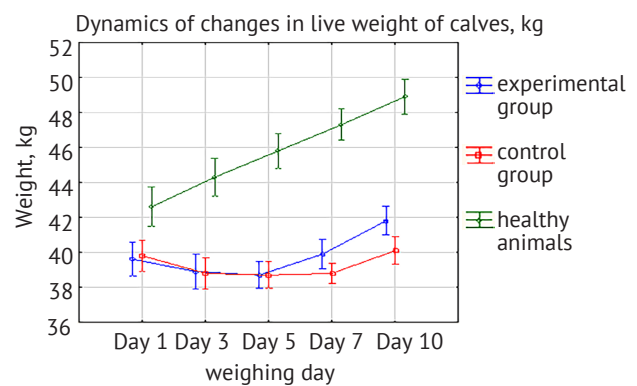


Figure 1. Change in live weight of calves of experimental and control groups during the therapeutic period and comparison with the indicators of healthy animals
Source: compiled by the authors of this study

One of the key differences between sick and healthy animals was the significant difference ($p < 0.05$) between the live weight of calves at the stage of treatment initiation. This indicates that even in the absence of symptoms of diarrhoea in sick animals, a decrease in body weight is observed in the first few days, which may be a consequence of impaired absorption of nutrients in the gastrointestinal tract. The difference between groups of diseased and healthy animals of the same age was greater than 2 kg. Newborn calves were not weighed on the farm, and therefore it is not possible to track the effect of disease incidence on diarrhoea in calves of different weights, so this will be a key area for future research to identify priority factors for preven-

tive interventions to reduce the incidence of diarrhoea in young calves.

The live weight of sick calves of both groups, at the stage of manifestation of the first symptoms of the disease, practically did not differ – 39.6 kg and 39.8 kg, respectively, in the experimental and control groups. Therewith, live weight indices in the groups of sick calves corresponded to normal distribution, as the average indices did not exceed the deviation of more than 3 sigma, indicating the similarity of the disease manifestation in sick animals. During the treatment, the average daily weight gain in the groups that were subjected to the therapeutic procedure significantly lagged behind that of healthy animals (Table 1).

Table 1. Average daily weight gain in groups of healthy and sick calves, $M \pm m$

Groups	No.	Duration of the period of illness			
		1-3 days	3-5 days	5-7 days	7-10 days
Experimental	10	-350 ± 150	-100 ± 124.7	600 ± 66.7	633 ± 59.8
Control	10	-500 ± 129.1	-50 ± 116.7	50 ± 116.7	433 ± 51
Healthy	10	850 ± 76.4	750 ± 83.3	750 ± 83.3	533 ± 54.4

Source: compiled by the authors of this study

In sick animals in the first days of the disease manifestation instead of positive weight gain there was observed a decrease in live weight as a result of active excretion of fluid from the body. At treatment of calves with phytomineral preparation created in West Kazakhstan Agrarian and Technical University named after Zhangir Khan increase in weight was observed from Day 5 after the beginning of treatment, while when using Diastatin positive indicators of growth occurred only from Days 7-10, and the level of weight gain was lower than when using phytopreparation. There were no failures in weight gain in healthy animals during this period, and therefore the weight gain during the entire experimental period was at the same level.

Thus, one of the key factors of the negative economic effect of the disease of young animals for diarrhoea is the reduction of animal weight gain during this period. Therefore, reducing the period of animal disease even by 1-2 days will improve livestock production indicators in the farm. The use of Diastatin for five days had only a temporary therapeutic effect, it was due to the fact that in 70% of calves of the control group in 3-4 days

after discontinuation of the preparation administration signs of dyspepsia and dehydration of the organism (pronounced distress, diarrhoea, liquid and watery faeces, with an admixture of mucus, putrid odour) returned. Therefore, the average duration of the disease in calves of the control group was 11-15 days. This indicates that the created phytomineral preparation helped to reduce the period of calf disease by 5-7 days.

No less principal factor in the treatment of animals are the indicators of internal homeostasis of the animal's organism and the state of its immune system. These are most easily tracked by haematological and biochemical changes in the blood system as an integral tissue in the whole body. Therefore, to determine the therapeutic effect of preparations on the calf organism, quantitative and qualitative blood parameters were determined in the groups of treated animals, while referential parameters characteristic for the given age and species of animals, as well as analogous parameters from the group of healthy animals were used as indicators for comparison. The results of haematological studies are presented in Table 2.

Table 2. Haematological parameters of blood cell fraction of healthy animals and calves treated with antidiarrhoeal therapy ($n = 10$), $M \pm m$

Indicators	Reference values characteristic for calves 1-3 months of age	Groups		
		Experimental	Control	Healthy animals
Erythrocytes, $10^{12}/l$	5.9 - 6.2	7.7 ± 0.11	7.3 ± 0.12	7.5 ± 0.16
Leukocytes, $10^9/l$	8 - 8.4	8 ± 0.13**	7.9 ± 0.15***	10.4 ± 0.55
Haemoglobin, g/l	100 - 105	108.6 ± 1.92**	104.3 ± 1.11*	99.5 ± 1.63

Table 2. Continued

Indicators	Reference values characteristic for calves 1-3 months of age	Groups		
		Experimental	Control	Healthy animals
Leucocyte counts, %				
Eosinophils	1 - 2	1.5 ± 0.45	2.1 ± 0.58	1.7 ± 0.51
Juvenile neutrophils	1 - 2	0.7 ± 0.24	0.3 ± 0.24	0.9 ± 0.45
Band neutrophils	< 3 - 5	3.2 ± 0.49**	3.6 ± 0.35**	5.3 ± 0.58
Segmented neutrophils	40 - 45	36.4 ± 1.25*	37 ± 1.21	39.3 ± 1.16
Lymphocytes	45 - 50	51.5 ± 0.68***	50.1 ± 2.27*	45 ± 1.03
Monocytes	< 3 - 5	4.1 ± 0.37	4 ± 0.58	5 ± 0.58

Note: *** – $p \leq 0.001$; ** – $p \leq 0.01$; * – $p \leq 0.05$

Source: compiled by the authors of this study

Quantitative indices of form elements in the blood of healthy and sick animals of experimental groups from the “Kazyna” farm practically did not differ from each other. At the same time, in terms of erythrocyte content in blood, animals from the farm exceeded the reference values typical for 1-3-month-old calves. If these differences were characteristic only of groups of animals after treatment, it could be explained by blood clotting due to dehydration of the organism during diarrhoea, but as it is, except for hereditary characteristics, no other explanation could be found. In calves of the experimental group the number of erythrocytes in the blood exceeded the analogous index of animals of the control group by 4.9%. Furthermore, in animals of the experimental and control groups there was also an increase in the count of haemoglobin above the reference values, while in animals that did not receive treatment, the level of haemoglobin was normal. The only logical explanation for this is the stimulating effect of the preparations due to the iron content. In contrast to the animals from the control groups, in healthy calves the level of leucocytes exceeded not only the count of leucocytes in sick animals, but also the norm indicators inherent in this kind of animals. The resilience of the animals before the disease may have been related to this. Therefore, future studies will genetically analyse animal resistance to diarrhoea in a population of dairy cattle.

Analysis of the leukocytic formula indicates that almost all white blood counts are within the physiological norm, except for a slight decrease in the count of segmented neutrophils and a slight lymphocytosis. Both

phenomena are interrelated and indicate a change in priority in the organism from cellular to humoral form of defence. Even though the indices of young forms of neutrophils were within the physiological norm, in calves of the experimental group they were significantly decreased compared to animals from other groups. This may suggest a decrease in the activity of the cellular part of the immune system, as there is a decrease in the production of macrophage precursors in the body. This fact can also be explained by the increase in the count of lymphocytes in the peripheral blood, which are more active in case of infectious aetiology of the disease. Not an insignificant fact associated with the growth of leucocytes in calves of the experimental group may be a considerable stimulating effect of the plant component included in the phytomineral preparation, since the decoction of camelthorn contains a significant amount of physiologically active substances – saponins, flavonoids, essential oils, steroids, alkaloids, and vitamins C, K, and B group. Statistically significant increase of separate elements of white blood in animals of the experimental group may be connected with it.

The next stage of testing the effect of phytopreparation in field conditions for the treatment of animals with diarrhoeal syndrome was the study of a series of biochemical indicators of blood in the organism of treated animals. For this, the most common indicators were used, such as the content of protein fractions in serum, a series of enzymes involved in protein metabolism, as well as the content of certain macro- and microelements. The results of such studies are presented in Table 3.

Table 3. Biochemical parameters of blood serum of healthy animals and calves after dyspepsia treatment ($n = 10$), $M \pm m$

Indicators	Reference values characteristic for calves 1 - 3 months of age	Groups		
		Experimental	Control	Healthy animals
Total protein, g/l	50 - 55	58.5 ± 1.09**	54.9 ± 1.05*	47.4 ± 0.82

Table 3. Continued

Indicators	Reference values characteristic for calves 1 - 3 months of age	Groups		
		Experimental	Control	Healthy animals
Protein fractions (%)				
Albumins	30 - 50	31.9 ± 0.91*	31.9 ± 0.71	34.3 ± 0.78
α - globulins	20 - 25	19.7 ± 0.49**	20.9 ± 0.99**	24.7 ± 0.41
β - globulins	15 - 25	16.9 ± 0.77	17.9 ± 0.84	18.3 ± 0.75
γ - globulins	20 - 30	28.1 ± 0.79**	25.3 ± 0.98*	20.4 ± 0.86
Enzyme systems				
AST, IU/l	95 - 105	70.9 ± 4.8	83.9 ± 5.08**	113.8 ± 9.51
ALT, IU/l	40 - 45	32.9 ± 2.97	36.9 ± 3.52	49.9 ± 4.96
Macro - and micronutrients				
Total calcium, mmol/l	2.5 - 3.1	2.81 ± 0.06	2.83 ± 0.03	2.59 ± 0.05
Inorganic phosphorus, mmol/l	1.45 - 2.5	2.36 ± 0.05	2.39 ± 0.06	2.79 ± 0.08
Copper, µg %	115 - 125	149.6 ± 11.9	134.9 ± 10.9	122.3 ± 11.8
Iron, µmol/l	25 - 30	27.8 ± 4.34	23.8 ± 4.69	20.5 ± 2.74

Note: *** – $p \leq 0.001$; ** – $p \leq 0.01$; * – $p \leq 0.05$; AST – aspartate aminotransferase; ALT – alanine aminotransferase

Source: compiled by the authors of this study

The conducted studies of protein components content in blood serum of controlled calves at the end of the treatment period indicate that the compounds included in the developed therapeutic preparation had a significant activation of protein synthesising function in the organism, thereby increasing the level of total protein in the blood of calves of the experimental group to the maximum level, which significantly exceeded ($p \leq 0.01$) analogous indicators of calves of the control group by 6.1% and healthy animals by 22.5%. This increase was mainly due to an increase in the γ -globulin fraction. This fact confirms the growth of activity of the humoral part of the immune system in the organism of calves treated with complex preparations. In healthy calves, the level of γ -globulins stayed at the lower level of physiological norm, indicating the absence of bacterial load on the organism of animals. Other fractions of protein components in animals of experimental and control groups were practically at the same level and inferior to the values obtained in healthy animals. This decrease is a consequence of diarrhoea, because during the period of illness, nutrient absorption was reduced through increased gastrointestinal peristalsis.

No less significant property of the preparation for the treatment of diarrhoeal syndrome is the presence of hepatoprotective action and the ability to bind and remove from the body toxic products formed during the development of pathological microflora. Both preparations, which were used for the treatment of calves, have this effect due to the content of mineral compounds with adsorbing effect. The efficacy of these components in the composition of therapeutic preparations is confirmed by the activity of liver enzymes as markers of toxic damage to liver cells. In the studies conducted in healthy animals, an increase in the activity of alanine aminotransferase and aspartate aminotransferase

enzymes was observed as indicators of liver damage syndrome, while in animals after treatment of diarrhoea, the activity of these enzymes was even below the physiological level, indicating a decrease in the toxic load on the liver. Notably, siliceous rock – opoka of Taskala deposit included in the developed phytomineral preparation helped to reduce the activity of enzymes ALT – by 22.4% and AST – by 28.7%, which in comparison with an analogous preparation, which was used for treatment of calves of the control group, was almost 2 times more effective (12.4% and 15.2%, respectively).

During the biochemical study of blood serum, a positive effect of complex preparations on the level of macro- and microelements assimilation in the body of calves was also established. In calves of the experimental and control groups, the level of these elements was higher than in animals that did not receive such treatment. The efficiency of the developed preparation in terms of mineral metabolism was 8-20% higher than that of the industrial pharmacological preparation Diastatin. Thus, the conducted studies indicate a positive therapeutic effect of the developed complex phytomineral preparation with the use of local fossils: opoka of Taskala deposit and decoction obtained from the vegetative part of camelthorn for the treatment of calves with diarrhoea. This preparation is not only not inferior to the pharmacological product Diastatin, but also exceeds it in therapeutic effect. Furthermore, due to the improvement of most of the body functions in animals, which have been treated with this preparation, it can be recommended to use it for prevention of diseases of young cattle in conditions of their industrial keeping.

DISCUSSION

Due to the high level of dyspepsia morbidity in young ruminants in the first days after birth, as well as a

significant percentage of mortality due to this disease, the most common methods of treatment of sick animals in farms of Kazakhstan, as well as scientific sources, were analysed to determine the most efficacious approaches in the treatment of dyspepsia in young animals. Considering that the duration of treatment can be from several days to several weeks and the cost of drugs, especially imported, is quite high, it was decided to develop a Kazakh analogue of the most effective preparation for the treatment of diarrhoea using as components local fossils and medicinal plants to obtain a therapeutic effect at the level of the imported preparation Diastatin, which was used by cattle breeders of Kyzylorda region most often in the treatment of diarrhoeal syndrome in young animals of large and small ruminants. The manufacturer of Diastatin does not report the full composition of the ingredients, and the instructions for the preparation only stated that Diastatin contains an inorganic enterosorbent based on highly dispersed silica and plant tannins, which help to improve digestion. Thus, the preparatory work for the development of the preparation centred on finding the necessary components. As a mineral component it was decided to use siliceous rocks – opoka of Taskala deposit of West Kazakhstan region.

When choosing a plant component, the key condition was its efficacious impact on digestive processes in the gastrointestinal tract, and high content of tannins for rapid antidiarrhoeal therapy. After comparing medicinal plants that are used by local people to treat diseases related to gastrointestinal disorders, it was decided to use the vegetative parts of camelthorn (*Alhagi maurorum*) as a plant base. B. Khasanova *et al.* (2023) and M. Urabee *et al.* (2021) also reported prominent therapeutic results of camelthorn in the treatment of digestive disorders in animals and humans. Furthermore, the fact that the pharmacological company “Zerde” (Kazakhstan) produces a pharmacy preparation containing raw material of camelthorn (*Alhagi maurorum*), which can be used for preparation of a medicinal preparation, was not an insignificant factor in the choice of a medicinal plant for creation of a phytomineral preparation. Considering that dyspepsia in calves is observed throughout the year, and the duration of storage of the preparation, while limited to a few days, this approach will avoid seasonality in the treatment and will ensure maximum therapeutic effect due to the control of plant raw materials at the pharmaceutical company.

As a result of this study, a Kazakh phytomineral preparation was obtained for the treatment of diarrhoea symptoms in calves, regardless of the aetiological factor. The preparation has high sorptive characteristics and contains macro- and microelements necessary for growth and development of calves, as well as flavonoids, saponins, sugars, tannins, vitamins C, K, and B group, carotene, and other biologically active substances due to their presence in the raw material of

camelthorn (Mahde & Hammod, 2024). Therewith, the created preparation is absolutely harmless and has no side effects due to the use of environmentally friendly natural mineral sorbent opoka and medicinal herb camelthorn. At the same time, the imported preparation Diastatin consists mainly of chemical components, making it more expensive economically and less natural.

The next and most responsible stage of the study was to obtain a comparative therapeutic effect from the use of both preparations in the field and to investigate their effect on metabolic processes in the organism of sick calves. For this, to eliminate the majority of subjective and economic factors, groups of animals were formed in the conditions of one herd to study the effect of both preparations. For a more objective judgement on the therapeutic effect of preparations, apart from direct comparison of experimental and control groups, the study searched for physiological changes in the organism of animals subjected to treatment with the results obtained from healthy animals in this herd and reference values typical for animals of this species and age.

The results of the experiments suggest that the preparation developed at the Institute of Veterinary Medicine and Animal Husbandry of West Kazakhstan Agrarian and Technical University named after Zhangir Khan was found to be more effective in comparison with imported preparation. This was expressed in earlier cessation of diarrhoea symptoms and restoration of positive dynamics of average daily weight gain in calves. It is not yet possible to draw an analogy with other findings, as these are the first studies of the phytomineral preparation created. But the positive effect of this preparation can be traced in the studies of M. Mahde and A. Hammod (2024), who obtained better feed conversion rates in young poultry when camelthorn root decoction was introduced into the diet than in comparison with pharmacological preparations Immuno-Care and Immunity-Stim. Thus, due to the improvement of digestive processes, the preparation containing decoction of camelthorn plant material could shorten the period of diarrhoea treatment by 5–7 days in comparison with the group treated with Diastatin.

Studies of the blood system of calves, which were treated with two preparations with analogous action, revealed that practically all indices of quantitative characteristics of blood forming elements were on the side of the animals to which the phytomineral preparation was applied. And even though these differences ultimately were not statistically significant, a more pronounced stimulating effect in the restoration of the body's defence mechanisms was characteristic of the Kazakh preparation. Notably, due to the use of biologically active substances of camelthorn in the organism of diseased calves, the acceleration of the development of mechanisms of humoral response of the immune system of the organism was observed. This was expressed in an increase in the count of lymphocytes by 3% and

γ -globulin fraction by 11% compared to animals receiving Diastatin. These processes occurred in parallel in both groups of diseased animals, as they were significantly higher compared to healthy animals. Z. Manafu *et al.* (2024) noted this effect of stimulating immune system function in lambs. No less important therapeutic effect in the treatment of animals was revealed by a significant hepatoprotective effect of the created preparation, which was manifested in a substantial decrease in markers of liver damage – activity in the blood of intracellular liver enzymes – alanine aminotransferase and aspartate aminotransferase. Initially, this effect was attributed to the adsorbing effect of the mineral component of the preparation, as in the case of Diastatin, but a more in-depth investigation of this effect helped to identify an analogous effect of the plant component – biologically active substances of camelthorn.

Considering the conducted theoretical and experimental study of therapeutic action of the created Kazakh preparation from diarrhoea of calves, the findings allow recommending this preparation for treatment and prophylaxis of morbidity of young stock of large and small cattle with digestive disorders.

CONCLUSIONS

Based on the findings obtained during the comparative analysis of the effectiveness of the therapeutic action of the created Kazakh complex preparation for the treatment of diarrhoea in newborn calves, as well as laboratory studies of haematological and biochemical blood parameters conducted after the use of this preparation, the following conclusions and suggestions for future studies can be made. The created complex phytomineral preparation helps, after detection of symptoms of digestive disorders in calves, in a brief time to reduce the manifestation of diarrhoeal syndrome and restore the physiological process in the intestines of young animals, thereby returning live weight gain of calves to their level before the disease.

In contrast to imported preparation with analogous action (Diastatin) application of phytomineral preparation allows in 90% of cases to cure animals on 6-7 days after the first symptoms of diarrhoea, whereas the treatment with Diastatin lasted 11-15 days. Thus, the use of phytomineral preparation allows reducing the treatment period by 5-7 days in comparison with imported preparation, and at the same time to restore positive dynamics of weight gain already on Day 5. Stimulating effect of the preparations included in the created preparation helps to improve haematological indices of the blood of the treated calves and to improve the immunological status of their organism due to the increase in the count of lymphocytes and proteins of γ -globulin fraction. This was not observed with the imported preparation.

An equally significant therapeutic effect observed in both preparations was a considerable hepatoprotective effect, which was manifested by a decrease, even below the physiological norm, in the activity of enzymes-markers of liver cell destruction. But in contrast to the imported preparation, in the Kazakh phytopreparation both components have such an effect, which was the reason for the lower values of alanine aminotransferase and aspartate aminotransferase activity in the blood of animals of the experimental group. The conducted studies did not consider the aetiological cause of diarrhoeal syndrome in calves, and therefore, these studies should be expanded with testing of the preparation in calf diseases of bacterial, viral, parasitic, and other aetiologies to understand such therapeutic effect of the preparation and to detect limitations in its use.

ACKNOWLEDGEMENTS

None.

CONFLICT OF INTEREST

The authors of this study declare no conflict of interest.

REFERENCES

- [1] Abirbekkyzy, Zh., Zamanbekov, N., Kobdikova, N., Korabayev, Y., Turzhigitova, Sh., Tuganbai, A., & Zhylgeldiyeva, A. (2024). [The content of lipid peroxidation products and the activity of the antioxidant system in the blood plasma of calves with dyspepsia against the background of the use of infusions from medicinal plants](#). *Ġylym Žane Bilim*, 74(1), 49-59.
- [2] Alomari, M.M., Dec, M., Nowaczek, A., Puchalski, A., Wernicki, A., Kowalski, C., & Urban-Chmiel, R. (2021). Therapeutic and prophylactic effect of the experimental bacteriophage treatment to control diarrhea caused by *E. coli* in newborn calves. *ACS Infectious Diseases*, 7(8), 2093-2101. doi: [10.1021/acscinfecdis.1c00010](#).
- [3] Ansari, M., Kargar, S., Eslami, M.A., Falahati, R., Albenzio, M., Caroprese, M., & Kanani, M. (2022). Potential benefits of early-life supplementation of liquid feed with fennel (*Foeniculum vulgare*) seeds or oregano (*Origanum vulgare*) leaves on growth, health, and blood metabolites in Holstein dairy calves. *Journal of Dairy Science*, 105(8), 6639-6653. doi: [10.3168/jds.2022-21776](#).
- [4] Azizov, Kh., Zamanbekov, N., Kobdikova, N., Korabayev, Y., Turzhigitova, Sh., Baimurzayeva, M., & Zhylgeldiyeva, A. (2023). The effect of extracts made from medicinal plants on the dynamics of morphological parameters of the blood of lambs with acute bronchitis. *Ġylym Žane Bilim*, 70(1), 209-219. doi: [10.52578/2305-9397-2023-1-1-207-217](#).

- [5] Bernal-Córdoba, C., Branco-Lopes, R., Latorre-Segura, L., de Barros-Abreu, M., Fausak, E.D., & Silva-del-Río, N. (2022). Use of antimicrobials in the treatment of calf diarrhea: A systematic review. *Animal Health Research Reviews*, 23(2), 101-112. doi: [10.1017/S1466252322000032](https://doi.org/10.1017/S1466252322000032).
- [6] Bondarenko, G., Nosevych, D., Kruk, O., & Chumachenko, I. (2023). Technological solutions for effective production on beef cattle breeding farms in the conditions of Ukraine. *Animal Science and Food Technology*, 14(4), 40-57. doi: [10.31548/animal.4.2023.40](https://doi.org/10.31548/animal.4.2023.40).
- [7] Castells, M., & Colina, R. (2021). Viral enteritis in cattle: To well known viruses and beyond. *Microbiology Research*, 12(3), 663-682. doi: [10.3390/microbiolres12030048](https://doi.org/10.3390/microbiolres12030048).
- [8] Davis, E. (2022). *Investigations into the role of dietary adsorbents to reduce the pathophysiological response of pathogens and biotoxins in livestock*. Lubbock: Texas Tech University.
- [9] Du, W., Wang, X., Hu, M., Hou, J., Du, Y., Si, W., & Xu, Q. (2023). Modulating gastrointestinal microbiota to alleviate diarrhea in calves. *Frontiers in Microbiology*, 14, article number 1181545. doi: [10.3389/fmicb.2023.1181545](https://doi.org/10.3389/fmicb.2023.1181545).
- [10] Eibl, C., Bexiga, R., Viora, L., Guyot, H., Félix, J., Wilms, J., Tichy, A., & Hund, A. (2021). The antibiotic treatment of calf diarrhea in four European countries: A survey. *Antibiotics*, 10(8), article number 910. doi: [10.3390/antibiotics10080910](https://doi.org/10.3390/antibiotics10080910).
- [11] Fayzieva, S., Norboev, K., Ruzikulov, N., Rakhmonov, U., Tursunaliev, B., & Tokoev, K. (2024). Clinical and biochemical status of calves with dyspepsia when using the probiotic "MAXLAC/DW" (Uzbekistan). *BIO Web of Conferences*, 118, article number 01012. doi: [10.1051/bioconf/202411801012](https://doi.org/10.1051/bioconf/202411801012).
- [12] Kara, K.N. (2020). Relation between non-infectious factors and neonatal calf health status in dairy herd. *Animal Science Journal*, 91(1), article number e13471. doi: [10.1111/asj.13471](https://doi.org/10.1111/asj.13471).
- [13] Kasa, A., Tulu, D., & Negera, C. (2020). [Review of common bacterial cause and management of neonatal calf diarrhea in cattle](#). *International Journal of Microbiological Research*, 11(2), 98-104.
- [14] Khasanova, B.J., Olimov, N.K., Abdullaeva, M.U., & Duschanova, G.M. (2023). [Study of anatomo-morphological features of Yantak camel thorns](#). *Farmatsevtika Fanlari*, 1, 39-43.
- [15] Kim, S., Yu, D.H., Jung, S., Kang, J., Park, K., Chae, J.B., Choi, K.S., Kim, H.C., Park, B.K., Chae, J.S., & Park, J. (2021). Biological factors associated with infectious diarrhea in calves. *Pakistan Veterinary Journal*, 41(4), 531-537. doi: [10.29261/pakvetj/2021.078](https://doi.org/10.29261/pakvetj/2021.078).
- [16] Kirimbayeva, Z., Abutalip, A., Mussayeva, A., Kuzembekova, G., & Yegorova, N. (2023). Epizootological monitoring of some bacterial infectious diseases of animals on the territory of the Republic of Kazakhstan. *Comparative Immunology, Microbiology and Infectious Diseases*, 102, article number 102061. doi: [10.1016/j.cimid.2023.102061](https://doi.org/10.1016/j.cimid.2023.102061).
- [17] Madeddu, S., Marongiu, A., Sanna, G., Zannella, C., Falconieri, D., Porcedda, S., Manzin, A., & Piras, A. (2021). Bovine viral diarrhea virus (BVDV): A preliminary study on antiviral properties of some aromatic and medicinal plants. *Pathogens*, 10(4), article number 403. doi: [10.3390/pathogens10040403](https://doi.org/10.3390/pathogens10040403).
- [18] Mahde, M.H., & Hammod, A.J. (2024). Effect of addition aqueous extract of camel thorn (*Alhagi maurorum*) plant roots and some of immune enhancers with drinking water on productive performance of broilers. *IOP Conference Series: Earth and Environmental Science*, 1371(7), article number 072008. doi: [10.1088/1755-1315/1371/7/072008](https://doi.org/10.1088/1755-1315/1371/7/072008).
- [19] Maier, G.U., Breitenbuecher, J., Gomez, J.P., Samah, F., Fausak, E., & Van Noord, M. (2022). Vaccination for the prevention of neonatal calf diarrhea in cow-calf operations: A scoping review. *Veterinary and Animal Science*, 15, article number 100238. doi: [10.1016/j.vas.2022.100238](https://doi.org/10.1016/j.vas.2022.100238).
- [20] Maliuk, M., Tul, O., Kulida, M., & Kovalenko, D. (2024). Prevalence and diagnostic methods of surgical pathology in the digestive system of animals. *Ukrainian Journal of Veterinary Sciences*, 15(1), 104-121. doi: [10.31548/veterinary1.2024.104](https://doi.org/10.31548/veterinary1.2024.104).
- [21] Manafu, Z., Du, R., Malajiang, X., Abulikemu, G., Xue, L., Bierdelieke, A., Xie, Y., Liu, D., Mai, Z., Guo, Q., Wusiman, A., Li, B., & Abula, S. (2024). Effects of *Alhagi maurorum* Medik polysaccharide derived from different regions on the intestinal immune functions of lambs. *Frontiers in Pharmacology*, 15, article number 1422461. doi: [10.3389/fphar.2024.1422461](https://doi.org/10.3389/fphar.2024.1422461).
- [22] Mendonça, F.L., Carvalho, J.G., Silva, R.J., Ferreira, L.C., Cerqueira, D.M., Rogge, H.I., & Facury-Filho, E.J. (2021). Use of a natural herbal-based feed additive containing isoquinoline alkaloids in newborn calves with cryptosporidiosis. *Veterinary Parasitology*, 300, article number 109615. doi: [10.1016/j.vetpar.2021.109615](https://doi.org/10.1016/j.vetpar.2021.109615).
- [23] Nikkhah, A., & Alimirzaei, M. (2022). Preventing diarrhea to reduce calf morbidity and mortality: A pragmatic outlook. *International Journal of BioMed Research*, 2(4). doi: [10.31579/IJBR-2021/059](https://doi.org/10.31579/IJBR-2021/059).
- [24] Norboyev, K., & Fayziyeva, S. (2024). Improving the treatment of calf dyspepsia. *The American Journal of Veterinary Sciences and Wildlife Discovery*, 6(3), 6-12. doi: [10.37547/tajvswd/Volume06Issue03-02](https://doi.org/10.37547/tajvswd/Volume06Issue03-02).
- [25] Saribayeva, D.A., Biyashev, K.B., Valdovska, A., Sansyzbai, A.R., & Biyashev, B.K. (2015). [Study antagonistic activity, the level of resistance to hydrochloric acid and bile probiotic strain Escherichia coli](#). *Journal of Pure and Applied Microbiology*, 9(1), 573-578.

- [26] Shen, L., Shen, Y., You, L., Zhang, Y., Su, Z., Peng, G., & Cao, S. (2023). Pueraria lobata polysaccharides alleviate neonatal calf diarrhea by modulating gut microbiota and metabolites. *Frontiers in Veterinary Science*, 9, article number 1024392. doi: [10.3389/fvets.2022.1024392](https://doi.org/10.3389/fvets.2022.1024392).
- [27] Smulski, S., Turlewicz-Podbielska, H., Wylandowska, A., & Włodarek, J. (2020). Non-antibiotic possibilities in prevention and treatment of calf diarrhoea. *Journal of Veterinary Research*, 64(1), 119-126. doi: [10.2478/jvetres-2020-0002](https://doi.org/10.2478/jvetres-2020-0002).
- [28] Stefańska, B., Sroka, J., Katzer, F., Goliński, P., & Nowak, W. (2021). The effect of probiotics, phytobiotics and their combination as feed additives in the diet of dairy calves on performance, rumen fermentation and blood metabolites during the preweaning period. *Animal Feed Science and Technology*, 272, article number 114738. doi: [10.1016/j.anifeedsci.2020.114738](https://doi.org/10.1016/j.anifeedsci.2020.114738).
- [29] Torche, S., Beroual, K., Zaouani, M., & Boujellaba, S. (2024). [Ethnobotanical study of medicinal plants used for traditional Diarrhea treatment in north-east Algeria](#). *Research Journal of Pharmacy and Technology*, 17(2), 811-819.
- [30] Tras, B., Ok, M., Ider, M., Parlak, T.M., Yildiz, R., Eser Faki, H., & Uney, K. (2023). Evaluation of the clinical efficacy of racecadotril in the treatment of neonatal calves with infectious diarrhea. *Polish Journal of Veterinary Sciences*, 26(4), 559-569. doi: [10.24425/pjvs.2023.148276](https://doi.org/10.24425/pjvs.2023.148276).
- [31] Turmagambetova, A.S., Alexyuk, M.S., Bogoyavlenskiy, A.P., Linster, M., Alexyuk, P.G., Zaitceva, I.A., Smith, G.J.D., & Berezin, V.E. (2017). Monitoring of Newcastle disease virus in environmental samples. *Archives of Virology*, 162(9), 2843-2846. doi: [10.1007/s00705-017-3433-y](https://doi.org/10.1007/s00705-017-3433-y).
- [32] Urabee, M.C., Abdulsattar, J.O., Nasif, Z.N., & Al-Garawi, Z.S. (2021). Extraction methods of Alhagi Maurorum (camel thorn) and its therapeutic applications. *Journal of Physics: Conference Series*, 1853(1), article number 012053. doi: [10.1088/1742-6596/1853/1/012053](https://doi.org/10.1088/1742-6596/1853/1/012053).
- [33] Wang, S., Cui, D., Lv, Y., Yan, Z., & Zhang, J. (2022). Cangpu oral liquid as a possible alternative to antibiotics for the control of undifferentiated calf diarrhea. *Frontiers in Veterinary Science*, 9, article number 879857. doi: [10.3389/fvets.2022.879857](https://doi.org/10.3389/fvets.2022.879857).
- [34] Wilson, D.J., Habing, G., Winder, C.B., & Renaud, D.L. (2023). A scoping review of neonatal calf diarrhea case definitions. *Preventive Veterinary Medicine*, 211, article number 105818. doi: [10.1016/j.prevetmed.2022.105818](https://doi.org/10.1016/j.prevetmed.2022.105818).
- [35] Zhang, X., Yi, X., Zhuang, H., Deng, Z., & Ma, C. (2022). Invited review: Antimicrobial use and antimicrobial resistance in pathogens associated with diarrhea and pneumonia in dairy calves. *Animals*, 12(6), article number 771. doi: [10.3390/ani12060771](https://doi.org/10.3390/ani12060771).
- [36] Zhylgeldieva, A., Korabaev, E., Zamanbekov, N., Sobiech, P., Kobdikova, N., Turzhigitova, Sh., Baymurzayeva, M., & Bayberekov, N. (2024). The effect of a phytopreparation used for calves dyspepsia on morphological and biochemical blood parameters. *Microbiology and Virology*, 44(1), 219-232. doi: [10.53729/MV-AS.2024.01.14](https://doi.org/10.53729/MV-AS.2024.01.14).

Лікування функціональних розладів шлунково-кишкового тракту телят комплексним фітомінеральним препаратом

Нургуль Монтаєва

Доктор філософії, в.о. доцента

Західно-Казахстанський аграрно-технічний університет імені Жангір-хана
090009, вул. Жангір Хана, 51, м. Уральськ, Республіка Казахстан
<https://orcid.org/0000-0003-2614-1592>

Сарсенбек Монтаєв

Доктор технічних наук, професор

Західно-Казахстанський аграрно-технічний університет імені Жангір-хана
090009, вул. Жангір Хана, 51, м. Уральськ, Республіка Казахстан
<https://orcid.org/0000-0001-5072-8989>

Аружан Монтаєва

Магістр

Західно-Казахстанський аграрно-технічний університет імені Жангір-хана
090009, вул. Жангір Хана, 51, м. Уральськ, Республіка Казахстан
<https://orcid.org/0009-0008-8706-2525>

Анотація. Значні економічні втрати, внаслідок захворюваності новонародженого молодняка на діарею, ведуть до зниження рентабельності галузі в структурі сільськогосподарського виробництва. Тому метою роботи стало створення та вивчення терапевтичного ефекту від застосування комплексного фітомінерального препарату з використанням місцевих компонентів: опоки Таскалінського родовища та відвару рослинної сировини верблюжої колючки (*Alhagi maurorum*) для лікування діареї у телят. Вивчення лікувальної дії від препарату проводили в умовах молочнотоварної ферми в Кизилординській області на поголів'ї телят 5-7-денного віку. Дію препарату вивчали в порівняльному аспекті з аналогічним препаратом імпортного виробництва та результатами, отриманими від здорових тварин. При цьому використовували клінічний, гематологічний та біохімічний методи дослідження. Отримані результати вказують на високий терапевтичний ефект створеного препарату. Його застосування дало змогу скоротити тривалість лікувального періоду на 5-7 днів порівняно з імпортним препаратом і вже на 5 день після початку лікування відновити позитивну динаміку середньодобових приростів. Гематологічні дослідження вказують на стимулювання імунної системи у тварин, що проявлялося збільшенням на 14 % кількості лімфоцитів і на 37 % білків γ -глобулінової фракції порівняно зі здоровими тваринами. Ці показники вказують на підвищення активності гуморальної частини імунної системи у тварин після застосування препарату. Також позитивний терапевтичний ефект від препарату спостерігався і в захисній дії на печінку хворих тварин. Незважаючи на присутній ефект в обох лікарських препаратів, зниження активності маркерів, що характеризують руйнування гепатоцитів, було вищим у казахського препарату. Таким чином, створений препарат характеризується вищою терапевтичною дією, порівняно з імпортним препаратом, що дає змогу його рекомендувати для лікування та профілактики діареї у молодняка тварин

Ключові слова: діарея; верблюжа колючка; опока Таскалінського родовища; терапевтичний ефект; Діастатин
