IOP Conference Series:
Earth and
Environmental Science

PURPOSE-LED PUBLISHING™

PAPER • **OPEN ACCESS**

The effectiveness of phytobiotic additives in the diet of sheep

To cite this article: E Saparova and T Zubova 2019 *IOP Conf. Ser.: Earth Environ. Sci.* **403** 012034

View the article online for updates and enhancements.

You may also like

- Anticancer effects of *Echinacea purpurea* extracts, treated with green synthesized ZnO nanoparticles on human breast cancer (MCF-7) and PBMCs proliferation
Narges Karimi, Mandana Behbahani, Ghasem Dini et al.
- Enhancement of agronomic and physiological traits in *Echinacea purpurea* BH 1 accession (Indonesia) through gamma irradiation in lowland conditions
Zainal Arifin, Ahmad Yunus, Edi Purwanto et al.
- Enhancing the secondary metabolite and anticancer activity of *Echinacea purpurea* callus extracts by treatment with biosynthesized ZnO nanoparticles
Narges Karimi, Mandana Behbahani, Ghasem Dini et al.

This content was downloaded from IP address 87.49.42.83 on 02/10/2026 at 22:32

The effectiveness of phytobiotic additives in the diet of sheep

E Saparova[1], T Zubova[1]

[1]Kemerovo State Agricultural Institute, Markovtseva str., 5. Kemerovo 650056, Russia

E-mail: ksai@ksai.ru

Abstract. The introduction of natural phytobiotic drugs in the diet of farm animals for the purpose of partial or complete replacement of feed antibiotics is relevant for domestic livestock. The workers of the agricultural sector have the following task: the transition to highly productive and environmentally friendly agro farm and water farm, development and introduction of systems of rational use of chemical and biological protection of farm animals. Therefore, the topic of this study on the use of environmentally friendly phytobiotic feed additives in the diet of sheep is of scientific and practical interest. The purpose of study is development and evaluation of the impact of a new environmentally safe herbal remedies based on the collection of extracts of leuzea carthamoides and Echinacea purpurea on the complex of economic traits of sheep. The collection of extracts of Leuzea carthamoides and Echinacea purpurea contains a significant amount of vitamins, phytoncides, chlorophyll, proteins, fats, inulin, glucose, essential and fatty oils, phenol carboxylic acids, betaine, resins, enzymes, macro - (potassium, calcium), trace elements (selenium, cobalt, silver, zinc, manganese, molybdenum) and other nutrients, and may serve as a valuable addition to the diet of sheep. The experiments on ewes and lambs of the edilbaevskaya breed show that phytobiotic additives included into the diet had a positive effect on the physiological status, productive qualities of ewes. Lambs' bodies weight was increased as well as resistance to disease and the safety of livestock population.

1. Introduction

In the works of many researchers [1,2], it was found that the late winter-stalled keeping period in the conditions of hypodynamia and microclimate parameters violation is the most stressful for pregnant ewes. The impact of stress factors accompanying industrial technologies of sheep breeding on the body of ewes causes them significant metabolic disorders and reduces productivity. In this case, metabolic disorders are accompanied by increased free-radical oxidation of lipids and by decreased antioxidant protection. This condition is considered as oxidative stress. The stress reaction developing by animals during this period leads to health problems and to a decrease in wool and milk productivity [2,3].

The use of medicinal plants in the diet of farm animals for the treatment and prevention of stress and certain diseases has been practiced for the long time. However, in practice, workers face some inconvenience in their application. It is necessary to prepare infusions and decoctions in the economy, just before use, as they have a short shelf life. The problem is the watering of these drugs to farm animals in large volumes due to the specific smell and bitter taste. Another problem is a large consumption of dry grass, to obtain the desired concentration of the solution [4,5,6].

Content from this work may be used under the terms of the Creative Commons Attribution 3.0 licence. Any further distribution of this work must maintain attribution to the author(s) and the title of the work, journal citation and DOI.
Published under licence by IOP Publishing Ltd

The scientists of Kemerovo State Agricultural Institute were tasked with the following: to develop the effective environmentally friendly complex preparations based on extracts of medicinal plants that have immunomodulatory, anti-inflammatory and other valuable properties.

Phytobiotics are complexes of phytogenic that have a various effect for the body: antimicrobial, antiviral, antifungal, etc. Phytobiotic additives can replace partially or completely feed antibiotics and, accordingly, increase environmental safety and the value of the products [7,8,9].

The advantages of phytobiotics:

- Low risk of allergic reactions
- Wide therapeutic effect
- Efficiency and safety of application

Purpose and tasks of the study

The purpose of this study was the development and evaluation of the impact of new environmentally friendly herbal drug based on extracts of leuzea carthamoides and Echinacea purpurea to the complex of traits of the sheep.

Defined tasks:

1. To establish the effect of feeding the pharmaceutical substation from extracts of medicinal plants of leuzea carthamoides and echinacea purpurea to the complex of economic and useful qualities of ewes.
2. To determine the main indicators of the blood of ewes under feeding them pharmaceutical substances made out of extracts of medicinal plants of leuzea carthamoides and echinacea purpurea.
3. To give recommendations for the implementation of phytobiotic feed additive, based on extracts of medicinal plants of leuzea carthamoides and echinacea purpurea as an alternative to feed antibiotics under growing sheep.

2. Material and methods

Experimental study on impact assessment of pilot batches of the pharmaceutical substances on the basis of extracts of leuzea carthamoides and echinacea purpurea to the complex of economic and useful qualities of the sheep was done.

Material for the research served as ewes of edilbaevskaya breed, newborn lambs, and an experimental batch of medicinal plant extracts leuzea carthamoides and echinacea purpurea in the previously defined optimal doses.

Scientific and economic experience was conducted in 2018 in sheep farms of the Kemerovo region to archive this goal. Control and experimental groups of pregnant ewes, 6 heads in each group, were formed for experimental studies. Animals are selected by live weight, age and duration of pregnancy (4 months). Ewes of the control group received the main diet, ewes of the experimental group received additional pharmaceutical substations based on the extract of the medicinal plant of leuzea carthamoides and echinacea purpurea according to the scheme of the experiment (table 1).

Table 1. Scheme of experience in assessing the impact of experimental batches of pharmaceutical substances based on the extract of the medicinal plant of leuzea carthamoides and echinacea purpurea on the physiological status and productive qualities of ewes.

Group	Quantity of heads	Dosage of pharmaceutical substation
Control	6	Basic diet (BD)
Experimental	6	BD+2.5 mg/kg of live weight of leuzea carthamoides + 8.6 mg/kg of live weight of Echinacea purpurea per day

All animals were in the same conditions of feeding and keeping.

The diets were the same in terms of energy nutrition and the content of basic nutrients. The feed additive in the form of capsules was fed to the animals in the morning before the basic feeding.

Daily observations took into account the main clinical indicators of the ewes and lambs: general condition, appetite, respiratory indicators, pulse and body temperature, digestive function and excretion.

Period of experience – 10 days.

Medicinal plants used in research:

2.1. Leuzea carthamoides

All parts of this plant (leaves, seeds, roots and rhizomes) contain biologically active substances (flavonoids, anthocyanins, alcohols, essential oils, steroids) that have a beneficial effect for the body of animals. But the greatest therapeutic value has an underground part of the raponticum – woody horizontal rhizome, which has a characteristic resin smell, from which branch numerous roots. The rhizomes of leuzea carthamoides contain organic substances, a small amount of alkaloids and vitamins, particularly ascorbic acid and carotene, and other compounds [10, 11, 12].

In addition to the above mentioned components, the composition of leuzea carthamoides includes: inulin, coumarins, alkaloids, organic acids, vitamins A and C, minerals (Ca, Mg, Fe, K, P, Cl, Si, S, Al), tannins, resin, fatty oil, wax, gum, arsenic, potassium oxalate, salts of phosphoric acid, and phytoecdysones – substances from the group of sterols, which intensifies the process of protein synthesis, serve as natural anabolics [5,13]. Leuzea carthamoides contains biologically active substances that affect to the recovery of humoral and cellular immunity. Contribute to the normalization and strengthening of mineral, carbohydrate, lipid and energy metabolism and reduce the negative impact of environmental stress factors. Liquid extract and tincture of leuzea carthamoides have an exciting effect on the central nervous system, it is manifested in increased motion activity and reflex excitability [14].

The most widely studied tonic properties of leuzea carthamoides. Experimentally proved that efficiency of skeletal muscles of animals is increased with a single and repeated administration of drugs of leuzea. It was established that the galena features of leuzea significantly extend the time of work before the period of extreme fatigue and reduce the level of damaging factors with exhausting physical activity. These properties of leuzea as features of increasing the general efficiency, were confirmed by experiments with animals by the study of biochemical parameters such as adenosine triphosphate, glycogen and phosphocreatine [15].

2.2. Echinacea purpurea

The herb of echinacea purpurea contains polysaccharides (heteroxylans, arabinogalaktans), essential oil (0.15-0.50%), flavonoids, hydroxy-cinnamic (chicory, ferulic, coumaric, coffee) acid, tannins, saponins, polyamines, echinatin (amide of polyunsaturated acid), echinodon (unsaturated cytosport), echinoid (glycoside containing coffee acid and pyrocatechol), organic acids, resins, phytosterols [16].

Rhizomes and roots contain inulin (up to 6 %), glucose (7 %), essential and fatty oils, phenol carboxylic acids, betaine, resins. All parts of the plant contain enzymes, macro - (potassium, calcium) and trace elements (selenium, cobalt, silver, molybdenum, zinc, manganese, etc.), as well as vitamin C [17].

Echinacea drugs increase immunity due to the activation of protective cells of the immune system (phagocytes), as well as the compound CIS-1.8 pentadecadiene, which has pronounced antitumor activity. The extract is used in the treatment of many autoimmune diseases (hepatitis, nephritis, rheumatoid arthritis), bacterial and viral diseases (influenza, herpes, smallpox, polio), under the treatment of various oncological pathologies. Juice made out of fresh inflorescences effectively affects to blood clotting and wound healing [18, 19].

Echinacea purpurea tincture is used to reduce immunity caused by various reasons (long-term antibiotic treatment, systematic hypothermia or overheating); as part of the complex therapy for the prevention and treatment of respiratory and acute infectious diseases; as a General tonic and adaptogenic remedy (increasing the body's resistance), during general weakness, weakening of the liver, kidneys, heart, hypofunction of the genital and other endocrine glands, fatigue, anemia, to

increase appetite, gas exchange, stimulation of tissue respiration, rearrangements and other technological stress factors [20,21,22,23].

Animals' blood was examined by conventional methods during our experiments.

Morphological and biochemical blood tests included the determination of the number of red blood cells, white blood cells, hemoglobin, total protein, glucose, calcium, inorganic phosphorus and their ratio, as well as potassium.

Blood from animals for morphological and biochemical studies was taken from the jugular vein at the same time, in the morning before feeding. Indicators were compared with norms.

The live weight of all lambs was determined at the beginning and at the end of the experiment in order to study the growth rates of young animals born by ewes. Based on this information, the absolute and average daily live weight gain was calculated. Resistance to disease and the safety of livestock were studied by lambs.

Conclusion about the positive effect of phytobiotic extracts was made on the basis of complex specific: clinical, biochemical, hematological and immunological methods of the research. Therapeutic and prevention efficacy was determined in comparison with widely used in these indications of means and negative control.

2.3. Results of the research

The most important indicator characterizing the intensity of oxidative processes in the body is blood.

Blood used to be the internal environment of the body, has a relative constancy of its composition. However, this system displays to some extent all the changes that occur inside the body. Hematological parameters of the blood are closely related to the productivity of animals [24,25,26].

The most significant results of blood parameters of ewes are mentioned below (table 2-3), which have significant differences between control and experimental group after the feeding of pharmaceutical substances based on extracts of leuzea carthamoides and echinacea purpurea.

Table 2. Results of morphological research of the ewes' blood in the average for the group.

№	Characteristic	Control group	Experimental group	Norm
1	Red blood cells 10^{12}/l	8.23±0.05	8.42±0.03	8.0-8.5
2	White blood cells 10^{9}/l	8.53± 0.10	8.63± 0.07	8.1-9.0
3	Hemoglobin g/l	100.17±1.18	106.83±1.04	79-119

2.3.1. Red blood cells (erythrocytes)

The main function of red blood cells is to transport of gases by the blood due to the presence of colored protein of hemoglobin.

Having a large specific surface area, red blood cells can adsorb by itself the numerous organic and mineral substances, including gases, and transport them to tissues. Their main function — respiratory — is inextricably linked with the properties of the hemoglobin protein contained in them.

Biconcave form provides red blood cells perform their main function - the transfer of oxygen and carbon dioxide.

The studies have shown that the content of red blood cells in the blood of animals was within the physiological norm. The fluctuations ranged from 8.1 to 8.5 million 10^{12}/l and did not differ significantly in the groups. This figure of control ewes was lower by 0.19 million 10^{12}/l compared to the experimental group, which was 4.93 %. Relative erythrocytosis is usually detected in conditions of exicosis (dehydration), "stress" situations, etc.

2.3.2. White blood cells (leukocytes)

Small layer of white blood cells (leukocytes) formed over precipitated red blood cells (erythrocytes) – white blood cells.

Unlike red blood cells, the number of which is almost constant in the blood of healthy animals, the number of white blood cells may vary depending on the time of day and the functional state of the

body. The number of leukocytes increases in various physiological conditions: pregnancy, lactation, after heavy physical activity, during stress, infectious diseases.

White blood cells play an important role in protecting the body. They can capture and digest bacteria and other extrinsic bodies that have entered the body. Their main role is to protect the internal environment of the animal from bacteria and control saprophytic microflora in the digestive tract and other organs.

White blood cells can envelop the elastic membrane of extrinsic bodies and cells and subsequently digest them. This phenomenon is called phagocytosis. It is accompanied by a sharp increase in the absorption of oxygen and glucose by leukocytes, an increase in the decay of glycogen inside it, an increase in the activity of enzymes.

Low leukocyte content ($7.84\pm0.47\times10^9$/l) was noted in the experimental group before using pharmaceutical substances. However, by the 10th day of the experiment there was an increase ($8.63\pm0.07\times10^9$/l), which indicates the restoration of hematopoiesis. This figure was normal by the end of the studies, which indicates a good condition of sheep. The difference between the groups was 0.1 thousand per 10^9/l (1.1 %).

2.3.3. Hemoglobin

The ability of red blood cells to carry oxygen depends on the amount of hemoglobin inside it. Determination of hemoglobin is the most important laboratory indicator for the assessment of anemic status. Reducing the amount of hemoglobin in the blood is called anemia. Anemia is not an independent disease, but only a symptom that accompanies many physiological processes and diseases, sometimes anemia is caused by a primary disease of the hematopoietic system of the animal.

The amount of hemoglobin in both groups of out studies corresponded to the normative indicators. The fluctuations ranged from 97.0 to 110.0 g/l. This figure exceeded the control by 13.0 g/l (13.4%) in the experimental group, which allows to increase the transport of oxygen and carbon dioxide and to enhance metabolism.

Table 3. The results of biochemical studies of the blood of sheep in the average for the group.

№	Characteristic	Control group	Experimental group	Norm
1	Protein, g/l	66.48±0.92	70.67±1.12	60-75
2	Glycose, mmol/l	2.5±0.11	3.02±0.07	1.94-3.30
3	Calcium, mmol/l	2.63±0.08	2.89±0.09	2.5-3.13
4	Phosphorus, mmol/l	1.74±0.08	1.60±0.08	1.45-2.48
5	Potassium, mmol/l	4.32±0.09	4.73±0.06	4.1-4.86

2.3.4. Proteins

Protein is the main plastic material for normal growth and development, especially of young animals.

The content of total protein in the blood of sheep has a close correlation with the mass of the carcass and the mass of the flesh, as well as with the coefficient of meat.

Serum proteins affect to the maintenance of blood viscosity, osmotic pressure, are involved in the transport of many substances in the regulation of the constancy of blood pH, blood clotting, immune processes.

Proteins break down to amino acids, which serve as a construction material for proteins of the internal environment of the body.

We have limited ourselves to the determination of total protein content in blood serum in our studies.

The content of total protein in the blood serum of ewes in the control and in the experimental group was within the physiological norm. However, the total protein content in the experimental group was higher by 4.19 g/l (6.3%), which contributed to an increase of the live weight of experimental animals.

2.3.5. Glucose

The main indicator of carbohydrate metabolism is the concentration of sugar in the blood, mainly the glucose. Glucose is an important, but not the only, source of energy for ruminants. It is also the main energy material for the brain and for the tissues of the udder ruminants. However, elevated above the norm indicators evidence about pathological process with a clinical manifestation of the disease of the gastrointestinal tract.

This figure ranged from 2.2 to 3.2 mmol/l in our studies and was within the physiological norm. The average glucose content in the experimental group was 0.52 mmol/l (20.8%) higher than in the control group.

2.3.6. Mineral substance

They are necessary for the normal functioning of the body of animals. The level of calcium and phosphorus in blood plasma is regulated by derivatives of vitamin D, calcitonin and parathyroid hormone. The absorption of calcium by the body is most facilitated by phosphorus, which itself is actively absorbed in the body if there is enough vitamin D.

Calcium is a part of bones, participates in blood coagulation, supports excitability of nerves and muscle tissue, increases myocardial tone, activates enzymes. Low levels of calcium lead to rickets, osteomalacia, nephritis, dyspepsia, postpartum paresis, pulmonary diseases. Calcium reduces the excitability of the muscular and nervous systems.

The calcium content in the blood serum of ewes was within the physiological norm in our studies. The values ranged from 2.34 to 3.11 mmol/l. The mean value in the experimental group was 0.26 mmol/l (9.9 %) higher than in the control group. This contributes to a better protection of the organism from dyspepsia and bronchitis.

Phosphorus is found mainly in bone tissue, as well as in muscle and nervous tissues and in the blood. It is part of the phosphate blood buffer, ATP, ADP; participates in the regulation of acid-base balance, as well as carbohydrate, fat and protein metabolism. Lack of phosphorus in the blood leads to anemia, dyspepsia, maternity paresis. Phosphorus is necessary for normal protein, fat and carbohydrate metabolism.

The phosphorus content in the blood serum of ewes was within the physiological norm in our studies. The values ranged from 1.45 to 1.95 mmol/l. The Mean value in the experimental group was 0.14 mmol/l (8.0 %) lower than in the control group.

The most complete picture of the adequacy of the content of minerals in the blood gives calcium phosphorus ratio.

A large amount of calcium is spent together with phosphorus on the formation of bones and teeth in the form of insoluble calcium and magnesium phosphate. That is why calcium and phosphorus can be deposited in the porous part of the bones, and with a lack of feed or increased needs, these reserves are used. During lactation, a large amount of calcium is released with milk and the need for it by ewes is higher. Physiological norms of calcium phosphorus ratio (Ca/P) for sheep is approximately 2:1. This ratio is 1.81 in the experimental group and it's better than in the control group 1.51 based on the executed studies.

Thereby, the introduction in the diet of experimental batches of pharmaceutical substances on the basis of extract of leuzea carthamoides and echinacea purpurea helps to normalize calcium and phosphorus ratio.

2.3.7. Potassium

Potassium is the main cellular cation involved in the regulation of osmotic blood pressure and maintaining acid-base balance. Potassium takes part in muscle contraction, functional activity of the heart, enzyme processes, affects the processes of nervous activity and metabolism.

The potassium content in both groups ranged from 4.1 to 4.9 and was within the physiological norm in our studies. However, in the experimental group, this figure was 0.41 mmol/l (9.5 %) higher

than in the control group, which improves the functional activity of the heart and increases metabolism.

We studied changes in live weight and reproductive qualities of ewes during our research.

The live weight of edilbaevskaya breed ewes during the whole experience was in the normal range for sheep of this breed.

The live weight of ewes in the experimental group after feeding of experimental batches of pharmaceutical substances on the basis of extract of leuzea carthamoides and echinacea purpurea ranged from 49.8 kg to 52.3 kg. At the average 50.82 kg. This index was lower in the control group and ranged from 46.5 kg to 49.3 kg. At the average 48.22 kg. The difference between the average indexes in the groups was 2.6 kg or 5.4%. We explain this by increasing metabolism, normalization of acid-base balance.

We have analyzed the time of exit of the placenta out from ewes after lambing. Diagnosis of the detention of the placenta in sheep can be supplied to the animal when the generic shell partially or fully out of the womb for five hours. The reason for the violation is the lack of exercise, illness, underfeeding and lack of a certain amount of vitamins and minerals in the diet.

It is possible to determine visually the retention of the placenta out from sheep, because in most cases a piece of tissue hangs from the vagina, and emits a characteristic putrid smell due to the decomposition process. If actions won't be taken in time, predicted death due to sepsis.

Exit of the placenta out from healthy ewes occurs within two hours after lambing.

The exit time of the placenta in the control group averaged 2 hours 29 minutes, in the experimental group 1 hour 57 minutes.

The exit time of the placenta in the experimental group was reduced by the average of 32 minutes, compared with the control. It speaks to the normalization of the generative process under feeding of experimental batches of pharmaceutical substances on the basis of extract of leuzea carthamoides and echinacea purpurea. The difference is significant ($P < 0.01$).

Great damage of pedigree livestock causes postpartum endometritis. Endometritis – inflammation of the lining of the uterus. This disease is often found inside ewes during mass lambing. The main cause of sheep endometritis is the penetration through the birth canal into the uterine cavity of streptococci, staphylococci, blue pus and colon bacillus and other. Endometritis is sometimes observed in pathological childbirth, after abortion, with the detention of the placenta, with insemination of ewes by rams – producers contained in unsanitary conditions.

Two ewes in the control group were found to have postpartum endometritis. The average recovery time for ewes was 23 days. Only one sheep was ill in the experimental group. Recovery time after the feeding of experimental batches of pharmaceutical substances on the basis of extract of leuzea carthamoides and echinacea purpurea was 17 days, which is 6 days less than in the control group.

Thereby, the use of pharmaceutical substances increased the reproductive quality of ewes, improved their physiological status and accelerated recovery.

We analyzed during our research the impact on newborn lambs of pharmaceutical substances that received pregnant ewes.

The number of live newborn lambs in the experimental group was 9, which is one head more than in the control group. Mean value of fecundity in the control group was 1.33 lamb for the one ewe, in the experimental group was 1.5 lamb that is 0.17 goals (12.8 %).

The average weight of lambs at birth moment, burned by ewes receiving pharmaceutical substances based on extract of leuzea carthamoides and echinacea purpurea was higher in average by 370 grams (11%), compared with the lambs of the control group. The difference is significant ($P < 0.01$).

The absolute increase during 10 days of observation was on average 410 grams higher of the lambs of the experimental group compared to the control group.

We explain this by the fact that ecdysteroids, which are contained in the extract of leuzea carthamoides involved in the synthesis of protein, interact with nuclear receptors of sensitive cells and start the process of gene transcription. In this case, there is a more effective transformation of energy

and protein of feed on the synthesis of muscle tissue, with the deposition of large amounts of dietary protein.

We have analyzed the most common diseases of newborn lambs – dyspepsia and bronchitis, as well as the safety of young animals.

In the group of lambs born by ewes receiving pharmaceutical substations based on extracts of leuzea carthamoides and echinacea purpurea, gastrointestinal diseases were not observed, whereas in the control group two lambs of 8 fell ill, the incidence of dyspepsia was 25% in the first month of the experiment. The positive effect of the collection is obviously due to its enterosorbent properties, antibacterial and antimicrobial activity of the components.

The same trend was observed for the bronchitis.

One of 8 lamb contracted bronchitis in the control group. The percentage of sick lambs was 12.5 %. After feeding the ewes of experimental batches of pharmaceutical substances of leuzea carthamoides and echinacea purpurea cases of bronchitis in lambs was not.

These data indicate a greater resilience of lambs born by ewes, receiving a collection of extracts of medicinal herbs.

Monitoring of newborn lambs for a month showed that one lamb of 8 perished in the control group. The percentage of lambs perished in the group was 12.5 %.

Loss of cattle of lambs in the experimental group, born by ewes receiving pharmaceutical substations on the basis of extracts of leuzea carthamoides and echinacea purpurea is not recorded.

3. Discussion

The conducted tests on the use of experimental batches of pharmaceutical substances based on extracts of leuzea carthamoides and echinacea purpurea in the diets of sheep confirmed the assumption that the introduction of natural phytobiotic drugs into the diet of farm animals for the purpose of partial or complete replacement of feed antibiotics will preserve the good health of ewes, improve their general condition, increase the immunological reactivity of the body, normalize the biochemical composition of their blood. This contributed to the increase in live weight of experimental animals. There was an increase in the humoral system of the protective reaction of the body of ewes. Calcium phosphorus ratio was normalized.

Reproductive and productive qualities of ewes in the experimental group are improved, and it promotes stimulation of growth and progress of newborn lambs, increases their resistance to diseases.

It was noted that the study drug based on extracts of leuzea carthamoides and echinacea purpurea did not cause side effects in animals, both immediately after use and throughout the period of observation.

Experienced animals observation will be continued.

The new feed additive based on extracts leuzea carthamoides and echinacea purpurea has a positive effect on the productivity and resistance of animals and can be recommended for use in addition to the basic diet of sheep, which will increase their reproductive quality, productivity, viability of lambs.

4. Conclusions

1. Bio-stimulating effect on the body of sheep by the introduction in the diet of pharmaceutical substances on the basis of extracts leuzea carthamoides and echinacea purpurea confirmed by the blood test. Improved blood parameters such as red blood cells (4.93 %), white blood cells (1.1 %), hemoglobin (13.4 %), total protein (6.3 %), glucose (20.8 %), calcium (9.9 %), phosphorus (8.0 %), potassium (9.5 %).
2. Contained in extracts of leuzea carthamoides and echinacea purpurea BAS enhance mineral, carbohydrate, energy metabolism, contribute to the optimization of the digestive system, increase appetite, restore immunity.
3. Ewes that received the collection from the extracts of leuzea carthamoides and echinacea purpurea were healthy, mobile, active, have good reproductive qualities. Fertility increased by 12.8 %. The exit

time of the placenta was reduced by 32 minutes. Recovery time after birth endometritis decreased by 6 days.

4. The new feed additive had a positive effect through the ewes to newborn lambs. Their live weight at birth was higher than in the control group by 11 %, the incidence of dyspepsia and bronchitis decreased by 25 % and 12.5 %, respectively. The loss of cattle case decreased by 12.5 %.

The received results have scientific and practical value, therefore we recommend to enter into the diet of pregnant ewes the pharmaceutical substances are based on extracts of leuzea carthamoides (with a dosage of 2.5 mg/kg) and echinacea purpurea (with a dosage of 8.6 mg/kg), for the transition to a highly productive and environmentally friendly agricultural farm without the use of antibiotics.

References

[1] Ladysh I, Znagovan S, Bublik V 2015 *Innovative ways of import substitution of agricultural products materials of international scientific-practical conference* pp 39-44
[2] Gotovskiy D, Kondakova V, Fomchenko I 2013 *The Scientists notes of the educational institution Vitebsk order of the badge of honour state Academy of veterinary medicine* **49** 1-2 pp 69-73
[3] Shermanova K 2014 *Collection of scientific works of the all-Russian research Institute of sheep and goat breeding* **7** pp 434-436
[4] Sklyarov P 2013 *Agrarian Bulletin of the Perm* **1** pp 39-42
[5] Torokova A 2016 *Ecology of southern Siberia and adjacent territories* pp 35-36
[6] Yrmashev A, Antipova V 2017 *Collection of articles all-Russian scientific-practical conference of young scientists* 149-151
[7] Garmaeva Z, Tsyrempilov P 2013 *Bulletin of the Buryat state agricultural Academy V.R. Filippova* **2** 31 pp 125-128
[8] Dutova S, Karpova M, Myadelets M 2015 *Pharmacy* **2** pp 51-53
[9] Castillo-Lypez R, Gutiérrez-Grijalva E, Leyva-López N, López-Martínez L, Heredia J 2017 *J. Anim. Plant Sci.* **27** 2 pp 349-359
[10] Antsupova T, Dashieva J, Endonova G, Gapova O, Ilyina L, Pavlova E 2015 *Medicinal plants of Buryatia in science and practice* (Ulan-Ude: Publishing house of East Siberian state University of technology and management) p 149
[11] Pechenkina Y, Voloshin V 2013 *Advances in science and technology, agriculture-industrial complex* **5** pp 44-46
[12] Radaelli M, Parraga da Silva B, Weidlich L, Hoehne L, Flach A, da Costa L, Ethur E 2016 *Braz. J. Microbiol.* **47** 2 pp 424-430 doi: 10.1016/j.bjm.2015.10.001
[13] Vilkova N 2017 *Bulletin of medical Internet conferences* **7** 6 pp 12-14
[14] Lebeda A, Dzhurenko N, Isaikina A 2011 *Medicinal plants. The most complete encyclopedia* (M.: AST-Press) p 496
[15] Grechannyi I 2013 *Complete Handbook of medicinal herbs and healing fees* (Belgorod: publishing house of LLC "Book club "family leisure Club") p 540
[16] Popov A, Dementiev Y, Manakova T 2015 *Proceedings of the XIV International scientific and practical conference* pp 109-121
[17] Zagumennov V, Molchanova A, Babaeva E, Petrova A 2014 *Chemical-pharmaceutical journal* **48** 10 pp 39-42
[18] Butakova N 2017 *Proceedings of the IV International scientific and practical conference* pp 235 - 237
[19] Tukhphatova R 2011 *Veterinary clinic* **4** 25-28
[20] Vetrova L, Kuznetsova M 2017 *Veterinary and feeding* **3** pp 22-23
[21] Gotovskiy D, Kondakova V 2013 *Materials of the XVI International scientific and practical conference devoted to the 80th anniversary of the Department of breeding and genetics of farm animals State Belorussia Academy of agriculture* pp 327 - 333
[22] Kiczorowska B, Samolińska W, Al-Yasiry A, Kiczorowski P, Winiarska-Mieczan A 2017 *Ann.*

Anim. Sci. **17** 3 pp 605-625 doi: 10.1515/aoas-2016-0076
[23] Jeroch H, Kozlowski K, Jeroch J, Lipinski K, Zdunczyk Z, Jankowski J 2009 *Züchtungskun-de* **81** 4 pp 279-293
[24] Begg E 2012 *Clinical pharmacology* (M.: BINOM. Laboratory of knowledge) p 104
[25] Hao H, Cheng G, Iqbal Z, Ai X, Hussain H, Huang L, Dai M, Wang Y, Liu Z, Yuan Z 2014 *Front. Microbiol.* **5** p 288 doi: 10.3389/fmicb.2014.00288
[26] Windisch W, Kroismayr A 2007 *Biomin World Nutrition Forum* https://en.engormix.com/feed-machinery/articles/phytobiotics-on-performance-gut-function-in-monogastrics-t33528.htm