

ANNOTATION

dissertation work Yertleuova Balaussa Otargalievna on the theme «Determination of the efficacy of a formulation derived from *Artemisia lerchiana* in the treatment of wounds in animals» submitted for the degree of Doctor of Philosophy (PhD) in the specialty 6D120100- «Veterinary Medicine»

Relevance of the research topic. In the message of the President of the Republic of Kazakhstan Kassym-Jomart Tokayev to the people of Kazakhstan, the development of agriculture, including animal husbandry, remains one of the key issues.

To date, the state of the agricultural industry directly affects the food security of the country. Numerous pilot projects are being implemented to address the strategic objectives of increasing production and improving the quality of domestic agricultural and livestock products. In the agricultural cooperatives that participated in these projects, productivity has doubled and livestock growth has increased by a quarter. On the way of increasing the number of livestock and bringing quality products to the market while maintaining this indicator, the main issue in the field of veterinary medicine is to ensure the health of the livestock kept.

In this regard, prevention and timely treatment of cases of complications arising from animal injuries is one of the most important problems of modern veterinary surgery. In industrial-type farms, several factors, such as hydrodynamic, stress, keeping a large number of animals in a limited area, violation of technological regimes, and veterinary and sanitary rules, lead to frequent animal injuries. In conditions of modern livestock farms, wound infection is characterized, as a rule, by an established pattern of each damage to animal tissues and significant economic damage to livestock industries.

Currently, veterinary specialists use various methods and means for wound healing, including the most common method of local treatment of wounds with ointments of chemical origin. However, the problem of wound healing remains relevant.

A certain disadvantage of each of the proposed methods and drugs in the treatment of wounds - the complexity of implementation, costliness, and weak effect on microflora, requires the search for available, inexpensive, and effective production of drugs and methods of pathogenetic therapy. One of the main unsolved issues is the formation of resistance of microorganisms to antibiotics, antiseptics, and the presence of side effects such as allergies, and toxic effects.

The search for new drugs that have a local effect and solve the issues of veterinary medicine is currently one of the most important issues. The global trend in recent years is the use of natural compounds as raw materials for obtaining medicines for humanitarian and veterinary medicine, cosmetics, and perfumes. In the course of long evolutionary development, natural substances are more easily assimilated by the body and do not have indirect harmful effects on the body compared to synthetic analogs.

Among the drugs used in a therapeutic capacity on the skin, ointments and gel-based substances are widely used, when applying the above drugs, without damaging the affected area, forming wound drainage, and the drug base of the drugs creates a positive therapeutic effect. The existing modern drugs should have several directed effects and should combine such properties as active effect on microorganisms, high ability of dehydration, and improvement of regeneration.

As clarified in our research topic, in this aspect, the development of antibacterial, anti-inflammatory, and herbal drugs that stimulate the regeneration process in the treatment of wounds in animals becomes important.

In recent years, in domestic and world practice, very often paid attention to the use of wormwood for therapeutic purposes in the fight against microbes and inflammatory processes in the bodies of animals.

Plants of the genus *Artemisia* (wormwood) are very rich in biologically active substances. The main reason why researchers are interested in the *Artemisia* plant is that it has a wide

therapeutic range, including blood-stopping, antimicrobial effect, and therapeutic efficacy in wound healing, indicating the versatility of the therapeutic properties of *Artemisia*.

Based on the harmlessness of *Artemisia lerchiana* plant for the body, therapeutic efficacy in veterinary medicine and veterinary medicine, availability in market conditions and common household use, for the first time in veterinary surgery for the treatment of the most common surgical injuries in animals, it is proposed to study the antimicrobial effect and pharmacotoxicological harmlessness of *Artemisia lerchiana*, the most common species of *Artemisia lerchiana* in the West Kazakhstan region.

Purpose of research of the dissertation. Application of a medicinal preparation developed on the basis of *Artemisia lerchiana* in the treatment of aseptic and purulent wounds of animals and comparative evaluation of its therapeutic efficacy.

Objectives of the study.

- Mastering the technology of preparation of a preparation based on *Artemisia lerchiana*;
- Study of antibacterial action of *Artemisia lerchiana*;
- Study of acutely toxic, allergic and local irritating properties of *Artemisia lerchiana*;
- Study of clinical, hematologic, biochemical indices and the influence of humoral immunity factors in the treatment of aseptic and purulent wounds in dogs with preparations based on *Artemisia lerchiana*;
- Study of clinical, hematological, and biochemical parameters and the influence of humoral factors in the treatment of aseptic and purulent wounds in sheep with preparations based on *Artemisia lerchiana*;
- Evaluation of the effectiveness of the drug based on *Artemisia lerchiana* in the treatment of wounds in sheep in production conditions.

Research methods. Laboratory and clinical methods of investigation were used in the study. Infusion based on *Artemisia lerchiana* was obtained by methods generally accepted in pharmacology, and the essential oil was obtained by the hydrodistillation method. The study of the antibacterial properties of *Artemisia lerchiana* (on Gram-positive microflora - *Staphylococcus aureus*, *Streptococcus* and on Gram-negative microflora *E. coli*) was carried out *in vitro*. Toxicological and allergic properties *in vivo*. To determine the effect of different herbal infusions on test microbes, techniques were used to determine the antibacterial action, and the results of the study were carried out on CPC (photoelectrocolorimeter) in cuvettes with a wavelength of 490 nm on a 10 mm red light filter. To determine the antibacterial action of essential oils of various plants was used disco-diffusion method on IPA .

Determination of acute toxic, allergic, and local irritant properties of the infusion and essential oil of *Artemisia lerchiana* was carried out following the methodological recommendations of R.U. Khabriev and A.N. Mironov.

Experimental aseptic and purulent animal wounds were developed according to the methods proposed by the authors Abdullah A. et al. Clinical studies were carried out according to generally accepted methods. Hematological blood parameters (leukocytes, erythrocytes, platelets, hemoglobin, hematocrit, thrombosis) were performed in a semi-automatic analyzer Mindray BC-2800 Vet, biochemical studies (total protein, albumin, α , β , γ - globulins) - in a semi-automatic analyzer BioChem SA. A planimetric study of wound area changes was performed according to the method of L. N. Popova. Humoral factors of immunity were determined by the method proposed by co-authors P. A. Emelianenko.

The main provisions submitted for defense.

- * Study of antimicrobial and some toxicological properties of *Artemisia lerchiana*;
- * Preparation of infusion and ointment from essential oil based on *Artemisia lerchiana*;
- * Comparative study of the therapeutic effect on aseptic and purulent wounds of experimental animals of preparations based on *Artemisia lerchiana* and traditional ones;
- * Comparative study of the therapeutic effect on aseptic and purulent wounds of farm animals of preparations based on *Artemisia lerchiana* and traditional ones;

* Determination of the therapeutic effect on accidental wounds of animals in production conditions.

Description of the main results of the study. The technology of obtaining antibacterial, topical regenerating ointment based on wormwood, the composition of which is theoretically and experimentally substantiated, has been developed.

Gram-positive (*Staphylococcus*, *Streptococcus*) and Gram-negative (*E. coli*) had high antibacterial activity. The most effective is *Artemisia lerchiana* in the form of essential oil, which even at low concentrations has antibacterial activity. *Artemisia lerchiana* was found to be superior to the medicinal plants used in practice in terms of antibacterial activity.

During preclinical studies, the developed preparation based on *Artemisia lerchiana* in the form of ointment did not cause acute toxic, allergic, and local irritating reactions in laboratory animals. The results of the study to determine the external toxic effect on the body of laboratory animals (through the skin) of the preparation based on *Artemisia lerchiana* also confirm the absence of its harmful effects.

The effectiveness of ointment based on *Artemisia lerchiana* in the treatment of wounds of dogs and sheep was revealed. According to the terms of wound healing, compared to the traditional method of treatment, the healing process in the treatment of aseptic wounds was reduced by 1-2 days, and in the treatment of purulent wounds - by 3-4 days.

Analysis of the results of testing the preparation in production conditions showed that the ointment based on *Artemisia lerchiana* is an effective drug in the treatment of accidental wounds in sheep. Healing of wounds in the groups where the ointment based on *Artemisia lerchiana* was applied, the treatment normalized in a short time (with a difference of 3-4 days) compared to the traditional method.

Substantiation of the novelty and importance of the results obtained. Based on the harmlessness of *Artemisia* for the body, therapeutic efficacy in veterinary medicine and veterinary medicine, availability in market conditions, and common household use, to treat the most common surgical injuries in animals in veterinary surgery for the first time was revealed antimicrobial effect of endemic species *Artemisia lerchiana* germinating in the West Kazakhstan region, clarified harmlessness in the pharmaco-toxicological aspect, developed a method of application of the drug, which is effective in therapeutic terms.

A new plant-based drug was proposed in veterinary practice, allowing to achieve positive results in the treatment of aseptic and purulent wounds in animals by activating regeneration and reducing treatment time.

The results of the research work are included in the curriculum of universities and higher colleges in the disciplines “Veterinary Surgery” and “Veterinary Pharmacology and Toxicology”.

Materials published on the results of the research work are proposed for use by scientists in their studies.

In addition, the preparation based on *Artemisia lerchiana* is recommended for use in peasant farms of West Kazakhstan region.

Compliance with the directions of scientific development or government programs. The research work was carried out within the framework of a project presented by the Ministry of Science and Higher Education of the Republic of Kazakhstan on the basis of grant funding on the topic AP15473422 «Determination of efficacy of *Artemisia lerchiana* based medication in the treatment of surgical injuries in animals» (2022-2024).

Description of the doctoral student's contribution to the preparation of each publication. On the materials of the proposed thesis work co-authors have performed 8 scientific works, including 1 (one) article in the Scopus database with a percentile on CiteScore 61, in the collections of the international scientific-practical conference - 2 articles, in the journals presented by the Committee for Quality Assurance in the field of science and higher education of the Ministry of Science and Higher Education of the Republic of Kazakhstan - 5 articles.

The scope and structure of the dissertation. The content of the thesis consists of an introduction, literature review, materials and methods of research, results of own research,

conclusion, and appendix. 175 scientific literary sources were used in the research work. The dissertation work is designed by the mandatory requirements and written in computer print on 125 pages. The research work used 19 tables, 25 images and applications.