

RESEARCH ARTICLE • PEER-REVIEWED • OPEN ACCESS • HAC/OAK 16.00.00 — VETERINARY SCIENCES
• UDC: 619:616-091.8:616.24-002.5

Histomorphological assessment of a drug complex in experimental tuberculosis of calves

Buzoqlarning eksperimental tuberkulyozida preparatlar kompleksini gistomorfologik baholash**Гистоморфологическая оценка комплекса препаратов при экспериментальном туберкулёзе телят****O. A. DJURAEV¹** ¹ Scientific-Research Institute of Veterinary, Uzbekistan**ARTICLE INFO****ARTICLE TYPE**

Research Article

LANGUAGE OF FULL TEXT

English (EN)

SCIENTIFIC FIELD / OAK☒ 16.00.00 – Veterinary Sciences

Veterinariya fanlari

HAC Presidium decision No. 371/5, 13.06.2025

UDC / UDK

619:616-091.8:616.24-002.5

ARTICLE HISTORY**Received:** 2026-07-02**Revised:** 2026-07-19**Accepted:** 2026-07-29**Published:** 2026-07-31 **DOI**<https://doi.org/10.66073/ReFocus.V5I7.0705>**CONTACT**

ReFocusJournal@gmail.com

LICENSE

Creative Commons Attribution 4.0 International (CC BY 4.0). This is an open access article distributed under the terms of the CC BY 4.0 licence.

AUTHOR, TITLE AND ABSTRACT METADATA (EN / UZ / RU)**ENGLISH****O. A. DJURAEV¹** ¹ Scientific-Research Institute of Veterinary, Uzbekistan

Abstract. The article presents the results of histological studies of the internal organs of experimental calves used in experiments to study the effects of a new complex of anti-tuberculosis drugs, Rifizostrep. It has been established that this drug, when used over a long period in animals with experimental tuberculosis, has a sufficiently high bactericidal activity against pathogens of the M. tuberculosis-7880 strain. Along with this, it was found that Rifizostrep has no side effects or negative effects on the body as a whole or on the structure of the internal organs of the experimental calves in particular.

Keywords: tuberculosis; complex preparation; Rifizostrep; internal organs; histology; morphology; structure; experimental calves; hemosiderosis

O'ZBEKCHA**DJURAEV O.A.¹** ¹ Veterinariya ilmiy-tadqiqot instituti, O'zbekiston

Annotatsiya. Maqolada tuberkulyozga qarshi preparatlarning yangi kompleksi «Rifizostrep»ning ta'sirini o'rganish bo'yicha sinovlarda bo'lgan tajriba buzoqlarining ichki a'zolarini gistologik tekshirish natijalari keltirilgan. Aniqlanishicha, mazkur preparat eksperimental tuberkulyozdagi hayvonlarga uzoq muddat davomida qo'llanganda kasallikning M. tuberculosis-7880 shtammiga qarshi yuqori darajadagi bakteritsid faollikka ega. Shu bilan bir qatorda, Rifizostrep tajriba hayvonlarining organizmiga umuman va ichki a'zolarining strukturaviy tuzilishiga xususan biron-bir nojo'ya yoki salbiy oqibat ko'rsatmasligi aniqlangan.

Kalit so'zlar: tuberkulyoz; kompleks preparat; Rifizostrep; ichki a'zolar; gistologiya; morfologiya; struktura; tajriba buzoqlari; gemosideroz

РУССКИЙ**ДЖУРАЕВ О.А.¹** ¹ Научно-исследовательский институт ветеринарии, Узбекистан

Аннотация. В статье представлены результаты гистологических исследований внутренних органов подопытных телят, находившихся в экспериментах по изучению влияния нового комплекса противотуберкулёзных препаратов «Рифизостреп». Установлено, что данный препарат при применении в течение длительного периода животным с экспериментальным туберкулёзом обладает достаточно высокой бактерицидной активностью против возбудителей заболевания из штамма M. tuberculosis-7880. Наряду с этим выявлено, что Рифизостреп не оказывает каких-либо побочных или отрицательных действий на организм в целом и на структурное строение внутренних органов подопытных телят в частности.

How to cite / Iqtibos keltirish / Как цитировать: DJURAEV, O. A. (2026). Histomorphological assessment of a drug complex in experimental tuberculosis of calves. Research Focus International Scientific Journal, 5(7), 36–38. <https://doi.org/10.66073/ReFocus.V5I7.0705>

© 2026 The Author(s). Published by Research Focus International Scientific Journal. Open access article under the CC BY 4.0 licence.

HAC / OAK: On the HAC list of national scientific publications (Academy of Sciences of the Republic of Uzbekistan) for 06.00.00 Agricultural Sciences and 16.00.00 Veterinary Sciences. O'zbekiston Respublikasi FA huzuridagi OAK ro'yxatida: 06.00.00 – Qishloq xo'jaligi fanlari; 16.00.00 – Veterinariya fanlari.

Ключевые слова: туберкулёз; комплексный препарат; Рифизостреп; внутренние органы; гистология; морфология; структура; подопытные телята; гемосидероз

1. INTRODUCTION

Kirish

In the modern world tuberculosis of farm animals and birds is not only a significant problem of veterinary science and practice but also carries a considerable degree of social relevance. It is known that one of the reasons for the decrease in cattle numbers is the removal of animals that react positively during routine allergic testing on livestock farms. According to the veterinary instructions and regulations in force in Uzbekistan, all positively reacting animals must be immediately isolated from the general herd and sent for sanitary slaughter. In such testing there are also cases of positive reactions arising for various other reasons in animals that are conditionally healthy with respect to tuberculosis.

Such circumstances cause serious economic losses not only to livestock farming but also to the specialists and employees working in this field. In this regard, the development of control measures and chemical prevention of this disease remains, as before, very much in demand.

2. MATERIALS AND METHODS

Materiallar va metodlar

In order to address this problem, over the past several years the staff of the Laboratory for the Study of Animal Tuberculosis at the Scientific-Research Institute of Veterinary have conducted large-scale scientific and practical research, which resulted in the creation of a new combination of anti-tuberculosis drugs, Rifizostrep. To study in vivo the effectiveness of this new complex — that is, its antibacterial activity against mycobacteria in a living organism — an experiment was conducted jointly with the staff of the Laboratory of Pathomorphology on six calves of a black-and-white breed aged six to eight months.

Before the start of the experiment all calves were subjected to an allergic test, in which no positive reaction to tuberculin was established 72 hours after administration. All calves were then infected subcutaneously in the neck with a suspension of *M. tuberculosis*-7880 at a dose of 1 ml (0.03 mg/kg) and divided into two groups of three head. The first group was the experimental group and the second served as a control. Twenty-four days after infection, taking into account the incubation period of mycobacterial development in the animal body, the calves of the first experimental group were injected with Rifizostrep subcutaneously at a dose of 5 ml per 100 kg of live weight for 60 days at ten-day intervals. The drug was not used in the animals of the second, control group.

The total duration of the experiment was six months. At the end of the experiments, with the participation of a specially created commission, all the calves were slaughtered for diagnostic purposes, dissected and thoroughly examined pathoanatomically. Pathological material — pieces of internal organs 0.5–1 cm thick — was then taken from each experimental animal for histological and microscopic studies.

3. RESULTS

Natijalar

The heart is represented as a thick layer of striated fibres; the structure of the cardiomyocytes is clearly expressed and their sarcoplasm consists of densely arranged myofibrils.

The boundaries of the numerous hepatic lobules are poorly expressed, and their parenchyma can be determined by the location of the central veins. The vein wall consists of a single-layered epithelium and connective tissue. Haemocapillaries and hepatic plates are

located around the central veins. In stellate macrophages inside the capillaries a dark brown pigment, haemosiderin, appears in the form of small grains or clusters of them. Fine-grained chromatin is clearly visible as dust in the nuclei of the multifaceted hepatocytes. It is very important that the structure of the hepatocytes in the parenchyma and the lobules of the liver is monotonous and not subject to dystrophic changes.

In histological preparations from the kidneys the cortical part, located at the periphery of the organ and consisting of renal corpuscles and the proximal and distal sections of nephrons, passes smoothly, without pronounced boundaries, into the medullary part. The structure of the medullary part in turn is formed from the loops of Henle and the collecting tubules. The renal tubules are covered with a single layer of tall cubic cells. In some preparations small yellowish-brown grains of lipofuscin are visible in the distal parts of the nephrocytes.

Most of the parenchyma of the spleen consists of white pulp, which is observed in the form of round and oval lymphoid follicles made up of clusters of numerous lymphocytes. Numerous dilated blood vessels, mainly venous sinuses, are located in the red pulp. In the lumen of these vessels, along with the formed elements of the blood, macrophages are also visible, containing grains and sometimes lumps of the pigment haemosiderin in their cytoplasm.

The gastric mucosa is covered with a single layer of cylindrical cells, on top of which lies a mucoid secretion of a light pink colour. In the fundal part of the stomach the glands take the form of tubes, in which the covering epithelium with a mucous mass can be examined.

Histological preparations made from the small intestine are presented in the form of numerous villi and crypts beneath the mucous membrane. The surface of the finger-like and, in rare cases, leaf-like villi is covered with a single-layered cylindrical epithelium. With pink-coloured cytoplasm, these enterocytes have an elongated nucleus. In the field of view of the preparation there are also a few areas with oedema in those places where the fibres of the smooth muscle layer of the intestinal walls are loosened.

The mucous membrane of the walls of the large intestine, with its numerous folds, is represented in the form of tubular crypts. The villi of the enterocytes covering these crypts are not clearly visible. There is also a lamina propria consisting of loose fibrous connective tissue, which is subject to the diffusion of scattered lymphocytes and epithelial cells. Numerous blood vessels are located in the folds of the mucous membrane.

4. DISCUSSION

Muhokama

The results of the studies on the subcutaneous use of the new complex antibacterial drug have shown that in the body of calves, after infection with a suspension of the *M. tuberculosis*-7880 strain, Rifizostrep has a sufficiently high bactericidal and bacteriostatic activity against the pathogens. Along with this, the drug has no negative, side or toxic effects on the body of the experimental animals.

Since the picture of the general pathological autopsy and of the histological examination of the internal organs, especially the numerous lymph nodes, in the calves of the second, control group was presented in the form of the well-known pathological processes characteristic of tuberculosis, it was not considered necessary to describe these changes again here.

5. CONCLUSION

Xulosa

In order to study the effect of the new combination of anti-tuberculosis drugs, Rifizostrep was administered subcutaneously to calves at a dose of 5 ml per 100 kg of body weight for 60 days at ten-day intervals. An analysis of the histomorphological studies of the internal organs of the experimental animals showed that when Rifizostrep is used over a long period, minor structural changes develop in the form of haemosiderosis in the parenchymal organs and a slight increase in the secretion of the gastrointestinal tract.

Thus, the results of pathoanatomical and laboratory histological studies have established that the drug Rifizostrep, when used for a long time at a dose of 5 ml per 100 kg of live weight, is harmless and does not cause any damage or morphological destruction of the internal organs of calves.

DECLARATIONS

Author contributions *CRedit*

Conceptualization; Methodology; Investigation; Data curation; Writing – original draft; Writing – review & editing. The author has read and agreed to the published version of the manuscript.

Funding

This research received no external funding.

Ethics approval

The experimental work on calves was carried out at the Scientific-Research Institute of Veterinary in accordance with the veterinary requirements and biosecurity rules in force in the Republic of Uzbekistan, under the supervision of a specially created commission. The study involved no human participants.

Informed consent

The author has read and approved the final version of the manuscript and has given consent to its submission and publication. The study involved no human participants and no personal data.

Data availability statement

All data supporting the findings of this study are presented in the article and are available from the author upon reasonable request.

Conflict of interest

The author declares no conflict of interest.

Acknowledgements

The author thanks the staff of the Laboratory for the Study of Animal Tuberculosis and the Laboratory of Pathomorphology of the Scientific-Research Institute of Veterinary for their cooperation during the experiment.

Generative AI disclosure

Generative AI was used only partially. The author used Claude (Anthropic, Opus 5) for language editing, formatting of the reference list and preparation of the Uzbek and Russian metadata. No text, data, figures or conclusions were generated by AI. The author reviewed and verified all output and takes full responsibility for the content of the publication.

REFERENCES

- [1] Алимов В.А., Эгамбердиева З.З. Патологик анатомиядан қўлланма. Тошкент, Ибн Сино, 1993, 168 б.
- [2] Антонов Б.И. и др. Лабораторные исследования в ветеринарии. Москва, Агропромиздат, 1986, 352 с.
- [3] Гарифуллин З.Р. Материалы юбилейной сессии, посвящённой 80-летию ЦНИИТ РАМН и 75-летию со дня рождения акад. РАМН А.Г. Хоменко. Москва, 2001, с. 113–114.
- [4] Джураев О.А. Патологоанатомическое вскрытие животных и птиц: монография. Самарканд, ООО «SHUXRAT MENGLIYEV», 2026, 162 с.
- [5] Джураев О.А., Мамадуллаев Г.Х., Файзиев У.М. Денгиз чўчкачаларида Рифизостреп препаратини синашнинг патоморфологик натижалари. Ўзбекистон кишлок ва сув хўжалиги, махсус сон (2), 2022, б. 62–64.
- [6] Джураев О.А. Ветеринарияда патологоанатомик ёриб текшириш: услубий қўлланма. Самарканд, АРТЕХ НАШР, 2024, 116 б.
- [7] Ибодуллаев Ф. Кишлоқ хўжалик хайвонларининг патологик анатомияси. Тошкент, Ўзбекистон, 2000, 420 б.
- [8] Лечение туберкулёза: рекомендации для национальных программ. ВОЗ, Женева, 1998, пер. с англ., 77 с.
- [9] Мамадуллаев Г.Х., Элмуродов Б.А., Джураев О.А., Джуракулов О.К., Файзиев У.М. Рифизостреп — новый комбинированный препарат против микобактерий туберкулёза. Эпизоотология, иммунология, фармакология, санитария, Минск, 2022, № 2, с. 52–57.
- [10] Рекомендации по лабораторной диагностике туберкулёза. Омск, 1988, 64 с.
- [11] Туберкулёз: определение лекарственной устойчивости к основным противотуберкулёзным препаратам. Проблемы туберкулёза, 2008, № 4, с. 38.
- [12] Туберкулёз сельскохозяйственных животных / под ред. В.П. Шишкова и В.П. Урбана. Москва, ВО Агропромиздат, 1991, 246 с.
- [13] Хайвонлар туберкулёзининг олдини олиш ва қарши кураш: йўриқнома. Тошкент, 1998, 16 б.
- [14] Ямбаев Н., Мирзоев Д.М., Хабибов А. Проблемы профилактики и оздоровления животноводческих хозяйств от туберкулёза КРС. Кишоварз, Душанбе, 2004, № 1, с. 33–36.