



ACADEMIC STATEMENT

on dissertation on a topic

„RESEARCH ON THE PREVALENCE, AETIOLOGY AND NATURAL DEFENCE MECHANISMS OF THE MAMMARY GLAND IN SHEEP WITH SUBCLINICAL MASTITIS“,

Presented by Dr. Aleksandar Aleksandrov Stoimenov

for the awarding the educational and scientific degree "Doctor", field of higher education 6.0 "Agricultural sciences and veterinary medicine", professional field 6.4 "Veterinary medicine".

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Relevance of the topic

In recent decades, there has been an intensive increase in the population of the planet, accompanied by increased food needs. This is related to the scientific research for solutions related to the optimization of breeding and exploitation of farm animals and obtaining healthy products of animal origin. One of the most important branches of animal husbandry worldwide is sheep farming, which is of fundamental importance to many civilizations. The presented dissertation summarizes the results of scientific and scientific-applied research on the prevalence, etiology and diagnosis of subclinical mastitis in sheep breed for milk, changes in the cytological composition and physico-chemical parameters of milk and some of the protective mechanisms of the mammary gland in animals, in order to optimize the early diagnosis, therapy and prevention of the disease, which argue the relevance of the dissertation topic.

Dissertation structure

The presented dissertation is structured on 175 pages: contents - 1 page; abbreviations and symbols used in the text – 2 pages; introduction - 3 pages; literature review - 53 pages; aims and tasks - 1 page; material and methods - 16 pages; results - 33 pages; ; discussion of the results - 26 pages; conclusions - 1 page; scientific contributions - 1 page; recommendations for practice - 1/2 pages; list of publications related to the dissertation - 1/2 pages; reference - 33 pages.

Introduction

In this part attention is focused on the prevalence, etiology and diagnosis of subclinical mastitis in ewes for milk, the changes in the cytological composition and physicochemical parameters of the milk and some of the protective mechanisms of the mammary gland in animals to improve the early diagnosis, therapy and prevention of the disease.

Literature review

It is comprehensive, based on 254 publications, of which only 8 in Cyrillic and 246 in Latin. Entering this section, we cannot fail to be impressed by the fact that almost 50% of the cited scientific works were published after 2010, which emphasizes the actuality of the issue and the importance of mastitis. The anatomical structure of the mammary gland and its protective mechanisms, the studies carried out to date regarding the prevalence, etiology, predisposing factors for the occurrence and development of mastitis in sheep are examined in detail. The connection with the development of antibiotic resistance of the causative agents of mammary gland infections is emphasized. It is a well-known fact that the identification of the microorganisms causing intramammary infections and their antibiotic susceptibility are key elements in the control and fight against mastitis, as well as in reducing the losses they cause.

The methods for diagnosing the clinical inflammatory processes of the mammary gland are indicated, and those that are used to detect subclinical mastitis are listed and analyzed in detail (rapid mastitis test, determination of the total number of somatic cells, determination of the pH and electrical conductivity of the milk secretion, the microbiological examination). Some relatively new methods such as non-contact thermography and ultrasound examination are also described, which still find limited application in the diagnosis of subclinical processes. Attention is also paid to the treatment and prevention measures for inflammatory processes of the mammary gland in sheep.

The analysis of the literature was carried out with a precision showing knowledge of the problem. Based on the analysis of the previous research and the obtained results, a theoretical hypothesis was formulated about the need for a more in-depth study of the problem of subclinical inflammatory processes of the mammary gland in sheep, which allows the author to well argue the development of the chosen topic and accurately determine the direction of the research and the methodology with which to fulfill this, since it is clear from what is indicated in the section that there are many studies already carried out on the subject of the problem, including in our country.

Aim and tasks

The aim is well formulated - to conduct studies on the prevalence of subclinical mastitis in sheep breed for milk, the participation of various microorganisms in the etiology of the disease and their antibiotic sensitivity, changes in the cytological composition and physico-chemical parameters of milk and some of the protective mechanisms of the mammary gland, as well as researching the possibilities of the non-contact thermography method for diagnosing inflammatory processes of the mammary gland. With the implementation of the set 5 tasks, opportunities are sought for clarifying discussion questions of a scientific-applied and applied nature and achieving the intended aim.

Material and methods

This section includes scientific and practical experiments with sheep from 5 farms in 4 regions of our country and laboratory tests of milk from them. The conditions of life, feeding, breeding and milking of the experimental farm animals are indicated. No information is provided as to whether the experimental work with animals was carried out after the approval of the Animal Ethics Committee of the Bulgarian Food Safety Agency.

Seventy-eight sheep were used as experimental animals for the study of subclinical inflammatory processes of the mammary gland, from which 156 milk samples were collected and analyzed for the purposes of the study. Five experimental setups are described, which correspond to the purpose and tasks, as well as the obtaining of milk and blood samples, the use of clinical and laboratory methods for their examination, as well as the performance of non-contact thermography of the mammary gland.

Modern statistical software was applied for data analysis.

Results

The section begins with reported results on the prevalence of subclinical mastitis in dairy sheep in the five sheep farms. Summarizing the results of all the animals studied, the author indicated that 41.03% of the total number of animals studied showed the signs of SCM, and it was found that the prevalence of unilateral mastitis was 24.35% and bilateral - 16.66%. In order to determine the microbial causative agents of subclinical mastitis in sheep and their antibiotic sensitivity, a microbiological examination of the milk samples was carried out. It is noteworthy that the author recalculated the data for animals with the presence of subclinical mastitis, which

was also one of the main remarks when presenting the project for this dissertation to the extended departmental council.

The type and percentage ratio of isolated pathogenic microorganisms compared to all positive samples, as well as their sensitivity to antibacterial agents, were determined. The minimum inhibitory concentrations of antibiotics from different groups were also investigated in relation to the most frequently isolated bacteria.

In order to accurately identify changes in the cytological composition and physicochemical parameters of milk in lactating sheep with subclinical mastitis, a physicochemical and cytological analysis was performed in a reference laboratory. The results of the examination of milk samples from three of the farms showed that no statistically significant differences were observed in the levels of fat, protein, dry matter, dry skimmed residue and freezing point, but only in the number of somatic cells in milk from affected and unaffected milk halves. Similar results were recorded in the remaining two farms, except for a difference in fat percentage in one and protein in the other.

In the specified results of performed hematological tests, it is indicated that the total amount of leukocytes in the blood of animals affected by subclinical mastitis is 18.1% more than in healthy animals, and it is not indicated whether the differences are statistically reliable, as for the presence of such becomes clear in the discussion carried out further back in the dissertation. In the examination of the biochemical indicators of the blood, the author points out reliable differences in relation to γ -globulins.

The results regarding the immunological indicators in healthy and affected sheep with subclinical mastitis show to a large extent the changes that occur both in the blood serum and in the milk secretion after the entry and development of an infectious process in the mammary gland. The existence of reliable differences in the cellular and humoral defense mechanisms of the mammary gland are proof of the significance of the research conducted in this part of the dissertation project.

In the thermographic measurements of the mammary gland, higher values were indicated in the temperature of the mammary gland as a result of the inflammatory process, but there were no reliable differences between healthy and animals affected from subclinical mastitis. A mean difference between mammary surface temperature in affected and unaffected animals of 0.95°C was indicated.

The dissertation contains 14 figures, all of excellent quality, and the research results are summarized in 27 tables.

Discussion of the results

Discussing the prevalence of subclinical mastitis in lactating ewes it is noticeable that the author obtained similar results to previous studies. An attempt was made to determine the influence of breed or milking technology on the prevalence of subclinical mastitis in sheep.

The discussion regarding the characterization of the microbial agents causing subclinical mastitis in sheep and their antibiotic susceptibilities is professionally done, skilfully comparing own results with those of other authors, which once again emphasizes the good literature awareness of the author. Analyzing and comparing the obtained results with the previous studies, the dependence of the number of cellular elements on the health of the mammary gland was clearly established..

The information on the presence of a relationship between the milk halves that reacted positively to CMT and the presence of microbial agents was analyzed, discussing which of the examined animals and with which test result (1, 2 or 3 pluses) had a concomitant microbiological finding. An analysis was performed regarding the physico-chemical parameters of the milk between the different breeds, and correctly it was mainly focused on the changes related to the presence of subclinical inflammatory processes of the mammary gland. The analysis of mammary defense mechanisms in sheep affected and unaffected by subclinical mastitis could serve to develop a basis for programs for the prevention, treatment and control of mastitis in sheep.

Conclusions

The information received from the conducted research was analyzed and based on it, the corresponding 6 conclusions were drawn, which reflect the research work carried out in the development of the dissertation.

Scientific contributions

Three original contributions are listed, followed by four confirmatory contributions, which I accept without exception.

Recommendations for practice

Two practice recommendations are proposed that could be useful in the diagnosis and treatment of subclinical mastitis in sheep..

Publications related to the dissertation

Two publications are indicated, in one of which the author of the dissertation is the lead, and in the second he is an independent author in the journal "Tradition and modernity in veterinary medicine".

Dissertation abstract

The dissertation abstract presented by Aleksandar Stoimenov is in full compliance with the dissertation work, properly structured and prepared according to the requirements of Law of development the academic staff of Republic of Bulgaria.

In conclusion, I consider that the dissertation work meets the requirements of Law of development the academic staff of Republic of Bulgaria its Rules, and based on the highlighted actuality, achieved original and confirmatory contributions, rich literary awareness, appropriate layout and documentation of information, I propose to the scientific jury to award Aleksandar Aleksandrov Stoimenov with educational and scientific degree "Doctor" in field of higher education 6.0 "Agricultural sciences and veterinary medicine", professional field 6.4 "Veterinary medicine", in the scientific specialty "Obstetrics and gynecology of animals and diseases of newborn animals".

20. 12. 2022

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