Veterinary and Sanitary Assessment of Sheep Slaughter Products for Dermatitis

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Abstract. The work is devoted to assessing the quality of livestock slaughter products, taking into account skin diseases of various etiologies. This criterion sometimes makes a significant contribution to the quality of livestock products, so it must be taken into account during veterinary and sanitary examination in laboratories. To assess the state of health and predict changes in the quality of products of the slaughter of sheep, great importance belongs to the study of patterns in the clinical, anamnestic, morphological, metric, and anatomical indicators of the body of the sheep. The use of these patterns and their dynamic changes characteristics helps to find out certain patterns that made it possible to develop several rules for the modern veterinary and sanitary assessment of sheep slaughter products. These rules allow not only to indicate the premisses for the occurrence of dermatitis of various etiologies but also to improve existing developments, as well as improve the quality of preventive remedies to prevent and eliminate these types of diseases. It should also be noted that for the start of preventive steps, the strict observance of elementary rules is important when grazing the number of sheep. This includes their movement in compliance with certain periods, the seasonality of the use of forage land, and the mandatory inspection of the livestock of animals and their parking places. In the case of the detection of infected animals with signs of damage to the skin, the animals are immediately isolated with subsequent diagnosis and treatment.

1. Introduction

Currently, certain regulatory indicators are used in the laboratories of veterinary and sanitary expertise (VSE) to assess the quality of livestock products to obtain approval for sale [1-5].

In these normative indicators, criteria related to the detection of damage to the skin of animals are not used, which often affects the quality of meat products that are approved for processing.

The development of criteria for assessing and predicting the quality of sheep slaughter products under VSE is an urgent and vital problem for science and practice in the field of veterinary medicine. To date, no clear criteria have been developed for assessing the performance of slaughter products for dermatitis of various etiologies, which would characterize certain changes associated with a deterioration in the quality of the products for sale. Therefore, one of the tasks of the VSE is the search for such criteria for
assessing and predicting the quality of slaughter products to detect a slight change in the body from a healthy to a pathological state [6-11].

The determination of the integral characteristics of viability involves the selection of criteria that are significant for assessing. As such, clinical, anamnestic, morphological, metric, anatomical indicators of the animal organism are usually used. But when it comes to assessing and predicting the quality of meat products, it must be remembered that even with insignificant changes in animals there is an increased sensitivity to various kinds of deviations caused by many factors [12].

Various biopsy samples are often used as anamnestic, clinical, and morphometric indicators, in particular, as a universal indicator (blood), which allows one to establish deviations from normative indicators and changes from various vital systems of the body caused by various factors [13-18].

The whole point of the criteria for assessing normative indicators is that they allow predicting the disease even before the appearance of its signs. The main prognostic criterion is the level of adaptive capabilities (adaptive potential) of the body, and its decline is the leading cause of the onset and development of diseases [19].

The classification of the body's stability levels can be divided into individual components:
- satisfactory adaptation to environmental conditions, in which the functional capabilities of the body are sufficient;
- tense state of adaptive mechanisms;
- poor adaptation with reduced functional capabilities of the body;
- failure of adaptation (crash of the adaptation mechanism), characterized by a sharp decrease in the functional capabilities of the body.

Such a classification simultaneously serves as a scale for measuring adaptation potential, which is determined not so much by the level of activity of functional systems as by functional reserves and the degree of tension of regulatory systems.

This work aimed to study the effect of anamnestic, clinical, and morphometric indicators for dermatitis of various etiologies on the veterinary and sanitary indicators of sheep meat production.

2. Materials and methods
Sheep dermatitis was studied in 3 private sector farms in different regions of the Stavropol Territory and the Republic of Dagestan, which were epizootically unfortunate for this disease and in slaughterhouses where culled sheep were slaughtered.

The objects of the study were sheep, with a clinic of skin diseases and the mutton samples taken after the slaughter of sick sheep at the slaughterhouses.

The selection and preparation of meat samples were carried out in accordance with [1, 2].

Laboratory analysis of the selected mutton samples was carried out in the laboratories of the veterinary sanitary examination [3-5, 20-24].

In total, 26 samples of meat and viscera from 8 animals with sheep dermatitis were examined in triplicate. The control was products of the slaughter of 8 healthy sheep, selected similarly to animals with dermatitis.

3. Experimental part
Muscle samples from carcasses and viscera of sheep, sick with dermatitis, who was killed in the initial stage of the disease and after 60 days of the pathological process, were subjected to physico-chemical analysis. Samples of meat and offal of carcasses of clinically healthy sheep, selected by the principle of analogs from the same herd, served as control. In 24 hours after the slaughter of sheep in the initial stage of the disease, the meat pH was 6.12-6.21, and the meat pH of the control animals was 5.87-5.88, that is, 0.22 units lower, indicating a decrease in the meat maturation rate of sick sheep.

Physico-chemical parameters of tissues of viscera (offal) were also determined in sheep killed after 60 days of the course of the disease. The pH values of the tissues of the heart, tongue, liver, kidneys, and lungs had deviations upward to 0.21-0.27. The amount of amino-ammonia nitrogen (AAA) in offal increased by 0.66-1.08 mg% compared with the control.
For clinical, hematological, and biochemical studies, blood from animals was taken from the jugular vein and the number of red blood cells, white blood cells, erythrocyte sedimentation rate, hemoglobin concentration, reserve alkalinity, and total blood serum protein were determined by the conventional method.

In blood serum, the activity of lysozyme, immunoglobulins of classes G and M, and bactericidal activity were investigated [25]. The level of phagocytosis was determined by the modified Leirir method using a suspension of the daily culture of E. coli 0111.

An organoleptic assessment of mutton determined the appearance, color, texture, smell of meat, the state of subcutaneous and bone fat, the condition of tendons, and the quality of the broth after cooking the meat. Quality indicators: appearance, aroma, taste, texture (tenderness, hardness), and juiciness were evaluated on a 9-point scale and according to [3]. The transparency and aroma of the broth were determined according to [1].

In order to assess the quality and nutritional value of sheep meat, the moisture content, protein, fat, ash, and amino acid composition of muscle tissue were determined [4, 5, 26, 27, 20-24].

The moisture content was determined by drying in an oven. The protein content was calculated by the amount of total nitrogen. The amount of fat was determined using ether extraction in a Soxhlet apparatus. The ash content was determined by burning the organic part of the sample of the product and calcining the mineral residue in a muffle furnace at a temperature of 600-800 ° C according to the generally accepted method. The sum of protein, fat, and minerals was subtracted from the dry matter mass and the resulting difference was taken as the mass of extractive (nitrogenous and non-nitrogenous) substances. Sulfate ash was determined by a simplified method.

The amino acid composition of muscle tissue was studied using a Hitachi AAA-881 amino acid analyzer (Czech Republic), voltammetry was used to clarify the amino acid composition. The pH of the meat was measured with a potentiometer (pH meter), as well as indicator papers.

The content of volatile fatty acids was determined by steam stripping in a 2% sulfuric acid solution and subsequent titration of the distillate with alkali (0.1 M sodium or potassium hydroxide solution).

The determination of amino-ammonia nitrogen was carried out by a method based on formol titration of protein breakdown products.

The determination of the water-binding ability of meat was carried out by pressing.

In the boiling sample, the smell of steam was evaluated, paying attention to the transparency of the broth and the state of fat on its surface.

The conducted studies allow us to conclude that meat products can be used in raw form. However, there are diseases caused by dermatitis of various etiologies in which heat treatment is necessary, or processing into feed substrates for animals and birds is recommended. There are several diseases (trichinosis, demodicosis, etc.) in which the meat of slaughtered animals is not allowed for sale and must be disposed of.

In the course of veterinary and sanitary studies of carcasses, a certain regularity, which complements the general picture in the identification and subsequent receipt of admission of slaughtered sheep for meat production was revealed.

4. Practical use of the obtained scientific results

1. To send raw meat and offal of sheep with dermatitis in a raw form for sale in most cases is not allowed since they can be unsafe for consumers by the veterinary-sanitary respect.

2. The meat of unexhausted slaughtered sheep with signs of dermatitis may be used for the production of various meat products with heat treatment.

3. The meat and offal of sheep sick with dermatitis with signs of exhaustion or dystrophy of muscle tissue must be sent for technical disposal or food for animals and poultry after thermal processing.

4. Blood and endocrine-enzymatic raw materials from sheep suffering from dermatitis are not subject to collection for medical purposes.
5. Recommendations for using scientific findings

1. To justify the veterinary and sanitary assessment of the slaughter products of the sheep sick with dermatitis, it is necessary to take into account the microbiological parameters of meat and offal, as they show increased contamination by microorganisms and the presence of coliform bacteria and salmonella in some cases.

2. The research results are recommended for inclusion in the third section of the Rules for Veterinary Inspection of Animals and Veterinary Sanitary Examination of Meat and Meat Products.

6. Conclusions

1. In sheep with dermatitis, the indicators of fatness and slaughter yield of carcasses decrease. According to organoleptic indicators in the initial stage of the disease, the meat of sick sheep had an assessment of 0.05-0.06 points lower, and after 60 days of illness, it was 0.15-0.62 points lower compared to the raw meat of healthy animals. The most pronounced deviations were identified when evaluating the color, aroma, and taste of meat.

2. In the meat of sheep with dermatitis, the content of free moisture increased by 1.12-2.25%, the amount of fat, protein, and extractives decreased by 0.26-0.45%. The number of ash elements was practically no different from the control.

3. According to the physico-chemical properties, the meat of sheep with dermatitis is slightly different from the meat of healthy animals. In the meat of sheep with dermatitis, the pH significantly increases and the water-binding ability decreases, the reaction to peroxidase accelerates. Other indicators did not differ from the control.

4. Morphological parameters of muscles and liver of patients with dermatitis and healthy sheep did not have any visible differences. However, in separate liver samples, stagnation and contamination by microorganisms were noted.

5. Protein-Quality Indicator (PQI) and the Relative Biological Value (RBV) of meat of sheep with dermatitis is lower by 4.88-7.82% in comparison with the meat of healthy animals. At the same time, in meat there is a decrease in the amount of most essential and dispensable amino acids, a deviation of tryptophan to hydroxyproline (PQI), the growth and reproduction of ciliates in the medium with the meat of sick sheep is reduced.

7. References

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