

Changes in quality indicators of meat at sarcocystosis

Goal. To study morphological changes of muscle tissue for sarcocystic invasion. **Methods.** The material for the study is beef (skeletal muscle, liver, heart, kidneys). Methods are pathomorphological.

Results The defeat of cattle with sarcocystosis does not depend on the level of feeding. However, the intensity of sarcoid invasion of the skeletal muscles and the heart of thin animals is significantly higher compared to the second category of fattening beef. In muscle fibers of thin animals affected by sarcocystosis, necrotic processes, thinning of muscle fibers, their fragmentation, absence or weak transversal striation of muscles, destruction or atrophy of muscle fibers in places of sarcocyst placement have been revealed. **Conclusions** The moderate and weak intensity of sarcotism invasion is accompanied by the development of pathological changes in the muscles.

Key words: sarcocystosis, beef, pathomorphological characteristic, meat, invasion, skeletal muscle, heart, liver, kidneys.

Sarcocystosis is a zoonotic disease caused by single-celled organisms belonging to the genus *Sarcocystis*. Definitive hosts of the pathogen are people, dogs, cats and other carnivores, in the intestine of which parasites are formed by oocysts. Intermediate hosts are domestic and wild herbivores and omnivorous animals, in which the muscles form sarcocysts [5].

Illness is detected at any time of the year. Clinical manifestation of the disease and the death of animals affected by sarcocystosis are rarely recorded. Only in the presence of a macrocyst (2 cm and more) during the post-mortem examinations of carcasses and internal organs of animals, you can see the oval, white color with the naked eye neoplasms - "misharovyie sachets" [1].

The main damage to livestock is caused by the latent form of the disease, which is characterized by the development of sarcocysts in the muscles of the skeleton, heart, esophagus, diaphragm [7]. The rules contain requirements for the veterinary and sanitary assessment of carcasses depending on the degree of tissue damage by sarcocystosis. In the case of the appearance of sarcocysts in the muscles, but in the absence of pathological changes in them, carcasses and other products of slaughter are sent for industrial processing.

In the conditions of defeat of carcasses with sarcocysts and the presence of changes in the muscles (exhaustion, gidremia, discoloration, liming of muscle tissue, dystrophic changes), carcasses and organs are utilized. Salty pigs and internal fat, guts and hides of animals of all kinds are used without restriction [4].

Macrocysts can be easily detected visually during a veterinary-sanitary examination of carcasses. In pork carcasses, microcysts are detected during trichinoscopy, and in beef carcasses they are rarely identified. During the slaughter of thin, non-categorical animals, in the absence of macroscopic changes in the carcass and internal organs, and depending on the results of the microbiological study, the carcasses are released after industrial processing and only if necessary carry out histological examination. The presence or absence of sarcocysts in meat is not considered [6, 8, 9, 10].

The purpose of the work is to study the morphological changes of muscle tissue of young livestock of large cattle of the II category of fattening and of lean sarcocystous invasion.

Materials and methods. The research was carried out during 2009-2011. The material for researches was beef grown in the agricultural enterprise "Nadiya" of Stavyschchansky district, OJSC "Zapadinka" of Vasylykivsky district of the Kyiv region. Samples were taken from the beef in category II of feedingstuffs obtained from young cattle with a slaughter weight of 380-430 kg (control) and skinny animals with a

slaughter weight of 140 in the shop of Agrarnik (Bila Tserkva) - 160 kg (experiment). Their skeletal muscles, heart, liver, kidneys were studied in accordance with generally accepted methods [2, 3].

Research results. It was established that the defeat of beef carcasses with sarcocysts does not depend on the level of feeding of animals (tabalica). Sarcocysts are found both in the muscle tissue of the II category of fattening and non-categorical (skinny). However, the intensity of invasion of the skeletal muscles and the heart of the non-hereditary beef was significantly higher than that of the control group. In the slaughter products, a control group of sarcotism was detected (weak invasion - 1-2 sarcocysts in the field of the histopreparatum) in 20% of cases in skeletal muscle and in 10% of cases in the cardiac muscle. In thin animals, muscle sarcocysts for weak in- novation were found to be 60%, and in the middle (3 to 5 sarcocysts in the field of the histopreparatum) in 30% of cases. The intensity of heart muscle damage significantly increased. Middle invasion registered at 10%, and weak - in 20% of cases.

In addition, in a small number of cases (10%) weak liver sarcoidosis (Table) was detected. In the examined beef samples of both groups, macrocytes were detected in 90% of cases, in the rest - microcosts (Fig. 1). In muscle fibers, sarcocysts were in the stage of degeneration. At the same time around the inactivated sarcotism of the inflammatory reaction was not observed, whereas the sarcocysts in the stage of degeneration were surrounded by cell infiltrate (Fig. 2).

Quite often, muscle fibers (4-head muscle) showed focal cell infiltration, which was not associated with the placement of sarcocysts. It is likely that leukocyte infiltration in this case is a consequence of the development of an inflammatory reaction around the cyst, in which parasites died for various reasons.

In the 4-headed muscle of lean beef affected by sarcocystosis, necrotic processes that were manifested by the thinning of fibers were recorded, in many cases, by their fragmentation, absence or smoothness of transverse muscle strain, destruction or muscle atrophy fibers in the places of localization sarcocysts.

The muscle fibers of the middle level of sarcotismic invasion were mostly thickened, they had fuzzy contours and different thicknesses. They swelled, acquired homogeneity and were intensively colored with acid dyes. The nuclei of muscle fibers were then subjected to rexis and lysis.

Significantly affected muscle fibers are unevenly colored, of varying thickness. In some places, they looked like bulbous formations, split into separate fragments and cakes.

Between fading muscle fibers, the accumulation of leukocytes, macrophages and fibroblasts, as well as the formation of connective tissue was observed.

The consequence of invasion of muscle tissue by sarcotism was the development of mucosal dystrophy of intermuscular connective tissue. Swollen connective tissue cells had a round, spindle-shaped or stellate form. Between cellular processes, the accumulation of mucus mass was detected. The connective fibers were in a state of loosening and refinement and were further destroyed.

The histological structure of the cardiac muscle for sarcocystistic invasion is preserved, nuclei are dark-purple, basophilic, and cypress-like. In the muscular bundle between the fibers, they were clearly distinguished by loosening the intermuscular structures. In the cardiac muscle, isolated (in the field of view of about 2) rounded forms and dark blue sarcosites are revealed.

Conclusions

The defeat of cattle with sarcotism does not depend on the level of feeding. However, the intensity of the invasion of the sarcomas of the skeletal muscle and the heart of the skinny animals is much higher than that of the second category of fattening beef. Muscular sarcocysts for weak in- novation were detected in 30%, the average - in 60% of cases. In products of slaughter of the second category of fecundity of sarcocysts, 20% of cases were found in skeletal muscle (weak invasion) and in 10% of cases in the cardiac muscle. In the muscle fibers of thin animals affected by sarcocystosis, non-cerebroscopic processes characterized by the thickening of muscle fibers, in many cases, were fragmentation, lacking or weakly transversal muscle striping, destruction or atrophy of m 'yagovyh fibers in the places of distribution sarcocysts. Medium and weak sarcotic invasion is accompanied by the development of necrotic changes in muscles in the form of fragmentation, lysis of muscle fibers. In the absence of visible changes in the muscle tissue of beef derived from thin animals, a histological study should be conducted to detect sarcotism. In the case of the detection of sarcositis, the carcass and the products of the attack should be sent for industrial

processing (if there is no degenerative changes) or for utilization (in the presence of degenerative changes). Prospects for further research are the study of the nutritional value of slaughter products for sarcocystosis.

Bibliography

1. *Байер Т.В.* Внутриклеточный паразитизм и проблема саркоспоридиоза/Т.В. Байер, А.И. Радченко//Известия РАН. Серия биологическая. — 2001. — № 2. — С. 157 – 164.
2. *Волкова О.В.* Основы гистохимии с гистологической техникой/О.В. Волкова, Ю.К. Елецкий. — М.: Медицина, 1982. — 303 с.
3. *Потоцький М.К.* Методичні вказівки. Основи гістопатологічної техніки/М.К. Потоцький, О.І. Кривутенко. — К.: НАУ, 2006. — 44 с.
4. *Правила* передзабійного ветеринарного огляду тварин і ветеринарно-санітарної експертизи м'яса та м'ясних продуктів, затверджені наказом Державного департаменту ветеринарної медицини України від 07.06.2002 № 28 та зареєстровані у Міністерстві юстиції України 21.06.2002 за № 524/6812. — С. 1 – 6.
5. *Радченко А.И.* Особенности строения и функциональные характеристики клеток в цистах саркоспоридий (буйволы, овцы, мыши)/А.И. Радченко, Т.В. Байер//Цитология. — 2004. — Т. 46. — № 7. — С. 592 – 600.
6. *Al-Hyali N.S.* Fate of macrosarcocyst of *Sarcocystis gigantea* in sheep/N.S. Al Hyali, E.R. Kennany, L.Y. Khalil// Iraqi Journal of Veterinary Sciences. — 2011. — V. 25. — P. 87 – 91.
7. *Chapman I.* Clinical Muscular Sarcocystosis in a Dog/I. Chapman, M. Mense, I.P. Dubey//J. of Parasitology. — 2005. — № 1. — P. 187 – 190.
8. *Kaltungo B.Y.* A Review of Some Protozoan Parasites Causing Infertility in Farm Animals/B.Y. Kaltungo, I.W. Musa//Tropical Medicine. — 2013. — P. 1 – 3.
9. *Prakas P.* Protozoan parasites from genus *Sarcocystis* and their investigations in Lithuania/P. Prakas, D. Butkauskas//Ekologija. — 2012. — V. 58. — P. 45 – 58.
10. *Tappe D.* Human and animal invasive muscular sarcocystosis in Malaysia — recent cases, review and hypotheses/D. Tappe, S. Abdullah//Tropical Biomedicine. — 2013. — V. 30 — P. 355 – 366.