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HISTOLOGY OF MEAT PRODUCTS FROM CATTLE WITH KETOSIS

Abstract. At present, all livestock dairy farms throughout the world suffer from ketosis. Ketosismostly affects-highly-productive animals. Ketosiscausessevere clinical manifestations and sometimes mortality. The productivity of dairy cows with ketosis decreases to the minimum and recovered animals lose their previous productivity.

Key words: ketosis, histology, dystrophia, haemotoxylin eosin, hepatocyte, pathoanatomy.

Introduction. Prevalence of ketosis of dairy cows in the countries of the European Union and in the most widespread control systems of after calving individuals during a transition period till recently remained substantially unexplored, except for the works reporting about the high frequency of occurrence of this pathology and also for the big economic losses of dairy production, related until recently (McKay, 2012).

The recent research conducted from May 2011 till October 2012 in 10 European countries showed that in dairy production the prevalence of cattle`s ketosis, defined as a high concentration of β-hydroxyoleic acid in serum of blood in cows was ranging from 21.8 to 36.6% [1-4].

Frequency of occurrence of level of ketosis at individuals in dairy herd was the lowest in the United Kingdom and Italy (31%) and was much higher in Germany (43%), in the Netherlands (46%) and in France (53%). In five of the studied countries the average value of prevalence of ketosis in herd of young dairy cows in the range of observation from 1 to 3 weeks after calving made 41%, while the observation within 35 days after calving gave the frequency of diagnostics of a clinical stage of ketosis only in 1.6% [5-8].

According to the definition [9, 10] ketosis or the acetonemia is the metabolic disorder which is characterized by abnormal increase in ketone bodies in blood of dairy cows which, usually, happens in the postnatal period, between the 2nd and 6th week after calving. Economic factors of production to the great extent suffer from influence of ketosis, because of the decrease in production of milk, because of the costs of treatment of individuals, because of the increased risk of a susceptibility to other diseases, the decrease in efficiency of reproduction and more other risks [11-13].

In clinical aspect of veterinary science a ketosis in dairy cows, is more often described in scientific publications as subclinical ketosis. The main aspects of a research of ketosis already occur in the scientific periodical press from the beginning of 1950`ies(Holmes, 1950). Later on, because of the increase in productivity and the expansion of production of dairy products this metabolic disorder became more widespread. This led to the appearance of new scientific works [14-20].

Work objective: histology of meat products from cattle with ketosis.

Methods. Meat products of forcibly killed cows were used for histological examination. The sample was takenfrom muscle, liver, kidney and heart of the cow. Obtained samples were put into 10% aqueous solution of 10×10×4 mm of formalin and then painted with hematoxylin eosin using standard method. The microscopy was performed using microscope. The stereometric analysis was carried out using the measuring grid.

Results. According to histology, dystrophic changes of different levels were noted in skeletal muscles, liver, kidneys and heart. Protein and fatty degeneration in liver cells have been identified as stable and consistent. Hepatocytes in histological preparations painted with hematoxylin eosin were in high level and their cytoplasm had small, large empty interspaces.

Hepatic volumes were noted as expanded and rounded, and interspaces in cytoplasm composed large volumetric pores. Such interspaces in some hepatocytes occupied completely all cytoplasm and the cell nucleus shifts to the edge of the cytoplasm. Small vessels are depressed and abnormal. As well as, proliferation of reticuloendothelial and mononuclear macrophage system cells has been constantly noted in all histologic preparations. They were found in reticular and lymphoid forms. Fat pieces in painted preparations were painted in red and brown. In the Schiff (PAS) reaction the amount of glycogen has decreased to the minimum in comparison to control group. The skeletal muscles are thickened at different levels, the horizontal strips are not clearly visible, and sarcoplasm had rounded grains and fat pieces painted with eosin in red. Also, the accumulation of fatty tissue in interstitial tissue caused atrophic compression of meat fibers. In the Schiff (PAS) reaction the amount of glycogen has decreased to the minimum in comparison to control group. The horizontal lines of the heart are almost invisible, and sarcoplasm had rounded grains and fat pieces painted with eosin in red. Also, the accumulation of fatty tissue in interstitial tissue caused atrophic compression of meat fibers. In the Schiff (PAS) reaction the amount of glycogen has decreased to the minimum in comparison to control group.

Dicussion. It was found that all the kidneys under test were damaged. These changes were caused by dystrophy and necrobiosis, as well as reflected as parenchymatous and adipose degenerations in epithelial cells of kidney's vertical holes. Some epithelial cells were destroyed by necrobiosis. Infiltration of polymorphic cells was noted in intermediate connective tissue. In the Schiff (PAS) reaction the amount of glycogen has decreased to the minimum in comparison to control group.

Conclusion. According to histology results, internal organs of dairy cows differed in the presence of parenchymatous, adipose and carbohydrate degenerations.

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