

ECHINOCOCCOSIS INFLUENCE ON BIOLOGICAL AND FOOD VALUE OF BEEF MEAT

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ABSTRACT

In this article we investigated influence of echinococcosis on biological value of beef meat. Investigating chemical meat structure we defined moisture content, protein, fat and ashes. Definition of chemical composition of meat gives the chance to define food value of meat and meat products. Chemical composition of meat depends on structure of forage, fatness, age, sex and species of animal.

For this purpose we used samples of meat of animals selected at slaughter with signs of echinococcosis and from healthy not infected animals. So, according to our researches, in beef meat from healthy animal, content of protein makes 19.6, fat contents 14.65, moisture 64.9, ashes 0.85. Beef meat, infected with echinococcosis, concedes on quality: content of protein 19.14, fat content makes 9.57, moisture 70.17, ashes 1.12. Beef meat, infected with echinococcosis, concedes on quality from meat of healthy animal

KEY WORDS: echinococcosis, beef, meat quality, amino acids, hypostasis.

INTRODUCTION

“New stage of Kazakhstan way - is new problems of strengthening of economy, increase of welfare of people. It is vital for Kazakhstan to find optimum balance between economic successes and providing public benefits”, - exact beginning of the message of the president of Kazakhstan N.A.Nazarbayev to the people in .

In economic situation existing now, attention to the question of increase of efficiency of agricultural animals sharply is brought. One of the directions of this activity is decrease in incidence of cattle with helminthiasis, owing to culling of infected bodies (liver, lungs, etc.), decrease in exit and quality of meat and meat products, dairy efficiency. At the same time it is necessary to note serious danger which the disease represents for health of person therefore echinococcosis is a social and economic problem.

Determination of quality and safety of products of slaughter of clinically healthy cattle and at helminthiasis, in particular — echinococcosis importance has the detection of concentration of connected amino acids in slaughter products.

Echinococcosis is a chronically proceeding illness of all animal species of agricultural and wild animals, and also the person, caused by larval stage of cestode *Echinococcus granulosus*. It is widespread everywhere including Kazakhstan. The activator - echinococcus - represents single-chamber bubble filled with liquid. It is outside covered with a connective tissue capsule from fabric of the owner. The wall of bubble consists from external (cuticular) and internal (germentative) covers. Cuticular cover of milky-white color, at older bubbles it grows turbid and gets yellowish shade. The size of echinococcal bubbles - from millet grain to the head of newborn child.

Meat and other products of slaughter of sick animals in the raw represent health hazard of the person or may cause distribution of infectious diseases among agricultural animals (Shuklin, 2008).

At cattle, echinococcal bubbles meet in lungs, in liver, is more rare in spleen, kidneys, in heart muscles. Bodies of hulks infected with echinococcal bubbles depending on size of

bubbles and their quantity get hilly surface, and from above - opaque gray color. At the veterinary and sanitary examination, internal organs strongly infected with echinococcosis, and also at icteric coloring and exhaustion, carcasses and bodies are utilized. In case of insignificant defeat of carcass and internal organs are let out after cleaning. All seized properties are neutralized as a source of invasion of carnivorous (Servulya, 2009).

The term offered for the first time by Thomas “biological value” (BV) of product characterizes quality of albuminous components and is expressed by degree of delay of nitrogen of food in body of growing animals depending on amino acid structure and other structural features of protein. Thus, it is assumed that value of protein is defined by the contents in it irreplaceable amino acids at enough of replaceable amino acids not to use irreplaceable for consumption in organism of food substances or than more its chemical composition corresponds to a formula of balanced food.

Food value of meat depends from morphological (maintenance of muscular, connecting and fatty fabrics) and chemical composition (content of high-grade and defective proteins, fat, moisture and mineral substances). Assessment of product according to the maintenance of one type of fabrics doesn't give complete idea of its food value.

The purpose of our researches was influence studying of echinococcosis on biological and food value of meat of animals.

MATERIAL AND METHODS

Work was carried out at department “Veterinary sanitary examination and hygiene”, and in “Nutritest” LLP which Founder is JSC “Kazakh Academy of Nutrition” of the Republic of Kazakhstan.

In work we used samples of meat of animals selected at slaughter with signs of echinococcosis (figure 1) and beef meat from healthy animal, as control group. When studying chemical composition of beef meat we defined moisture content, protein, fat and ashes. Amino acid structure determined by amino acid analyzer T-339 (Sarsembayeva, 2005).



Figure 1. Cattle liver, infected with echinococcosis

RESULTS AND DISCUSSION

At strong infection with echinococcosis of skeletal muscles, internal organs, and also skeletal muscles, and also at icteric coloring and exhaustion, carcasses and internal organs are utilized. In case of insignificant infection, carcass and internal organs are let out after cleaning. All seized properties neutralize as a source of invasion of carnivorous. In spite of the fact that meat from all studied carcasses, infected with echinococcosis, is let out without

restrictions, it is impossible to recognize it qualitatively high-grade, free from toxins echinococcus (Zhitenko, 1998).

So, on our researches in beef meat from healthy animal, the content of protein makes 19.6, fat contents 14.65, moisture 64.9, ashes 0.85. Meat of beef, infected with echinococcosis, concedes on quality: content of protein 19.14, fat content 9.57 moisture makes 70.17, ashes 1.12. Received results of research are presented in the table 1.

Carried-out researches showed that besides a big economic damage, echinococcosis causes change of quality of beef meat, reduces its food and flavoring indicators (Pozdnyakov, 1969; Vasilyev, 1975). So, moisture content in meat at infected animals raises for 2%, ashes for 0.1%. Analyzing chemical composition and content of amino acids it is defined by considerable decrease in protein and fat.

Table 1

Chemical composition of beef, infected with echinococcosis

№	Studied meat	Food value, on 100 g				
		Proteins, g	Fats, g	Water, g	Ash, g	Power value of meat on 100 g (kcal)
1	Control group (beef meat from healthy animal)	19.6	14.65	64.9	0.85	185
2	Test group (meat of beef infected with echinococcosis)	19.14	9.57	70.17	1.12	163

Biological and food value of protein depends on content of amino acids in them. We investigated the content of amino acids by chemical methods. Received results of research are presented in tables 2, 3.

Table 2

Content of irreplaceable amino acids in beef meat from healthy and from animals infected with echinococcosis. mg/100 g

№	Studied meat	Irreplaceable amino acids, % to the general protein							
		valine	isoleucine	leucine	lysine	methionine	threonine	tryptophan	phenylalanine
1	Control group (beef meat from healthy animal)	1100	862	1657	1672	515	859	228	803
2	Test group (meat of beef infected with echinococcosis)	1042	814	1574	1589	482	811	208	758

Table 3

Content of replaceable amino acids in beef meat from healthy and from animals infected with echinococcosis. mg/100g

№	Meat	replaceable amino acids, % to the general protein										
		alanine	arginine	aspartic acid	histidine	glycine	glutamic	hydroxyproline	proline	Seripn	tyrosine	cystine
1	Control group (beef meat from healthy animal)	1153	1083	1904	718	986	3310	350	859	882	699	296
2	Test group (meat of beef infected with echinococcosis)	1113	1046	1831	697	953	3175	345	833	843	668	283

Studies have shown that amino acid content in meat of animals infected with echinococcosis significantly lower compared with from healthy animals. Essential amino acids in meat of healthy animals valine-1100, isoleucine-862, leucine-1675-1672 lysine, methionine-515, threonine-859, tryptophan-228, phenylalanine-803. Indicators of essential amino acids from the experimental group, beef infected with echinococcosis concede that can be seen on the following parameters, valine-1042, isoleucine-814, leucine-1574-1589 lysine, methionine-482, threonine-811, tryptophan-208, phenylalanine-758

Content of essential amino acids in healthy animal is alanine-1153, Arg-1083, Asp-1904, histidine-718, glycine-986, glutamic acid-3310, hydroxyproline-350, proline 859, serine-882, tyrosine-699, cystine -296. Indicators of replaceable amino acids in beef meat of animal infected with echinococcosis concede alanine-1113, arginine-1046, aspartic acid-1831, histidine-697, glycine-953, glutamic acid-3175, hydroxyproline-345, proline 833, serine 843, tyrosine 668, and cystine-283.

Obtained data confirmed that carcasses infected with echinococcosis considerably influences on the quality of meat. Increases content of water and ashes, reduces maintenance of protein and fat. We convinced also that content of irreplaceable and replaceable amino acids considerably goes down.

CONCLUSIONS

In the researches carried out by us in beef meat from healthy animal the content of protein 19.6, fat content 14.65, moisture makes 64.9, ashes 0.85. Meat of beef, infected with echinococcosis, concedes on quality from meat of beef of healthy animal. Moisture content makes protein 19.14, fat contents 9.57, moisture makes 70.17, ashes -1.12.

We convinced also that content of irreplaceable and replaceable amino acids in meat infected with echinococcosis considerably goes down.

In spite of the fact that meat from all studied carcasses, infected with echinococcosis, are let out without restrictions, it is impossible to recognize it qualitatively high-grade, free from toxins of echinococcus. Decrease in concentration of connected amino acids as a part of meat of animals at echinococcosis testifies to destructive processes that lead to deterioration of

products of slaughter of animals. In this regard it is necessary to direct on technical utilization not only the infected organ as it is specified in legislative and regulations of veterinary and sanitary examination, but also other internal organs. Thus it is necessary to direct carcasses on industrial processing (manufacturing of boiled and boiled and smoked sausages).

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