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THE AMINO ACID COMPOSITION OF CAMEL MEAT

Abstract. The chemical composition of camel meat and amino acid content in the muscle tissue of camel meat of Almaty region were studied. The comparative assessment of biological value of meat is given, the speed of amino acids of protein is defined. There are some differences on chemical composition and caloric content camel meat from beef meat. The ratio of essential amino acids to nonessential amino acids in camel meat was 10 % higher than in beef meat.However, the ratio of tryptophan to hydroxyproline in beef protein is 22.8% compared to camel meat.On the basis of the obtained data, it was concluded that the chemical composition of camel meat, determined the high protein content, including essential amino acids.

Key words: camel, amino acids, biological value.

Introduction. Camel breeding in Kazakhstan occupies a leading position among other sectors of agricultural production, providing the population with valuable food, milk and dietary meat, and the population - an important raw material (wool, skin, etc.). The rate of development of camel breeding in our country in recent years shows the development of the livestock industry. Camel meat has become in great demand among the local population in the Western and Southern regions, where camel farms predominate and account for a large share of consumption. In this regard, the most economically justified further increase in the production of camel meat. The carried out researches of chemical composition of camel meat, a number of domestic and foreign scientists, showed that camel meat contains all necessary substances for a high-grade food of the person, it is a source of the main nutrients (proteins, animal fats and minerals) which are presented in it in the most optimum quantitative ratio and are easily acquired by a human body. The greatest value for consumers of camel meat are proteins, consisting of non-essential and essential amino acids. The amount of various essential and non-essential amino acids in proteins of any kind of meat determines its nutritional value and biological value. The high biological significance of essential amino acids is that they are involved in the synthesis of tissue cells and perform a number of special functions in the human body. The most important of them are lysine, leucine, isoleucine, valine, tryptophan, etc. [1].

In practice, the usefulness of muscle proteins or protein-quality indicator (PQI) is determined by the ratio of amino acids such as tryptophan (from the group of essential) and hydroxyproline (from the group of non-essential). Tryptophan is found only in high-grade proteins, oxyproline is more in connective tissue proteins. Itis believed that the higher the ratio of tryptophan to hydroxyproline, the higher the biological value of meat proteins. The ratio of tryptophan to hydroxyproline in the muscle tissue of camel meat can be up to 3.5.In relation to tryptophan to hydroxyproline, that is, full-fledged proteins to defective, camel meat is superior to the meat of other farm animals [2, 3].

Objects and methods of research. The objects of research were the muscle tissue of camel and beef meat from farms of Almaty region. The biochemical composition of the samples was studied in the analytical research laboratory of the University of Putra Malaysia. The mass fraction of moisture was determined in the laboratory of the Kazakhstan-Japan Innovation Center (KazNAU), by drying the sample according to GOST 9793-74. Mass fraction of protein - Kjeldahl photometric method according to GOST 25011-81.Mass fraction of fat - using extraction to conventional Soxhlet extractions according to GOST 23042-86. Mass fraction of ash - by the method of ash (burning) samples according to GOST R 53642-2009.

Results and discussion. Studies have shown that the organoleptic characteristics of camel and beef meat has no significant differences. Chemical composition and caloric value of camel meat had a certain difference from beef. Differences in moisture, protein and fat content, as well as in the caloric content of camel meat in comparison with beef meat were revealed. These data are presented in the table. 1. There was an increase in moisture content in camel meat by 5.65% and protein by 1.61% compared to beef, but it revealed a decrease in the amount of fat by 36%. The energy value of camel meat in relation to beef decreased by 22.53 kcal or 115.19 Kj (14.67%). In our opinion, such a decrease in the caloric content of the meat of prototypes is associated with a decrease in the fat content and an increase in the amount of moisture.

Table 1 – Chemical composition and caloric content of meat

Indicators	Camel meat	Beef meat
Moisture, %	71,81± 0,51	67,75± 0,20
Fat, %	7,94± 0,62	12,41± 0,51
Protein, %	19,23± 0,42	18,92 ± 0,32
Ash, %	1,24 ± 0,17	1,00 ± 0,02
Nitrogen-free substances	0,21	0,23
Calorific Value, Kcal	160,07 ± 0,5	187,60 ± 0,3
Calorific Value, Kj	669,73± 0,2	784,92± 0,1

In the study of the amino acid composition of the muscle tissue of camel and beef meat, we have determined the content of 19 amino acids, 8 of which are essential. These data are presented in table 2. From the data obtained it can be seen that in camel meat in comparison with beef meat there is an increase in the content of certain essential amino acids: valine - 90 mg/100 g (7.7%), lysine - 373 mg/100 g (19.1%), methionine - 87 mg/100 g (16.8%), tryptophan - 81 mg/100 g (27.8%). The content of leucine, threonine and phenylalanine is lower by 14.3, 3.3 and 5.0%, respectively. However, the average amount of essential amino acids increased by 631 mg / 100 g or 8.12%.

In the group of interchangeable amino acids there was a slight increase in the content of arginine, histidine, glycine, serine, and no cystine. At the same time, the amount of non-essential amino acids decreased only by 267 mg/100 g, or 2.36%. The ratio of essential amino acids to interchangeable in camel meat was 0.7, in beef meat-0.63, or 10% higher. For a more complete assessment of the biological value of camel meat on the amino acid composition was determined by the ratio of tryptophan (indicator of the content of full muscle proteins) to hydroxyproline (indicator of defective connective proteins).In camel meat this ratio was equal to 3.16, and in beef-0.72, or 77.2% higher, which indicates a significantly high nutritional and consumer properties of camel meat.

Table 2 – Amino acid composition of white meat, mg/100 g

Name	Camel meat	Beef meat
Essential amino acids	**7768±0,1**	**7137± 0,1**
Valine	1124±0,1	1034 ±0,1
Isoleucine	798±0,2	782±0,3
Leucine	1523± 0,02	1778 ± 1,1
Lysine	1961± 0,1	1588 ± 0,4
Methionine	532± 0,2	445 ± 0,4
Threonine	781± 0,1	808 ± 0,7
Tryptophan	291± 0,01	210 ± 0,01
Phenylalanine	758± 0,07	798 ± 0,06
Non-essential amino acids	**11025± 0,1**	**11292± 0,1**
Alanine	895±0,04	1086 ± 0,7
Arginine	1673± 0,2	1034 ± 0,1
Aspartic acid	1697± 0,1	1771±0,1
Histidine	736± 0,04	710 ± 0,5
Glycine	1078± 0,1	997 ±0,1
Glutamic acid	2863± 0,2	3073 ±0,1
Oxyproline	92±0,02	290±0,1
Proline	568± 0,01	685 ± 0,1
Serine	798± 0,03	780 ± 0,3
Tyrosine	625± 0,05	658±0,7
Cystine	0,001	259 ± 0,1
Ratio of essential to non-essential amino acids	0,70	0,63
Protein-quality indicator	3,16	0,72

Conclusion. Analyzing the data obtained, we can conclude that the biological value of camel meat is much higher compared to beef.

Camel meat increases moisture content by 5.65% and protein by 1.61%, compared with beef, but it revealed a decrease in the amount of fat by 36%.Reducing the caloric content of meat meets the wishes of consumers and can increase the demand for dietary products from camel meat.In the amino acid composition of camel meat, there are also positive changes that increase the biological value of meat, as the amount of essential amino acids increases by 8.12% and the amount of interchangeable ones decreases by 2.36%.The ratio of essential to non-essential amino acids in camel meat was 0.70, in beef meat-10% lower.The ratio of tryptophan to hydroxyproline (PQI) in camel meat was 3.16, in beef meat - 0.72, that is 23.6% higher, which indicates the prospect of processing camel meat for the production of dietary meat products.

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ТҮЙЕЕТТІНІҢ АМИН ҚЫШҚЫЛДАРЫНЫҢ ҚҰРАМЫН ЗЕРТТЕУ

Аннотация. Түйе етінің химиялық құрамы және Алматы облысындағы түйе тұқымдас бұлшық еттінін деаминқышқылдардың мөлшері зерттелді. Ет биологиялық құндылығына салыстырмалы баға берілді, ақуыздың аминқышқылдарының скоры анықталды.Түйе етінің сиыр етінен химиялық құрамы мен калориялығы кейбір айырмашылықтар табылды.Негізгі амин қышқылдарының түйе етіне шаққандағы мөлшеріне сиыр етіне қарағанда 10% жоғары болды.Сонымен бірге сиыр етінің ақуызын датриптофанның оксипролинге қатынасы 22%-ды құрайды, түйе етіне қатысты. Алынған мәліметтерге сүйенсек, түйе етінің химиялық құрамында маңызды аминқышқылдарды және жоғары ақуыз мөлшері анықталды.

Түйін сөздер: түйе етті, аминқышқылдар, скор,биологиялық құндылығы.

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ИССЛЕДОВАНИЕ АМИНОКИСЛОТНОГО СОСТАВА ВЕРБЛЮЖЬЕГО МЯСА

Аннотация. Изучены химический состав верблюжьего мяса и содержание аминокислот в мышечной ткани верблюжатины Алматинского региона. Дана сравнительная оценка биологической ценности мяса, определен скор аминокислот белка. По химическому составу и калорийности верблюжье мясо, имело некоторые отличия от говяжьего мяса. Отношение суммы незаменимых аминокислот к заменимым в верблюжьем мясе составило на 10 % выше, чем в говяжьем мясе. Вместе с тем отношение триптофана к оксипролину в белке говяжьего мяса составляет22,8%, по отношению к верблюжьему мясу. На основании полученных данных сделаны выводы, что в химическом составе верблюжьего мяса, определено высокое содержание белка, в том числе незаменимых аминокислот.

Ключевые слова: верблюжатина, аминокислоты, скор, биологическая ценность.

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