

## SEASONAL VARIATIONS IN THE BIOCHEMICAL COMPOSITION OF RABBIT MEAT

Ludmila Tarasenko<sup>1\*</sup>, Olha Piven<sup>1</sup>, Maria Khimich<sup>1</sup>

<sup>1</sup>Odessa State Agrarian University, Ukraine

### Abstract

*The results of monitoring of seasonal variations in biochemical composition of rabbit meat, which is implemented on agrofood markets of Odessa region are given in the article.*

*It is established that the rabbit meat which is implemented on spring-summer period is characterized by more pronounced dietary properties. In particular, by 5.6 % less than in the autumn-winter period by the content of proteins, by 36 % lower fat content and by 9.1 % lower ash content. Accordingly the moisture content in it is higher by 5.8 %. In autumn-winter period the rabbit meat which implemented on agrofood markets of Odessa is characterized by higher fat content –  $8.6 \pm 0.5$  %, protein content  $17.8 \pm 0.5$  %, water –  $72.5 \pm 0.3$  %, ash –  $1.1 \pm 0.5$  %.*

**Key words:** ash, biochemical composition, fats, proteins, rabbit meat

### INTRODUCTION

Rabbit meat, as a dietary product, is used by people of all ages. It is very juicy, low-fat and contains a large amount of high-grade protein, second only to turkey, reminds of chicken meat [2, 15].

The meat of young rabbits contain 73.1–73.3 % of total humidity. This is less than in the meat of other feature. So it is not surprising that in most countries, for example in France and Italy, rabbit meat is the most common meat product. Moreover, as the first in the life meat for children doctors recommend rabbit meat [9, 10, 13].

In general according the chemical characteristics in rabbit meat are high protein content (15–19 %), low fat (5–6 %), extractive substances, cholesterol and high content of lecithin [1]. The chemical composition of the meat of rabbits depends to a large extent on the age and breed of animals, the direction of productivity, varies from the level of feed, nutrition and the exchange energy in it [3, 5]. The acidity (pH) of meat depends on the genotype, sex, age, weight, type of nutrition and technological types of animal maintenance [6].

In the protein of meat of rabbit 19 amino acids are found including all the irreplaceable. Most of all in the rabbit meat contains the irreplaceable amino acid – lysine – 10.43 %, methionine and tryptophan respectively – 2.37 and 1.55 %. In addition, the meat productivity of rabbits has a correlation with respect to the age of rabbits, but the effect of the age of animals on the amino acid is not significant [14].

At the same time with high content of high-grade protein, rabbit meat has a low calorie content. If the rabbit meat contains an average of 168 kcal, than in beef – 274–335 kcal, in mutton – 319 and in pork – 389 kcal [11].

The meat of rabbits is also able to excrete radionuclides from the human body. In the opinion of nutritionists, the systematic use of rabbit meat helps normalize fat metabolism, maintaining the optimal balance of nutrients in the body. In connection with this this rabbit meat is prescribed to patients with a lack of digestive juices, gastritis, peptic ulcer of stomach and duodenum, colitis and enterocolitis, liver and biliary tract diseases, hypertension, atherosclerosis, heart and kidney diseases, diabetes [4, 7, 8, 12].

The goal was set for us to determine in what way the biochemical composition of rabbit meat which is realized to the population throughout the year in the condition of the Odessa region is changing.

\*Corresponding author: tarasenkola1965@gmail.com

The manuscript was received: 05.09.2018

Accepted for publication: 14.04.2019

## MATERIAL AND METHODS

Research of rabbit meat was conducted on the basis of a multidisciplinary laboratory of veterinary medicine of Odessa State Agrarian University.

We studied the biochemical composition of rabbit meat from animals 4<sup>th</sup> months of age in the autumn-winter and spring-summer periods during 2016–2017.

The biochemical composition of rabbit meat (the percentage of water, protein, fat, ash, carbohydrates) was determined with the help of a device FoodScan.

## RESULTS AND DISCUSSION

The biochemical composition of rabbit meat can vary depending on the type of content, feeding, breed, season according to the published data. It is obvious that in each region, territory the average levels of protein, fat, carbohydrate, water and ash content will differ.

Therefore, we monitored the biochemical composition of rabbit meat, which is sold in the markets of Odessa in order to establish its value in the autumn-winter and spring-summer periods. The results of monitoring conducted in the autumn-winter period are presented in table 1.

Table 1 Biochemical composition of rabbits meat that implemented on agrofood markets of Odessa in summer-spring period during 2016–2017 (n=54, M±m)

№ of sample	Indexes, %				
	proteins	fats	carbohydrates	water	ash
1	18.2±0.6	8.3±0.5	-	72.4±0.3	1.1±0.4
2	19.4±0.4	11.1±0.7	-	68.4±0.5	1.1±0.7
3	17.5±0.3	7.0±0.4	-	74.3±0.5	1.2±0.6
4	17.3±0.7	8.3±0.4	-	73.5±0.3	0.9±0.6
5	18.4±0.3	10.2±0.6	-	70.4±0.2	1.0±0.4
6	16.1±0.5	6.4±0.4	-	76.3±0.2	1.2±0.2
Average value	17.8±0.5	8.6±0.5	-	72.5±0.3	1.1±0.5

According to the data obtained in the autumn-winter period, the average protein content in meat of rabbit was 17.8±0.5 %. Meat was characterized by high fat content – the fat content was 8.6±0.5 %. Water was

72.5±0.3 %, carbohydrates were absent. Ash was 1.1±0.5 %.

The results of monitoring of biochemical composition of rabbit meat conducted in the spring-summer period were slightly different. Their indicators are displayed in the table 2.

Table 2 Biochemical composition of rabbits meat that implemented on agrofood markets of Odessa in spring-summer period during 2016–2017 (n=76, M±m)

№ of sample	Indexes, %				
	proteins	fats	carbohydrates	water	ash
1	18.1±0.3	5.1±0.4	-	76.0±0.3	0.8±0.3
2	16.3±0.3	5.3±0.5	-	77.5±0.3	0.9±0.5
3	18.2±0.2	4.8±0.5	-	76.0±0.4	1.0±0.3
4	15.5±0.5	6.2±0.5	-	77.3±0.5	1.0±0.3
5	15.7±0.3	5.6±0.3	-	77.6±0.2	1.1±0.4
6	17.2±0.4	6.1±0.4	-	75.5±0.4	1.2±0.2
Average value	16.8±0.3	5.5±0.4	-	76.7±0.4	1.0±0.3

The average protein content in rabbit meat was 16.8±0.3 % in spring-summer period. This is less in comparison with the autumn-winter indicator by 5.6 %. The rabbit meat was characterized by a lower fat content – 5.5±0.4%. This is less in comparison with

the autumn-winter index by 36 %. Increased water content relative to the winter by 5.8 %. It was 76.7±0.4%. Ash content was 1.0±0.3%. This is less than in winter by 9.1%.

Seasonal variations of biochemical composition of rabbit meat are shown on figure 1.

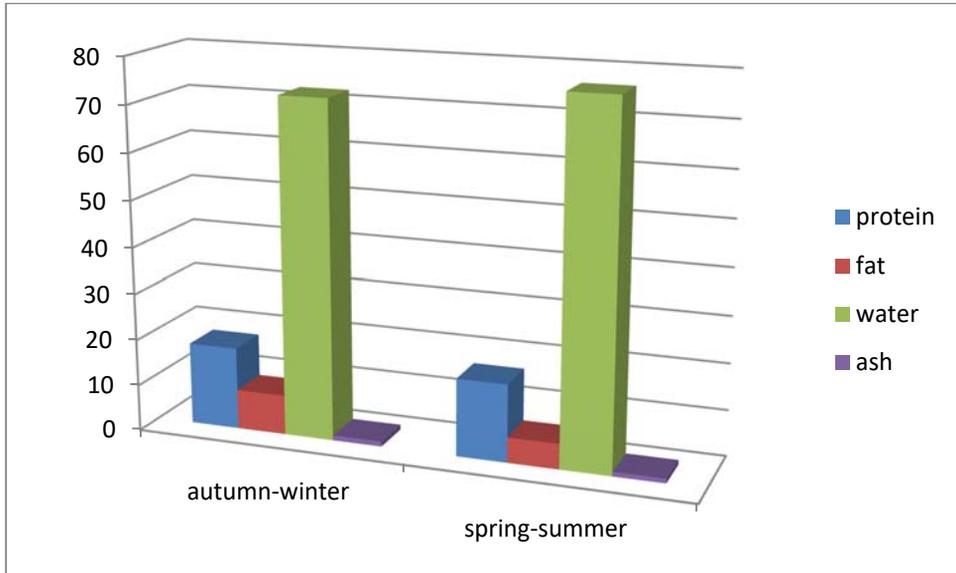


Fig. 1 Rabbit meat seasonal fluctuation of biochemical content during 2016–2017

It can be seen that on the whole fluctuations in the biochemical composition were insignificant in the autumn-winter and spring-summer periods. The content of proteins and ash varied insignificantly. In the spring-summer period there was a pronounced increase in water content and a decrease in the percentage of fat. Accordingly, we can conclude that in connection with the decrease in fat content in rabbit meat its energy value has decreased in direct proportion. So the rabbit meat that is marketed in the spring is properties compared to meat that is sold in winter.

Thus, the monitoring of the biochemical composition of rabbit meat during the autumn-winter and spring-summer periods made it possible to conclude that meat in winter is characterized by higher fat content ( $8.6 \pm 0.5$  % against  $5.5 \pm 0.4$  % in the spring), lower water content ( $72.5 \pm 0.3$  % against  $76.7 \pm 0.4$  % in the spring) and a higher percentage of proteins ( $17.8 \pm 0.5$  % against  $16.8 \pm 0.3$  % in the spring). This indicates its higher energy value in winter and more pronounced dietary properties in the spring.

## CONCLUSIONS

1. Rabbit meat is the valuable dietary product. Its biochemical composition fluctuates throughout the year and also depends on the breed, the conditions of keeping and feeding the region and many other factors.

2. Rabbit meat that is sold in agrofood markets of Odessa in autumn-winter period is characterized by higher fat content -  $8.6 \pm 0.5$ %, protein -  $17.8 \pm 0.5$  %, water -  $72.5 \pm 0.3$  %, ash -  $1.1 \pm 0.5$  %.

3. Rabbit meat that is sold on agrofood markets of Odessa in spring-summer period is characterized by 5.6 % less than in the autumn-winter period protein content, 36 % less fat content and 9.1% less ash content. Accordingly the moisture content in it is increased by 5.8 %.

4. Rabbit meat that is sold on the market in spring-summer period is characterized by more pronounced dietary properties compared to meat that is sold in the autumn-winter period.

## REFERENCES

- [1] Alekseev A. Industrial rabbit breeding – information for consideration / A. Alekseev // Effective livestock breeding. – 2012. - № 1. – P. 40-42.
- [2] Andreev S. Promising branch of rabbit breeding / S. Andreev, I. Ignatenko // Cattle breeding in Russia. – 2007. - № 10. – P. 9-10.
- [3] Dynamics of live weight of rabbit on fattening with the use of microelement additives / I. V. Levitsky [et al.] // Col. of Sci. Papers of Vinnitsya National Agrarian University : Agricultural Sci. – 2010. – Vol. 4(44). – P. 108-110.
- [4] Zalipuchin O. D. Accumulation of strontium in the body of rabbit under the action of calcium phosphate / O. D. Zalipuchin // Sci. Bull. of the National Univ. of Bioresources and Nature Management of Ukraine. – 2010. – Vol. 151. – P. 82-86.
- [5] Ibatullin I. Indicators of slaughter and chemical composition of the muscles of rabbits at different sources of chromium in combifed / I. Ibatulin, K. Machno // Cattle breeding of Ukraine. – 2014. – Vol.5. – P. 35-39.
- [6] Ignatovska M. Fatty acid composition of muscle tissue of rabbits under the influence of vitamin E in micellar carriers / M. Ignatovska // Cattle Breeding of Ukraine. – 2014. – Vol.5. – P. 40-43.
- [7] Korzun V. N. Problems of nutrition in the current environmental situation / V. N. Korzun, V. S. Mychailovsky, A. M. Parau // Problems of Nutrition of population : All-Ukrainian Sci.-Pract. Conf. [materials]. – Poltava, 2003. – P. 138-142.
- [8] Kotelevych V. A. Concerning the benefit of rabbit for the population in the changed ecological conditions of the Polesie region / V. A. Kotelevych, V.S. Fedotov // Billeyin of the State Agroecological Univ. – 2007. – Vol. 2(19). – P. 30-33.
- [9] Kotsubenko G. Obtaining an ecological rabbit meat : delicious and profitable / G. Kotsubenko // Food Industry of AIC. – 2011. – Vol. 5. – P 29-32.
- [10] Kotsubenko G. The prospect of creating highly productive rabbit farms // Cattle Breeding of Ukraine. – 2004. – Vol.4. – P. 5-6.
- [11] Kotsubenko G. Technology of cultivation and productive qualities and composition of meat of rabbits / G. Kotsubenko // Cattle Breeding of Ukraine. – 2011. – Vol.9. – P. 2-5.
- [12] Piskovy J. Ecological monitoring of accumulation of radionuclides of CS-137 in rabbit meat // J. Piskovy // Cattle Breeding of Ukraine. – 2010. – Vol.2. – P. 2-4.
- [13] Plotnikov V. G. On the development trends of rabbit breeding in the world / V. G. Plotnikov // Rabbit Breeding and Fur Farming. – 2003. – Vol.2. – P. 13-15.
- [14] Foster M. Australian farmed rabbit – prospects for industry development publication / M. Foster. – R/RDC Profect ABA, 2008. – 40 p.
- [15] Harriman M. House rabbit handbook : how to live with an urban rabbit / M. Harriman. – Drollery press, 2005. – 95 p.