

UNIVERZITET U KRAGUJEVCU  
AGRONOMSKI FAKULTET U ČAČKU



UNIVERSITY OF KRAGUJEVAC  
FACULTY OF AGRONOMY CACAK

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# **XVII SAVETOVANJE O BIOTEHNOLOGIJI**

sa međunarodnim učešćem  
- ZBORNIK RADOVA -



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# PHYSIOCHEMICAL CHARACTERISTIC OF GOAT MEAT ACCORDING TO BREED AND FINISHING SYSTEM

*Elena Joševska, M. Stojanovski, A. Kuzelov, Marijana Radevska*

**Abstract:** The aim of this study was to determine the physiochemical characteristic of goat meat according to breed and finishing system. A group of twenty two kids from two breed's Alpine and Domestic Balkan goat were used. Finishing systems were: group 1- goat kids with their mothers in pasture and group 2 - weaned goat kids in pasture. Results of chemical composition for percentages of moisture, protein, and ash were influenced by the finishing system. According to results for tissue composition, the differences indicate that breed and finishing systems has an impact on the tissue composition of kid's meat.

**Key words:** chemical composition, kids, breed, finishing system

## Introduction

Kid's meat lately occupies an important place in the diet of the population, due to its high biological value. Interest in the production of meat comes from expressed fertility of goats. The Republic of Macedonia continued to dominate in the breed structure of the domestic Balkan goats (80%). There are also a large number of strains of Balkan goats, crossbreeds of different breeds, as well as crossbreeds of Balkan goats and noble breed.

In order to maintain high production and a high quality final product, a strategy of our country would be exploring genetic diversity of goat species. Breeds with potential to increase profitability are those with heavier weights at maturity and genetic propensity for meat production, (Rodrigues et al., 2011).

It is well known that goat race can have a significant effect on meat quality (Dhanda et al., 2003). In addition to breed, animal performance and meat quality can be affected by the feeding system (Titi et al., 2000).

Finishing systems in cattle have been extensively studied over the years with varied results on carcass traits and meat quality. Many studies have compared the meat tenderness and color of animals from extensive systems to those fed concentrated diet (French et al., 2000).

The objective of this study was to determine the influence of race and finishing system on physiochemical characteristics of kid's meat.

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## Material and methods

Investigations were conducted in villages in the municipality of Bitola in the Republic of Macedonia in different flocks of goat private breeders.

As a material used for testing was 10 male kids from domestic Balkan goats and 12 male kids from F<sub>1</sub> crossbreeds between domestic Balkan breed and Alpine breed, average age of 114 days prior to slaughtering. Kids were reared with their mothers to weaning (60 days, approximately), and then fed *ad libitum* with hay and concentrate. After 60 days of age, they were divided into two finishing systems: group 1- goat kids with their mothers in pasture and group 2 - weaned goat kids in pasture.

Slaughter was performed with classical method of treatment: bleeding, separation of the skin and the lower parts of feet, extracting intestines. Carcasses were cut into sides along the spine according to Rulebook on quality of meat from slaughter livestock, poultry and wild game (*Official Gazette of R.M., No. 29/74*). Three rib cut, which included 9<sup>th</sup>, 10<sup>th</sup> and 11<sup>th</sup> rib, was separated from the back, and dissected in order to separate tissues, muscle, fat, and bone tissues. The pH was evaluated immediately after slaughter (pH<sub>1</sub>) and 24<sup>h</sup> (pH<sub>2</sub>) postmortem in the MLD (*musculus longissimus dorsi*) between 13<sup>th</sup> and 14<sup>th</sup> rib, using a pH meter, model "testo" 205. The chemical composition was determined using the procedures described by Official Methods of Analysis, AOAC (1995). The obtained results were verified statistically by t-test using STATISTICA 6.0 PL software (2002).

## Results and discussion

The effects of breed and finishing systems, on parameters of chemical composition and pH of goat kids are shown in Table 1.

Table 1. Chemical composition of complete diet

	Parameters (%)					pH
	Moisture	Protein	Fat	Ash	Carbohydrates	
Breeds	Indicator LSM					
Kids from F <sub>1</sub> crossbreeds between domestic Balkan breed and Alpine breed,	73.85	19.81	5.43	0.82	0.09	5.76
Kids from Balkan goats	74.61	20.92	3.29	1.07	0.11	5.90
Finishing systems	Indicator LSM					
G-1 goat kids with their mothers in pasture	75.55	20.60	5.55	0.84	0.09	6.24
G-2 weaned goat kids in pasture.	74.43	21.34	3.43	1.07	0.11	6.37

\*LSM-last squares means for chemical composition of complete diet

Moisture percentage varied (73.85 - 74.61%) Table. 1, which is in agreement with the results found Rodrigues et al.(2011); Dhanda, Taylor and Murray (2003). According to Lawrie (2005), the least understood intrinsic factor that affects muscle constitution is individual variation between animals. Even between animals of same sex, considerable differences are found in moisture percentages and intramuscular fat. Kids from Balkan goats presented higher percentage of fat of 2.14% compared with kids from F<sub>1</sub> crossbreeds between domestic Balkan breed and Alpine breed. *Longissimus dorsi* muscle from group 2 (weaned goat kids in pasture), had higher percentage of crude protein compared with that of kids of group 1. These results indicate that weaned goat kids depositing more muscular protein. Ash percentage varied (0.82 - 1.07 %) among the finishing systems. Feedlot kid goats had a higher value for ash compared with kid goats finished on pasture due to low moisture percentage and, consequently, higher protein and fat percentages.

The mean pH values of meat from bought breed (5.76 - 5.90) and pH values of meat from finishing system (6.24 – 6.37) considered optimal for high-quality goat meat (Dhanda et al.,2003).

Table 2. Share and ratio of tissues in three rib cut of kids

Parameters	Muscle tissue (%)	Bone tissue (%)	Fat tissue (%)
<b>Race</b>			
Kids from F <sub>1</sub> crossbreeds between domestic Balkan breed and Alpine breed,	55.27	26.54	18.19
Kids from Balkan goats	49.46	33.19	17.35
<b>Finishing systems</b>			
G-1 goat kids with their mothers in pasture	54.32	26.54	19.11
G-2 weaned goat kids in pasture	48.23	33.19	18.29

In our investigation determined value of muscle tissue from F<sub>1</sub> crossbreeds between domestic Balkan breed and Alpine breed was 55.27% and 49.46 % of the domestic Balkan goat kids. According to finishing system the value of muscle tissue from G-1 was 54.32 %, which is higher than the G-2 48.23 %. The difference of 5.81 % occurs in bone tissue, or 6.65% of fat in favor alpina kids and 6.45 % of fat in favor of G-1. These differences indicate that breed and finishing systems has an impact on the tissue composition of kid's meat. Our results are nearly identical with the results of which indicate (Mioč,1998) of 57.5%, for alpina kids, and (Živković and Knežević, 1991) of 50.1% of muscle tissue (Memiši et al., 2004) of 58.26 %, 45.23 % for Balkan kids.

### Conclusion

Based on test results set from the physiochemical characteristic of kid's meat according to race and finishing system can perform the following conclusions:

The chemical composition of the LD muscle was significantly affected by breed. However, results suggest that decreasing the slaughter weight from 12 to 10 kg for kids reared with their mothers does not have negative effects on meat quality.

The mean pH values of meat from bought breed (5.76 - 5.90) and pH values of meat from finishing system (6.24 - 6.37) considered optimal for high-quality goat meat.

F<sub>1</sub> crossbreeds between domestic Balkan breed and Alpine breed were higher proportion of meat (muscle tissue) from the domestic Balkan kids (55.57 % : 49.46 %) and adipose tissue (18.19 % : 17.35 %).

Therefore, in the circumstances of the study, breed and extensive production finishing system without dietary supplementation, does not justify slaughtering the kids with more than 60 days old.

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