

Electronic Journal of Polish Agricultural Universities is the very first Polish scientific journal published exclusively on the Internet, founded on January 1, 1998 by the following agricultural universities and higher schools of agriculture: University of Technology and Agriculture of Bydgoszcz, Agricultural University of Cracow, Agricultural University of Lublin, Agricultural University of Poznań, Higher School of Agriculture and Teacher Training Siedlce, Agricultural University of Szczecin, and Agricultural University of Wrocław.



**ELECTRONIC  
JOURNAL  
OF POLISH  
AGRICULTURAL  
UNIVERSITIES**

**1998  
Volume 1  
Issue 1  
Series  
FOOD SCIENCE AND  
TECHNOLOGY**

Copyright © Wydawnictwo Akademii Rolniczej we Wrocławiu, ISSN 1505-0297  
KORZENIOWSKI W., JANKOWSKA B., KWIATKOWSKA A., PRZAŁA F. 1998. EVALUATION OF YOUNG GOATS CARCASSES OF POLISH WHITE ENNOBLED RACE. *Electronic Journal of Polish Agricultural Universities*, Food Science and Technology, Volume 1, Issue 1. Available Online <http://www.ejpau.media.pl>

## **EVALUATION OF YOUNG GOATS CARCASSES OF POLISH WHITE ENNOBLED RACE**

Władysław Korzeniowski, Barbara Jankowska, Aleksandra Kwiatkowska, Franciszek Przała \*

*Department of Meat Technology and Chemistry*

*\*Department of Veterinary Preventive Treatment and Feed Hygiene  
Olsztyn University of Agriculture and Technology, Poland*

---

[ABSTRACT](#)  
[MATERIALS AND METHODS](#)  
[RESULTS](#)  
[REFERENCES](#)

---

### **ABSTRACT**

During the last few years a significant increase in goats population all over the world is observed. It is expected that in the year 2000 the total number of these animals will probably reach ca. 900 millions [2, 5]. Also in Poland a renewed increase of interest in goat breeding can be seen. The population of these domestic animals is mostly used for milk production. Only goats eliminated from further breeding and/or older, rejected animals are used as a source of meat.

In the countries where farther goat meat consumption has a long term tradition, young goats, castrated at the age of 2 weeks and slaughtered at the age of 4-6 weeks (with total body mass equal to 8-10 kg), are considered as source of meat demonstrating the highest quality. The second source of valuable meat is the group of goats which are slaughtered at the age of 2-3 months, with the body mass equal to ca 20 kg. Meat of goats with weight of 20 kg-40 kg and, in particular, of old specimens is characterised by undesirable organoleptic properties, and for this reason it is treated as less valuable meat [1].

It is expected that an increase in goat population in Poland will cause a greater interest as far as the meat production and the quality of these animals is concerned. Numerous interbreeding experiments with domestic goats and goat meat races have been already done. These experiments were focussed on the evaluation of goat carcass quality and meat properties of the most popular Polish white ennobled race.

**Key words:** goats carcasses, dietetic meat

## MATERIALS AND METHODS

12 young goats of Polish white ennobled race from an ecological farm located in the Suwałki province (north-east part of Poland) were the raw material for this experiment. Animals were fed using milk replacer with the addition of a feed mixture. All specimens demonstrated the same sex (male) and were slaughtered with the body mass equal to ca 15 kg. After slaughter and chilling all carcasses were weighted and each right side of carcass was divided in elements according to the rules of lamb carcass cutting. The following cuts were obtained: scrag, shoulder, middle neck, leg, loin, best end of neck, breast, front shank and back shank. All pieces were next weighted, and meat, bones, fat and tendons were separated. Based on results obtained, the average percentages of main parts of carcasses, also with respect to each type of tissue, were calculated. Additionally, the percentage composition of grounded leg meat and calorificity were determined. The moisture content was determined by heating of samples in the temperature equal to 105° C to constant weight (Polish Standard PN-73 A – 82110). The total content of nitrogen was determined by Kjeldahl method and converted to the equivalent protein content by numerical factor of 6.25 (PN-72A-04018), while fat content was determined using ether solvent extraction and boiling temperature equal to 60-80° C (PN-73A-82111). For determination of mineral content samples were burned to ash using temperatures in the range of 525 – 550 °C [11]. Based on the known chemical composition of samples their energy values were calculated by the use of the following energy equivalents: for proteins – 4.00 kcal/g, for fat – 9.02 kcal/g [11].

## RESULTS

The goat carcass cutting resulted in 9 main cuts having different percentages of total animal body and demonstrating different technological value. Almost a quarter of a goat carcass is leg, and this is the biggest part, and next the ones in turn are: breast and shoulder (constituting anywhere from ten to twenty per cent of carcass) and the middle neck accounting for ca 10% of the total carcass. Other cuts, like best end of neck, loin and scrag, constitute between 7.19% and 7.92% of each carcass, while front and back shanks- between 5.02 and 6.89% ( [Table 1](#)).

**Table 1. Percentages of certain parts of goat carcass**

Cut	Mean value x	Variation coefficient V
Scrag	7.19	8.90
Shoulder	12.98	8.86

Front shank	5.02	9.76
Middle neck	10.58	10.58
Best end of neck	7.90	10.89
Loin	7.92	7.20
Leg	24.93	5.90
Back shank	6.89	13.50
Breast	16.59	4.40

The total percentage of biggest cuts (leg, breast, shoulder and middle neck) is about 65% of the goat carcass and corresponds well to the literature data for the same race of goats and a similar body mass [10]. It is worth noting that the variation of percentages for the majority of cuts was relatively small, which means that proportions between parts were only slightly influenced by individual factors.

The results of dissection of each separated part with respect to the tissue composition indicated the biggest percentage of muscle tissue in leg (67.81%), and in turn, in middle neck (65.32%), shoulder (65.21%) and breast (63.16%). The meat content of these cuts is characterised by small individual variation (Table 2). The smallest content of meat was found in best end of neck and loin (49.33% and 45.21%, respectively) with the highest variation of this component ( $v = 11.43\%$  and  $v = 11.15\%$ , respectively), and in both shanks.

**Table 2. Percentage tissue composition of certain parts of goat carcass**

Cut	Meat		Bones		Tendons		Fat	
	x	V	x	V	x	V	x	V
Scrag	58.30	6.86	37.20	11.59	4.50	29.33	-	-
Shoulder	65.21	8.07	28.47	16.72	2.89	29.76	3.43	44.90
Front shank	49.08	6.60	44.02	8.25	6.90	37.10	-	-
Middle neck	65.32	7.70	32.57	15.75	2.11	32.70	-	-
Best end of neck	49.33	11.43	46.69	11.59	3.98	31.66	-	-
Loin	45.21	11.15	47.41	11.35	6.50	27.23	0.88	22.73
Leg	67.81	4.11	26.99	14.71	1.93	39.38	3.27	54.43
Back shank	49.21	10.08	44.29	11.56	6.50	30.92	-	-
Breast	63.16	5.87	26.92	13.60	3.25	44.62	6.67	49.93

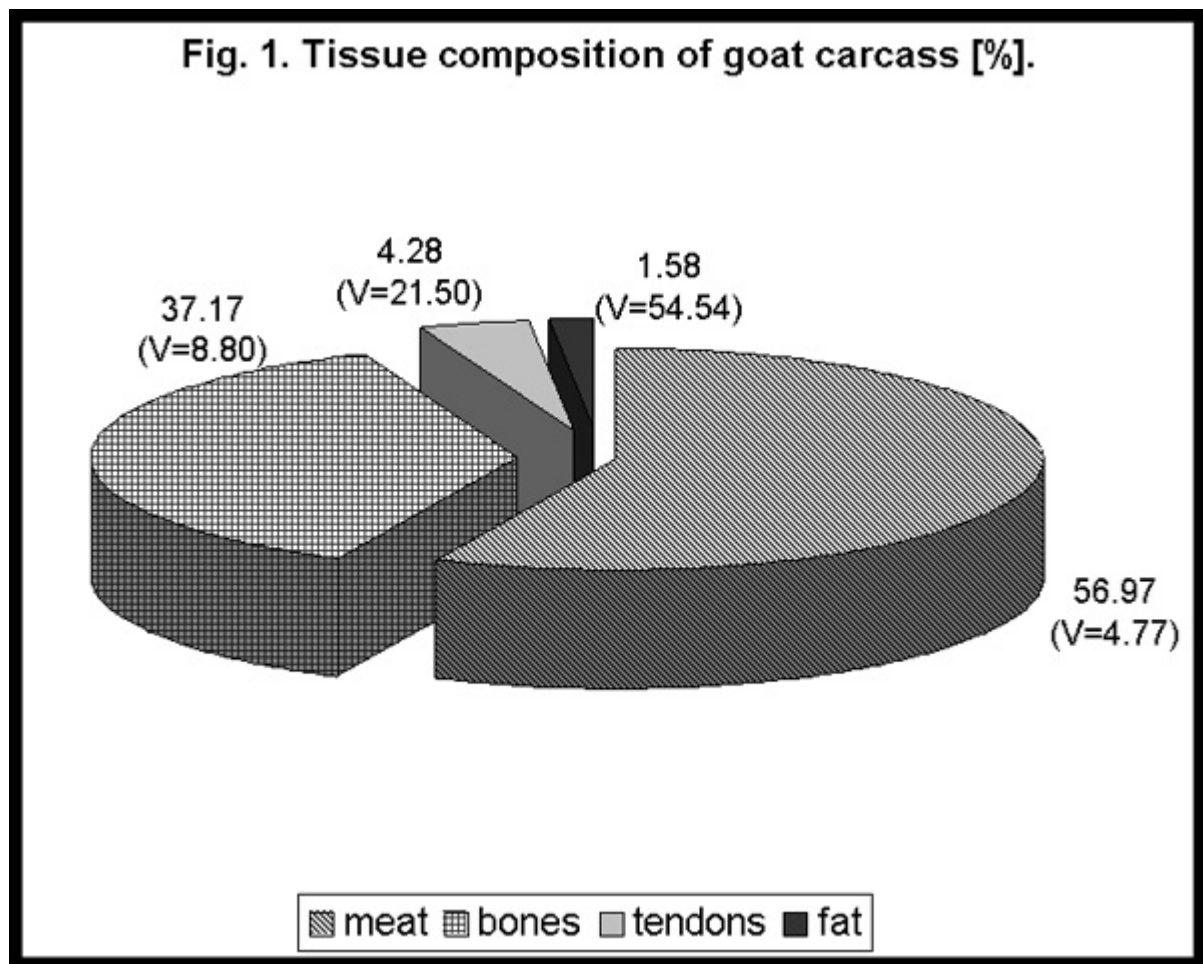
Goat cuts are characterised by different percentage of bones. It was observed that in parts demonstrating a high content of meat, bones constituted 26.99% (leg) and 26.92% (breast),

while in parts with low meat content (best end of neck and loin) 46.69% and 47.41% was found, respectively.

The content of tendons varied within the range of 1.93% (leg, middle neck and shoulder) and 6.90% (both shanks).

Each of the obtained cut was characterised by different content of intermuscular fat. This tissue was not isolated from scrag, best end of neck, middle neck and shanks, while its highest content was found in breast (6.67%), and next in shoulder (3.43%) and leg (3.27%), however, very high individual variation was observed ( $v=44.90 - 54.43\%$ ).

Based on the results collected for each separate part, the tissue composition of whole goat carcass was also determined, with the meat tissue content equal to 56.97%, a relatively high content of bones equal to 37.17%, and a very low content of fat tissue equal to 1.58% ([Figure 1](#)).



It is believed that in the body of a growing goat the fat is deposited slower as compared to cattle and lamb, and it is accumulated mostly in the abdominal cavity [8]. Probably for this reason muscles of examined goats contained relatively small amounts of fat.

Some components of carcass, like intermuscular fat and tendons content, are characterised by a significant variation, while the others like contents of meat and bones, are more stable and, therefore, they are more critical for the final value of a whole carcass.

A small content of meat tissue and the same time a high content of bones should be considered as a characteristic property of examined goat race carcasses. This fact also confirms the necessity of interbreeding experiments between this goat race and meat type goat races for their value improvement (as it is recommend by other authors).

The chemical characteristic of goat meat have been done for samples of leg meat ([Table 3](#)), and it was found that approximately demonstrated the moisture content of 76.94%, protein content of 19.02%, fat content of 2,88 and mineral substances content of 1.06%. The energy value calculated from results of chemical analysis of meat indicated 103.25 kcal, while the ratio of energy delivered by protein to total energy value was high and equal to 0.74. The caloricity and chemical composition of goat meat is similar to that of calf and lamb, in particular, as compared with respect to dietetic properties (similar content of fat and almost the same content of protein).

**Table 3. Chemical composition and caloricity of meat from young goat**

	X	V
Water (%)	76.94	2.00
Protein (%)	19.02	2.05
Fat (%)	2.88	52.05
Minerals (%)	1.06	4.71
Caloricity (kcal)	103.25	13.55

According to the data provided by literature, goat meat cuts have protein content equal to 18-21%, fat ranges from 3 to 18% and moisture content indicates levels of 55-76% [9, 4, 7,3]. The meat of young goats at the age of 11 months of Polish white ennobled race contained moisture within the range from 72.8 to 76.9%, protein – 19.5 – 20.4%, fat – 2.9 – 6.96% and ash – 1.08 – 1.27% [6]. The chemical composition of goat meat examined here and collected from goats of the same race (but slaughtered earlier), indicates the moisture content close to the top limit, and the protein content similar to the bottom limit as reported by the authors mentioned above. The approximate content of fat was lower as compared to the same source of data, however, at the same time, the high variation of this parameter was confirmed. (V =52.05%).

On the basis of the results collected during this study the following conclusions can be drawn:

1. Carcasses of young goats of Polish white ennobled race are characterised by a low meat content and the high percentages of bones which factors entail restrictions for further utilisation,
2. A characteristic property of goat carcass is a very low content of intermuscular fat tissue, which is present mostly in selected cuts like breast, shoulder and leg.
3. Goat meat of the Polish white ennobled race should be considered as lean meat demonstrating a high level of hydration and a common content of protein. For these reasons it posses properties of dietetic meat.

## REFERENCES

1. Cegiełka J., Tyburcy A. (1995) : “Uwarunkowania produkcji i wykorzystania mięsa koziego” *Mięso i Wędliny*, 4, 4
2. Jamroz D., Nowicki B. (1994) : “Kozy – chów i hodowla”, PWN, Warszawa
3. Johnson D.D., Eastridge J.S., Neubauer D.R., McGowan C.. (1995): Effect of Sex Class on Nutrient Content of Meat from Young Goat”, *J. Anim. Sci.*, 73, 1, 296
4. Krupa J., Zin M., Dominik M. (1990): “Charakterystyka wartości rzeźnej kóz oraz jakość mięsa”, *Gosp. Mięsna*, 42, 12, 23
5. Nowicki B., Jasek S., Maciejowski J., Nowakowski P., Pawlina E. (1995) : Atlas ras zwierząt gospodarskich”, PWN, Warszawa
6. Panasik M., Urban A. (1996): “Charakterystyka jakościowa i ilościowa mięsa koziego”, *Gosp. Mięsna*, 10, 44
7. Pieniak-Lendzion K., Szeliga W. (1995) :”Wartość rzeźna koźląt rasy polskiej białej uszlachetnionej oraz właściwości fizyko-chemiczne ich mięsa”, *Roczn. Inst. Przem. Mięsn.*, 32/33, 63
8. Piotrowski J. (1995): “Wybrane zagadnienia mięsnego użytkowania kóz”, *Medycyna Wet.*, 51, 2, 70
9. Pisula A., Słowiński M., Pawłowski P., Bidwell-Porębska K, Piotrowski. (1994) : Skład chemiczny właściwości fizykochemiczne i jakość sensoryczna mięsna koźląt “mlecznych” odchowanych do masy ciała 16 kg”, *Gosp. Mięsna*, 46, 11, 15
10. Szymanowska A., Gruszecki T., Lipecka Cz. (1996):”Wartość rzeźna koźląt ubijanych przy różnej masie ciała” *Materiały seminarium nt. : Charakterystyka chemiczna i technologiczna niekonwencjonalnych surowców mięsnych i perspektywy ich wykorzystania” Olsztyn*, 7.
11. “Wybrane metody badania składu i wartości odżywczej żywności” (1981) Red. U. Rutkowska, PWZL, Warszawa

---

Submitted: 24.10.1998

---

Władysław Korzeniowski, Barbara Jankowska, Aleksandra Kwiatkowska, Franciszek Przała  
Department of Meat Technology and Chemistry  
Department of Veterinary Preventive Treatment and Feed Hygiene  
Olsztyn University of Agriculture and Technology  
Plac Cieszyński 1, 10-718 Olsztyn-Kortowo, Poland  
tel. (+ 48 89) 5233295

---

[Responses](#) to this article, comments are invited and should be submitted within three months of the publication of the article. If accepted for publication, they will be published in the chapter headed ‘Discussions’ in each series and hyperlinked to the article.

---