QUALITY OF THE SAANEN KIDS MEAT FEEDED WITH GROUND, PELLETED AND EXTRUDED TOTAL RATION

Amaral, Cecília M. C.[1]; Souza, Hirasilva B. A.[2]; Sugohara, Atushi[3]; Pelicano, Elizabete R. L.[4]; Ferreira, Daniel S.[5].; Ferreira Angela C. D.[6]; Fregadolli, Fábio L[7]; Lima, Tânia M. A.[8];.

[1] Post-graduate Animal Science student of FCAV- UNESP, Jaboticabal /SP/Brazil. Supported by CNPQ. mail:cmcamaral@netsite.com.br
[2,3] Animal Science Professors of FCAV- UNESP, Jaboticabal /SP/Brazil.
[4,6,7] Post-graduate Animal Science students of FCAV- UNESP, Jaboticabal /SP/Brazil.
[5] Graduate Animal Science student of FCAV- UNESP, Jaboticabal /SP/Brazil.
[8] Laboratory tecnician of FCAV- UNESP, Jaboticabal /SP/Brazil.

Background

Due the optimization of the dairy systems it is possible to obtain profit by the milk sale and an option to the additional rent to the producer is the commercialization of the young goats to slaughter. But this system provide positive results when the animals are slaughtered precociously (BUENO et al., 1997) because according to COLOMER-ROCHER (1987) the efficiency of the goat production occur when in the short period and low cost, the animals produced carcasses with great quality to be commerced. DEVENDRA & BURNS (1970) verified that in different areas of the planet, communities of the developed or underdeveloped countries, are at most or less degree, dependents of the goats to supply of the meat necessity. In other research, DEVENDRA & OWEN (1983) related that the "cabrito" meat is consumed in Latin America and Indian West and comes from of the animals that are slaughtered between 8-12 weeks, weighting between 6 to 8 kg. The meat is a noble food the human due the energy production, plastic function on the formation of the new organic tissues and in the regulation of the physiologic processes. The meat ability to hold water is an essential meat quality parameter for economic, technological and characteristic sensory reasons. Common drip losses from meat are 0.1-1% after 2 days of storage. The amount lost from sliced meat is higher (2-10%). Very high losses come from thawed meat (about 25%). The DRIP is formed of intracellular and extracellular water (in ration 10:1) and contains proteins, ions (K^+, Na^+, Cl^-) and compounds of low molecular weight (aminoacids, vitamins).The red color of drip fluid is caused by the myoglobin content (OFFER & KNIGHT, 1988). SCHÖNFELDT et al. (1993) observed that the goat meat show lower fluid loss in relation to sheep meat, the fluid loss increased significantly with the increase of the age, thus the young goat meat showed more succulence in relation to the oldest animals. Several chemical and physical treatments such extrusion and peletization are used in the ration processing with the objective of the improve the utilization efficiency of the diet, by the way, the effect of this processing on the organoleptic characteristics of the goat meat are lack in the literature.

Objectives

Then, the objective of the study was to evaluate the effect of ration processing on the soluble protein value, water holding capacity and drip loss of the Longuíssimo and *Semimembranosus* muscles of the Saanen kids slaughtered with 30, 45 and 60 days of age.

Methods

It were used 36 Saanen kids, feeding with total ration and the main ingredients were: corn hay (40.00%), ground corn (29.26%), soybean meal (21.82%), molasses (4.84%), soybean oil (0.91%) and minerals (3.17%). The animals were assigned in a randomized complete design with a 3x3x2 factorial (three ages, three rations and two muscles) with four replications and the treatments were: ground total ration (GTR) the control, peletted total ration (PTR) and extruded total ration (ETR).The means were analyzed using Tukey's test (5%). The bromatological composition (% dry matter) of the rations GTR, PTR and ETR was respectively 16.58; 16.93 and 16.47% crude protein (CP); 34.54; 27.78 and 32.03% neutral detergent fiber (NDF); 19.89; 20.33 and 18.39% neutral detergent acid (NDA) and 8.92; 9.13 and 8.57% ether extract. Twelve kids (4 per treatment) were slaughtered with 30, 45 and 60 days of age and the live-weight in the slaughter moment was about 5, 7 and 10 kg respectively. The water and the ration of the animals were take of 12 and 24 hours before of the slaughter, respectively. Immediately after the slaughter, the animals were eviscerated and the carcasses were chilled in refrigerator for 24 hours at 4°C. After that, the left leg and the Longuíssimo muscle were separated of the carcass, weighted, put inside the plastic bags and frozen in refrigerator during eight months. Then the material was thawed in environmental temperature and weighted to determine the drip loss and the soluble protein of the drip, then, the *Semimembranosus* muscle was dissected and the Longuíssimo was separated to determine the water holding capacity. The water holding capacity was calculated using the HAMM (1960) methodology and the soluble protein values were determined according to HARTREE (1972). The drip loss was calculated in percentage, then the chilled samples were weighted and after the thawing were weighted again.

Results and Discussion

In relation to soluble protein of the drip, was observed that the animals feeded with GTR and PTR showed higher values ($P<0,05$) than the animals that received ETR (Table 1).Verified that the drip loss percentage was low, about 0.30% and this fact is very important to the goat meat quality because the drip loss decrease the nutritive value of the meat, because the nutrients ca be loss with the liquid, resulting in a meat with juiciness and low tenderness. Significant differences were not noted among the rations and among the muscles. Physical properties of the fresh meat such color, tenderness and texture are dependents of the water holding capacity. Studies showed that exist the positive correlation between tenderness and water holding capacity, due the succulence that occur during the mastication process (Bouton related by SILVA SOBRINHO, 1999). When the tissue show low water holding capacity and is placed at the freezer before occur the *rigor mortis* during the thaw occur a fiber decreasing more sever than the normal and can be about 80%, the humidity losses and consequently weight losses are high. In this study significant differences were not noted in relation to CRA among the rations and the values obtained were about 65%, by the way, the Longuíssimo muscle exhibited higher water holding capacity. SHERIDAN et al. (2003) observed that Merino lambs feeded with a low or a high metabolizable energy level during 56 days did the *Semimembranosus* muscle have a significantly higher drip loss than that of Boer goats (low: 4.84 v.3.43%; high:4.72 v. 3.23%). Statistical analyses showed that significant interaction were not noted between age and ration in relation to the water holdind capacity and the DRIP of the muscles, by the way, was interaction ($P<0,05$) among age, ration and muscles to the soluble protein values of the goat meat (Table 2). It can be verified that the soluble protein values increased with an increase in slaughter age and this values were higher ($P<0,05$) in the Longuíssimo muscle than *Semimembranosus* muscle.

Conclusions

The extrusion and peletization process of the total ration to Saanen kids, did not effect the water holding capacity and the drip losses of the meat in relation to the animals that received ground total ration.

The soluble protein of the drip increased with the increase of the age and the values were higher on the Longuissimo muscle than on the *Semimembranosus*.

References

BUENO, M. S. et al. Avaliação de carcaças de cabritos abatidos com diferentes pesos vivos. ***Boetim da Industria Animal***., v. 54, n. 2., p. 61-67, 1997.

COLOMER-ROCHER, F. Factors influencing carcass quality: carcass component and composition. In: INTERNATIONAL CONFERENCE ON GOATS, 1987, Brasília. *Proceedings...* Brasília: EMBRAPA, 1987, p. 181-194.

DEVENDRA, C. & BURNS, M. *Meat Production*. Chapter 4. Goat production in the Tropics. 2.ed. Commonwealth Agricultural Bureaux, Surrey, UK, p. 55-63, 1970.

DEVENDRA, C. & OWEN, J. E. Quantitative e qualitative aspects of meat production from goats. ***World Animal Review***, v. 47, p.19-29, 1983.

HAMM, R. Biochemistry of meat hydratation. *Advances in Food Research Cleveland,* v. 10, n. 2, p. 335-443, 1960.

HARTREE, E. F. Determination of protein: a modification of Lowry method of gives a linear photometric response. *Analitical Biochemistry*, v. 48, p. 422-27, 1972.

OFFER, G. & KNIGHT, P. The structural basis of water-holding capacity in meat. Part 2: Drip losses. In: LAWRIE, R. A. *Developments in meat science* - Elsevier Science Publishers, London, 1988.

SCHÖNFELDT, H. C.; NAUDÉ, R. T.; BOK, W.; VAN HEERDEN, S. M.; SOWDEN, L.; BOSHOFF, E. Cooking and Juiciness - related Quality characteristics of goat and sheep meat. *Meat Science*, v. 34, p. 381-94, 1993.

SHERIDAN, R.; HOFFMAN, L. C.; FERREIRA, A. V. Meat quality of Boer goats kids and Mutton Merino lambs 2. Sensory meat evaluation. *Animal Science,* v. 76, p. 73-9, 2003.

SILVA SOBRINHO, A. G. & GONZAGA NETO. S. *Produção de carne caprina e cortes da carcaça.* www.capritec.com.br.

Table 1. Soluble protein value (mg/mL), drip loss (DRIP) and water holding capacity (WHC) of the *Semimembranosus* and Longuíssimo muscle of the Saanen kids leg, feeding with ground total ration (GTR), pelleted total ration (PTR) and extruded total ration (ETR).

Ration	Soluble Protein (mg/ml)	DRIP (%)	WHC (%)
GTR	32.70 [a]	0.35 [a]	66.54 [a]
PTR	32.78 [a]	0.37 [a]	65.46 [a]
ETR	27.80 [b]	0.33 [a]	64.42 [a]
Muscle			
Semimembranosus	23.77 [b]	0.30 [a]	64.24 [b]
Longuíssimo	38.42 [a]	0.34 [a]	66.72 [a]
CV %	15.78	16.03	4.98
Interaction	*	NS	NS

[a,b] Means within a line with same letters no differ significantly (P>0,05).
* significative interaction, NS - no significant

Table 2. Soluble protein values (mg/mL) of the *Semimembranosus* and Longuíssimo muscle of the Saanen kids leg, slaughtered with 30, 45 and 60 days of age, feeding with ground total ration (GTR), pelleted total ration (PTR) and extruded total ration (ETR).

Age (days)	Soluble protein values (mg/mL)	
	Longuíssimo muscle	*Semimembranosus* muscle
30	28.31 [a B]	19.61 [b B]
45	41.78 [a A]	23.66 [b AB]
60	45.17 [a A]	28.05 [b A]
Ration		
GTR	35.90 [a]	29.50 [b]
PTR	45.27 [a]	20.30 [b]
ETR	34.09 [a]	21.52 [b]

[a,b] Means within a line with same letters no differ significantly (P>0,05).
[A,B] Means within a column with same letters no differ significantly (P>0,05).