PHYSICAL AND SENSORY PROPERTIES OF LAMB MEAT FROM NORTHEAST BRAZIL

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Background

Meat from small ruminants is economically important in several regions of the world including Northeast Brazil *(Sainz, 1996)*. Tropical sheep are animals with small or non hair deposition and well adapted to the semi-arid climate of the region. Lamb consumption from this type of animals is frequently limited by factors such as active flavor and odor, poor texture and high levels of fat. This is due in part to inadequate practices of rearing and managing of the animals as well as deficient slaughtering practices and poor meat distribution and commercialization practices. Several studies indicate, however, that the meat from young and well fed lambs is quite acceptable *(Sañudo et al., 1997)*. Meat palatability is an important trait to determine consumer acceptability of pure and crosses breed lamb. According to *Abularach et al. (1998)*, meat color and water holding capacity as well as tenderness and juiciness are among the most frequently observed quality attributes of meat. The breed and the feeding regime also can influence color, cooking losses and tenderness of the meat *(Sañudo et al., 1997)*. Meat tenderness can also be improved by high levels of energy in the diet *(Crouse et al., 1978)*.

Objective

The objective of this study was to evaluate the quality of the meat from tropical lambs and the effect of different feeding regimes on physical and sensory characteristics of this food.

Methods

The study utilized 10 ½ Somalis-Brasileira x ½ Crioula (SB-C) and 11 ½ Santa-Inês x ½ Crioula (SI-C) rams from two feeding regimes during weaning: grass hay + leucena hay (D1) and grass hay + leucena hay + 20% crude protein concentrate (D2). Animals were slaughtered at 140 days at the CNPC/EMBRAPA (National Center for Research with Goats), in Sobral, CE, Brazil. Carcasses were chilled at 0°C and the right leg and loin of each carcass were separated for analysis. Leg meat was used for pH, color and sensory panel; loin meat (*L. dorsi*) was used for cooking losses and Warner-Bratzler shear force.

Meat pH was determined on the filtrate of a homogenate of 5g meat and 50 mL distilled and deionized water according to *Rhee et al. (1998)*. Cooking losses were determined weighting meat samples before and after cooking, according to *Abularach et al. (1998)*. Samples were thawed for 24 h at 4°C and then it was cut in 2.5 cm muscle slices. The samples were grilled until internal temperature reached 70°C. For Warner-Bratzler shear force, cooked meat slices were held at room temperature for 2h. Six cubes (1.27 cm) were then removed according to *Abularach et al. (1998)*. Meat shear force was evaluated using a Warner-Bratzler blade mounted on a TA-XT2 texture device (Stable Micro System, Surrey, England).

Meat color was estimated in the L*a*b* system by using a colorimeter Minolta CR300 (Minolta Co., Osaka, Japan). Three measurements in each of four different locations of the raw meat slice were made.

Meat samples used for sensory analysis were thawed for 48 h at 4°C. Then 1.9 cm cubes were removed and grilled until internal temperature of 75°C, according to *Jeremiah et al. (1997)*. The panel consisted of 24 consumers using a hedonic scale from 1 (dislike extremely) to 9 (like extremely) described by *Stone e Sidel (1985)*.

Collected data for pH, color, cooking losses, shear force and sensory evaluation were analyzed in a randomized block design 2 × 2 (2 breeds × 2 feeding regimes) through the analysis of variance *(Minitab, 1995)*.

Results and Discussion

It was not observed effect of crossbreed or feeding regime on meat quality attributes. Meat pH values varied from 5.62 to 5.65. Similar values have been reported by *Sañudo et al. (1997)* in meat from Spanish lamb. Cooking losses varied from 21.45 to 23.90%. *Summers et al. (1978)* found cooking losses of about 20% in meat from lamb fed crude protein concentrate during weaning. Shear force varied from 4.46 to 4.85 kg-f. *Sañudo et al. (1997)* found slightly lower values in the meat of animals from Churra, Castellana, Manchega e Awassi breeds and also observed no differences for this parameters among these breeds.

According to *Miltenburg et al. (1992)*, higher values of L* tend to characterize pale meat and high values for a* and b* parameters indicate darker tonalities of red and yellow, respectively. In this study color parameters varied from 36.67 to 37.70 for L*, from 14.85 to 15.54 for a* and from 0.83 to 1.37 for b*.

Sensory analysis of lamb showed a good acceptability by panelists with no differences between treatments. Regardless of crossbreed or feeding regime used in this study lamb meat was considered highly acceptable.

Conclusions

Meat quality from crossed breed rams ½ Somalis Brasileira × ½ Crioula and ½ Santa Inês × ½ Crioula from Northeast Brazil is similar. Meat quality is quite acceptable as measured by both objective and sensorial methods.

The inclusion of protein concentrate in the diet of these animals during the weaning age does not affect the quality of the meat.

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Table 1. Mean values and standard error for pH, cooking losses and shear force in meat from lambs ½ Somalis Brasileira x Crioula (SB-C) and ½ Santa Inês x Crioula (SI-C) breeds.

Factors	Variables		
	pH	Cooking Losses	Shear Force
Crossbread			
SB-C	5.65 ± 0.05	23.50 ± 1.47	4.74 ± 0.27
SI-C	5.63 ± 0.02	22.26 ± 1.27	4.63 ± 0.19
Feeding Regime			
Grass hay	5.62 ± 0.03	21.45 ± 1.36	4.46 ± 0.11
Grass hay + concentrate	5.65 ± 0.04	23.90 ± 1.28	4.85 ± 0.26

Table 2. Mean values and standard error for color attributes (L* a* b*) in meat from lambs ½ Somalis Brasileira x Crioula (SB-C) and ½ Santa Inês x Crioula breeds.

Factors	Variables		
	L*	a*	b*
Crossbreed			
SB-C	36.78 ± 0.47	15.27 ± 0.41	1.04 ± 0.39
SI-C	37.42 ± 0.71	15.22 ± 0.52	1.09 ± 0.36
Feeding Regime			
Grass hay	37.70 ± 0.61	14.85 ± 0.46	1.37 ± 0.18
Grass hay + concentrate	36.67 ± 0.35	15.54 ± 0.29	0.83 ± 0.24

Table 3. Mean values and standard error for sensory scores in meat from lambs ½ Somalis Brasileira x Crioula (SB-C) and ½ Santa Inês x Crioula (SI-C) breeds .

Factors	Sensory panel scores
SB-C	7,21
SI-C	7,04
Grass hay	7,25
Grass hay + concentrate	7,04