METHODS OF COOKING AND ITS INFLUENCE ON MEAT QUALITY OF LAMB

Zeola, Nivea Maria Brancacci Lopes[1]; Souza, Pedro Alves[2], Silva Sobrinho, Américo Garcia[3]; Souza, Hirasilva Borba Alves[2]; Pelicano, Elizabete Regina Leone[1]; Leonel, Fábio Roberto[1]; Lima, Tânia Mara Azevedo[4]; Boiago, Marcel Manente[5]

[1] Post-Graduate student - Animal Science Graduate School - FCAV/Unesp, Jaboticabal/ SP/ Brasil. Contact:nivea@fcav.unesp.br
[2] Professor - Departamento de Tecnologia - FCAV/Unesp, Jaboticabal/SP/Brasil
[3] Professor - Departamento de Zootecnia - FCAV/Unesp, Jaboticabal/ SP/ Brasil
[4] Tecnician - Laboratório de Tecnologia dos Produtos de Origem Animal - FCAV/Unesp, Jaboticabal/SP/Brasil
[5] Graduate student - Animal Science Graduate School - FCAV/Unesp, Jaboticabal/ SP/ Brasil

Background

The quality requirements vary according to the preferences of the different markets and oscillate inside of the commercialization chain, which is extended from the producer to the consumer. In the table of the consumer the quality of the meat is evaluated by its appearance, in another words, by its colour, and organoleptic factors, as well as the flavor, the tenderness and the succulence (OSÓRIO *et al.*, 2002). The consumer considers the colour the most important attribute in the acquisition of the product. The cooking method can influence such parameter, providing meats with greater or lower lightness (GONÇALVES, 2001). Currently, the production of lamb meat searchs not only for the better performance of the lambs but also for better qualitative characteristics of the meat which are very important for the acquisition of the product. Research works involving *post mortem* processes gain prominence in the national market, providing new technologies to be used in commercial scale (ZEOLA, 2002). Different methods of cooking are used in the research works to determine the cooking loss and the tenderness of the lamb meat. OSÓRIO *et al.*, (1998) have used fry and baked meat, with the shear force expressed by area (kgf/cm^2) for the first situation and total cut force (kgf) for the second. SILVA SOBRINHO (1999) and ZEOLA *et al.*, (2002) used water bath, expressing the shear force in kgf. These differences make difficult the comparison between the research works and the methodology standardization would facilitate the interpretation and discussion of the results.

Objectives

The objective of this work was to evaluate the effect of different methods of cooking on the cooking loss, colour (lightness, redness and yellowness) and shear force of the lamb meat.

Methods

A *Morada Nova* lamb was slaughtered with 30 kg of body weight, after a 16 hours fasting of hydrous and solid diets. The stunning was made by electric discharge of 220V during 8 seconds. After that, the jugular vein and the carotid artery were parted for the bleeding. Later, the flays was proceeded, followed by the evisceration and withdrawal of the head and the extremities. Then, the carcass was cooled at 4ºC for 24 hours and the *longissimus* muscle (*longissimus* lumbar muscle, thoracic, of the neck, of the atlases and of the head) was removed and divided in 20 slices. A completely randomized experiment was used, with four treatments and five replications: T1 - the meat was baked in an oven pre-warmed to 170ºC until the core temperature of the sample was 75ºC (CORTE *et al.*, 1979); T2 – the meat was involved in aluminum paper and baked in an oven pre-warmed to 170ºC until the core temperature of the sample was 75ºC; T3 – the meat was cooked in water bath at 70ºC during 90 minutes (SILVA SOBRINHO, 1999) and T4 – the meat was grilled in electric plate until the core temperature of the sample was 75ºC. Contrast comparisons among treatment means were made using Tukey's test at 5% of probability level and analysis of variance according to SAS (1996). Cooking loss (CL) was determined as the difference between the initial and the final weight of the sample. Meat colour values (L* - lightness, a* - redness and b* - yellowness) after cooking, was determined by the colorimeter Minolta CR-200, and shear force (SF) determination was measure by the Warner-Bratzler blade from the Texture Analyzer TA-XT2i apparatus, which measures of the sample expressed in kgf/cm^2.

Results and Discussion

CL, colour (L *, a* and b*) and SF results are shown in Table 1. Treatment influenced ($P<0.05$) CL. The treatment that the meat was cooked in water bath, presented lowest CL (25.86%), not differing ($P>0.05$) from the treatment, which the meat was baked (31.52%). SILVA SOBRINHO (1999) and ZEOLA *et al.* (2002) obtained superior results, respectively, in CL (38.41 and 37.63%) working with the *Semimembranosus* lamb muscle. On the other hand, inferior value (17.78%) was observed by MONTEIRO *et al.*, (2001) when evaluating CL in the lamb meat (*longissimus* muscle). Regarding to the colour of the meat, the different methods of cooking had influenced ($P<0.05$) this parameter. The literature on the colour of the meat presents data (PUGA *et al.*, 1999, BYRNE *et al.*, 2000 and ABULARACH *et al.*, 2001) that evaluates the colour of the meat *in natura*, since this is the usual product presentation form to the consumer. However, the meat cooking method that will provide desirable colour to the consumer has great importance, therefore the acceptance or rejection of the product will only happen after the cooking. The treatments, which the meat was baked in aluminum paper and cooked in water bath, had propitiated greater L* value (43.36), in another words, had presented paler meats, which have lowest acceptance to the consumers. The treatment which the meat was grilled presented lowest L* value (33.75), suggesting a bigger acceptance. Studying characteristics of the meat from lambs ½ Santa Inês ½ Bergamácia slaughtered up to 15 and 25 kg, SOUZA *et al.* (2001) had found L* values of 36.52 and the 32.65; a* values had been greater in the treatments that the meat was baked and grilled, with average value of 11.19, followed by the treatment that the meat was baked in aluminum paper (10.16) and by the treatment that the meat was cooked in water bath (8.52), respectively. These values had been inferior from those reported by FARIA *et al.*, (2001), that had described a* values varying of 12.27 to 18.01 in lamb meat. The b* value was lowest (6.02) in the treatment that the meat was grilled while the others treatments had not differed ($P>0.05$) between themselves, with average value of 9.85. The inferior value (4.30) was obtained by SILVA SOBRINHO (1999) when evaluating the colour of the lamb meat from different genotypes, probably due to the fact of the colour have been gotten in the meat *in natura*, frequently used. Concerning the tenderness of the lamb meat (SF), the treatments influenced ($P<0.05$) this parameter. Inferior results in SF were observed in the treatments that the meat was baked in aluminum paper (2.22kgf/cm^2) and grilled in electric plate (2.42 kgf/cm^2). While the treatments, which the meat was baked and cooked in water bath, had not differed ($P>0.05$) they had propitiated lowest meat tenderness, with value of SF of 3.14 to 3.47 kgf/cm^2, respectively. HUIDOBRO *et al.*, (1998) found inferior values (0.24 kgf/cm^2) from the cited ones on this experiment, probable due the fact to work of the very young slaughtered animals (12kg of body weight).

Conclusions

The grilled lamb meat was considered adjusted in the evaluation of the qualitative parameters when it presents a normal cooking loss, lowest lightness and better tenderness which are important characteristics in the consumption besides they contribute for the acceptance of the product.

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Table 1. Cooking loss (CL), colour (L *, a* and b *) and shear force (SF) of the lamb meat as a function of different methods of cooking.

Parameter	Treatment				CV (%)
	T1	T2	T3	T4	
CL (%)	31,52^{ab}	34,87^{a}	25,86^{b}	34,52^{a}	11,01
L*	39,01^{b}	43,83^{a}	42,90^{a}	33,75^{c}	9,67
a*	11,81^{a}	10,16^{b}	8,52^{c}	10,58^{ab}	13,29
b*	9,26^{a}	9,62^{a}	10,66^{a}	6,02^{b}	22,42
SF (kgf/cm^2)	3,14^{ab}	2,22^{c}	3,47^{a}	2,42^{bc}	27,31

[a] Similar superscripts on the same line are not different (P>0.05) by Tukey's Test (5%);
L* - lightness; a* - redness; b* - yellowness;
CV - coefficient of variation