PHYSICAL-CHEMICAL CHARACTERISTIC OF BERGAMÁCIA AND SANTA INES MEAT LAMBS, SLAUGHTERED AT DIFFERENT WEIGHTS

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BACKGROUND

The most important qualities of red meat is its appearance (color, brightness and the presentation of the meat cut) which is responsible for consumer acceptability at the moment of acquisition and the tenderness, which determines the satisfaction sense of the consumer. These physical characteristics shown variation associated with several factors, such as: slaughter weight, breed and pre-slaughter condition of the animal and handling of meat after slaughter. The Santa Inês and Bergamácia breeds have showed a high potential for meat production, are large and prolific animals adapted to different climates conditions.

The pH decrees after slaughter constitutes one of the most remarkable factors in the transformation of the muscle in meat, with decisive importance to the final quality of meat. Several authors had not found significant differences in pH *post mortem* (SINNETT-SMITH *et al.*, 1989; OSÓRIO *et al.*, 1998). However, PEREZ *et al.* (1997) working on the pH *post mortem* decline in Santa Inês and Bergamácia animals, verified differences at 6,12 and 18 hours. At these times, the Santa Inês carcass showed higher pH than the Bergamácia breed.

In relation to the effect of breed and slaughter weight on the shear force (SF), the results in the literature are contradictories. Studies with lambs slaughtered at 36, 45 and 54kg of live weight, KEMP *et al.* (1972) found that the SF decreased with the increase of weight. Whereas, other authors had not verified significant effects (KEMP *et al.*, 1981; PURCHAS *et al.*, 1996).

OBJECTIVES

The objectives of the study was to evaluate the physical- chemical parameters of: pH; cooking weight loss (CWL); and shear forces (SF), in muscle of Santa Inês and Bergamácia lambs slaughtered at different live weights.

MATERIAL AND METHODS

The animals were raised confined at the Sheep Production Sector the Federal University of Lavras, Lavras, MG in Brazil. The samples were analysed at the Food Science Institute of Campinas, SP - Brazil. Thirty-six entire males lambs (24 Santa Inês and 12 Bergamácia) were used in the study. The lambs weighed 15kg at the beginning and were randomly distributed in four slaughter groups, 15, 25, 35 and 45kg of live weight. After slaughter the carcasses were chilled for 24 hours at 4ºC. During this period pH measures were taken at 1, 2, 3, 4, 5, 6, 8, 10, 12, 15, 18 and 24 hours. After that, the *longissimus dorsi* muscle was removed and cooled at –10ºC until the chemical analyses. The pH was determined according to BENDALL (1973). Weight loss from cooking was measured according to BILGILI *et al.* (1989). Shear value measurements were carried out on the cooked samples following the procedures of FRONING *et al.* (1988), using a Warner-Bratzler blade coupled to an Instron. Casual tracing was used entirely in factorial outline (8 treatments), four groups of slaughter weight and two breeds. The Santa Inês had 6 treatment repetitions and the Bergamácia breed had 3 repetitions. The experimental unit was composed of one animal. The statistic program utilized was the SAEG (Euclydes, 1983) and the regression equations were determined by the TABLECURVE program V. 2.03 (Jardel Scientific, 1994).

RESULTS AND DISCUSSION

The breeds, Santa Inês and Bergamácia, presented similar results in pH among the slaughter weights analysed. Analysing the pH curves it was observed that: the muscle *longissimus dorsi* **(Figure 1.a)**, had a pH declining speed higher in groups of lambs with weights 35 and 45kg, than those in the groups 15 and 25kg; the muscle *semimembranosus* **(Figure 1.b)** pH declining was faster in the 45kg group compared with the other weight groups (15, 25 and 35kg). These results showed that glycolisis development was faster in the higher slaughter weight lambs. The variation in the glycolisis velocity observed might be attributed to the larger quantity of subcutaneous fat in those groups of higher weight. The fat might have act as a thermal isolator, maintaining the temperature of the carcass at higher temperature for longer periods of time in the 35 to 45kg group. In the opinion of JOHNSON *et al.*, 1989, the higher the temperature of the carcass at *post mortem* the higher velocity of glycolisis and a faster declining of the pH.

The breed and the slaughter weight had not significant effect on CWL and SF (**Table 1**). The similarity of CWL between the breeds Santa Inês and Bergamácia observed in this study are in agreement with the results obtained by PEREZ *et al.* (1997), in the *longissimus dorsi* and *biceps femoris* muscles. Also, in relation to the slaughter weight, LLOYD *et al.* (1981), did not found differences in the CWL. Whereas, KEMP *et al.* (1972), related differences in the CWL, which increased with the increasing of the lamb slaughter weight. In the present study, the similarity of CWL between slaughter weight groups and breeds could be explained by two facts: first, in both muscles, *longissimus dorsi* and *semimembranosus*, the external layer of fat had been removed; second, probably in growing lambs of these breeds (even those belonging to the heavier weight groups) there was not enough time for the deposition of largest amount of inter and intra-muscular fat or even it could be a breed effect.

The breeds and the slaughter weight groups, presented similar values of SF in the muscle studied. Comparing the results obtained in this study whit those found in the literature it is possible to verify that similar SF values between the breeds Santa Inês and Bergamácia have been described as those from PEREZ *et al.* (1997), however with slight higher values (4.51 and 3.88kg respectively). Other authors, also found no differences in the SF in lambs at similar laughter weight as those used en this study (NOTTER *et al.*, 1991; KISHORE *et al.*, 1984).

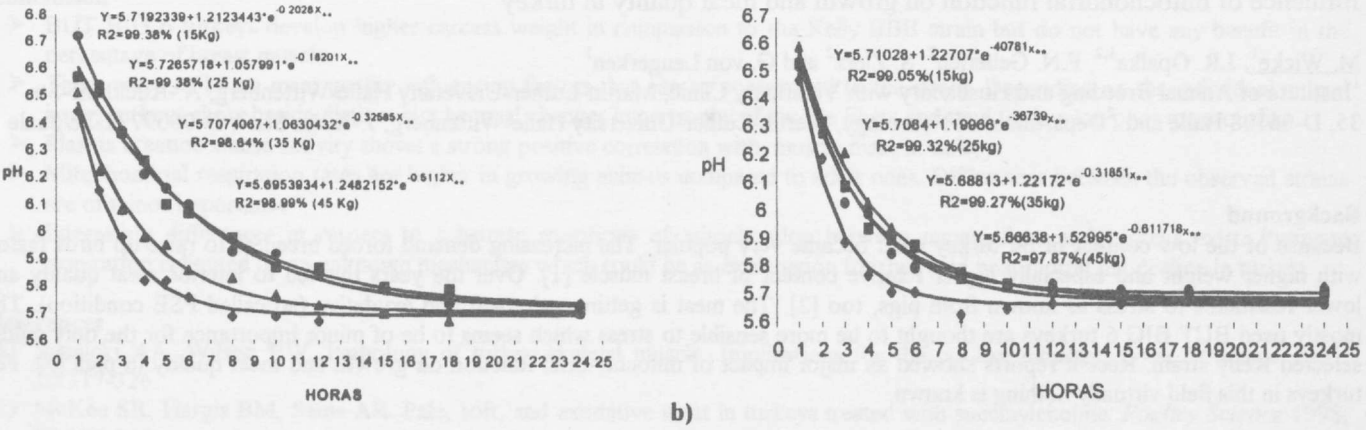

FIGURE 1. pH fall curves of lamb breeds, Santa Inês and Bergamácia, in relationship with slaughter weights of (•) 15kg; (■) 25Kg; (▲) 35kg e (♦) 45kg: **a)** *longissimus dorsi* (**P<0,01); e, **b)** *semimembranosus* (**P<0,01).

TABLE 1. Results of cooking weight loss (CWL) and shear force (SF) and respective deviation pattern found in the muscle *longissimus dorsi* (LD) and *semimembranosus* (SM) in relationship with slaughter weight groups.

	CWL				SF			
	15 kg	25 kg	35 kg	45 kg	15 kg	25 kg	35 kg	45 kg
LD	27,6 ±3,2	27,2 ±2,3	29,1 ±2,2	28,1 ±1,9	2,7 ±0,5	2,3 ±0,5	2,8 ±0,7	2,5 ±0,6
SM	31,1 ±4,4	30,3 ±2,9	33,1 ±4,5	29,4 ±4,1	2,6 ±0,6	2,5 ±0,5	3,1 ±0,5	3,2 ±0,7

CONCLUSIONS

The glicolysis *post mortem* developed faster with the increase of the lamb slaughter weight. The breeds Santa Inês and Bergamácia and the slaughter weights studied showed similar values for cooking weight loss and shear force in muscle samples taken from *longissimus dorsi* and *semimembranosus*.

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