

Chemical composition and tenderness of *longissimus dorsi* muscle from non-castrated Murrah buffaloes slaughtered at different weights

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ABSTRACT: Buffalo meat production has been arising interest breeder and emerges as alternative to consumer, more and more demanding of the quality products. Thus, this research was conducted to study the chemical composition and tenderness of *Longissimus dorsi* muscle from 10 non-castrated Murrah buffaloes slaughtered at different weights. The research was carried in feedlot of School of Veterinary Medicine and Animal Science of the Sao Paulo State University, Botucatu, São Paulo, Brazil. Animals were divided in two groups, received diet *ad libitum* and slaughtered when reached 450 and 500 kg of live weight. The experiment design was completely randomized, with five repetitions to each treatment. Meat sample from *Longissimus dorsi* muscle, taken between 12th and 13th ribs, were carried analysis of moisture, crude protein, fat, ash, *Longissimus* muscle area (LMA), fat thickness (FT), marbling, calorie and tenderness. It did not have significant difference between the groups. Average values at of 76.0; 20.7; 2.1 and 1.2 of moisture, crude protein, fat and ash respectively, were obtained. Calorie, tenderness, LMA, FT and marbling were obtained at average values of 132 kcal/100g; 3.94 kgf; 34.2 cm²; 5.9 mm and 2 points, respectively. Values obtained for tenderness are similar in the literature and has been proving that buffalo meat is tender (< 5kgf). Positive correlation was observed between the protein percentage and the shear force of the meat. The buffalo meat is excellent alternative source of red protein of high biological value to feeding of Brazilian consumers.

Key words: Buffaloes, Crude protein, Marbling, Shear force.

INTRODUCTION - The meat production chain has been suffering a reorganization that the competitiveness and efficiency of production systems are goals of the sector, in this context characteristic as production, composition and quality of the meat are of extreme importance (Jorge et al., 2003a). When are evaluated parameters that involves the quality of

meat, the tenderness is the bigger factor of variability, being the desirable attribute for the consumer (Felício, 1993). The buffalo meat is not very known by professionals of the health and consumers, as well not very studied by researchers. With the concern to evaluate and characterize the composition of the buffalo meat, the objective of this work was to study the chemical composition and tenderness of *Longissimus dorsi* muscle from non-castrated Murrah buffaloes slaughtered at different weights.

MATERIAL AND METHODS - The experiment was carried out in the experimental feedlot of the Department of Nutrition and Animal Improvement of the School of Veterinary Medicine and Animal Science of the Sao Paulo State University – UNESP, Campus of Botucatu, São Paulo State, Brazil. The experiment took place at July of 2005 to January of 2006. Ten non-castrated Murrah buffaloes were used, with average live weight of 330 kg and 14 months of age and divided in two groups and slaughtered when they reached 450 and 500 kg live weight. Animals received *ad libitum* diet, in enough amounts for 5% of daily surplus, related to the natural substance. Each 28 days the animals were weighed, for the adjustments of the diets, always before the first meal of the day and with 16 hour of solids fast. After reaching the praised weights, the animals were slaughtered in commercial slaughterhouse in the normal flow. After slaughter, carcass identified, weighed and cooled for 24 hours. After that, *Longissimus dorsi* muscle samples were taken, to accomplish the analyses of centesimal composition, following the method of A.O.A.C. (1990); shear force, according the methodology for Savell et al. (1998); and calorie, using of the calorimeter. The determination of the *Longissimus* muscle area (LMA) was made after the cooling, between 12^a and 13^a ribs through tracing in vegetal paper and posterior evaluation in Polar Planimeter A. OTT. The fat thickness (FT) was measured after cooling the carcass between 12^a and 13^a ribs, in the same height of the measure of the LMA through paquimeter. The methodology used to determinate the marbling degree was of USDA (1989). The experimental design adopted was completely randomized, with five repetitions for each treatment. The data of the experiments were submitted to the analysis of variance and the comparative average of the treatments through test F with 5% of significance. The analyses had been carried out by the Statistical Analysis System program (SAS, 1996).

RESULTS AND CONCLUSIONS - It did not have significant difference ($P>0,05$) between the treatments of all the analyzed variable (see Table 1).

Values of LMA founded in the present study confirm the results of Jorge et al. (1997a) in study comparing bovine and buffaloes non-castrated slaughtered in different stages of physiological maturity (slaughter weight), in which was also not found significant difference ($P>0,05$) between treatments for buffaloes slaughtered at 450 and 500 kg live weight, not only for LMA but also for FT. Tenderness values were similar to the existing ones in literature and demonstrate that the buffalo meat is tender, being inside of the ideal gauge (< 5 kgf). Positive correlation was observed significant ($P<0,05$) between protein and shear force of meat. The referring data to correlations between the analyzed variable are presented in Table 2.

Table 1. Means and standard deviations of the moisture, crude protein, fat, ash, calorie, shear force, *Longissimus muscle* area, fat thickness and marbling of the longissimus dorsi muscle from non-castrated Murrah buffaloes slaughtered at 450 and 500 kg live weight.

Variable	Class of live weight	
	450 kg	500 kg
Moisture (%)	74.88 ^a ± 1.60	75.10 ^a ± 1.00
Crude Protein(%)	20.76 ^a ± .72	20.68 ^a ± 1.01
Fat (%)	2.24 ^a ± .69	1.92 ^a ± .34
Ash (%)	1.27 ^a ± .44	1.09 ^a ± .54
Calorie (cal)	131.08 ^a ± .29	132.87 ^a ± .06
Shear Force (kgf)	4.34 ^a ± 5.98	3.54 ^a ± 3.23
Longissimus muscle area (cm ²)	50.20 ^a ± 1.30	58.20 ^a ± 2.58
Fat thickness (mm)	6.30 ^a ± 4.64	5.52 ^a ± 6.98
Marbling (point)	2 ^a	2 ^a

P>.05 – Means followed by the same letter in the line, did not differ by F test.

Table 2. Pearson correlation coefficients among the physical-chemical parameters of *Longissimus dorsi* muscle from non-castrated Murrah buffaloes slaughtered at 450 and 500 kg live weight.

Variables	Moisture	Crude Protein	Fat	Ash	Calorie	LMA	FT
Shear Force	-.20	.73*	-.27	.54	.70	-.39	.13
Moisture	-	.01	-.28	.04	-.033	-.05	.49
Crude Protein	-	-	-.47	.49	.36	-.12	.32
Fat	-	-	-	.05	+.26	.28	+.40
Ash	-	-	-	-	.40	.07	-.29
Calorie	-	-	-	-	-	-.47	.08
LMA	-	-	-	-	-	-	-.18
FT	-	-	-	-	-	-	-

LMA = *Longissimus muscle* area; FT = fat thickness; * P<.05.

It can be concluded that there is no significant differences in the chemical characteristics of the *longissimus dorsi* muscle from non-castrated Murrah buffaloes slaughtered to 450 and 500 kg live weight and positive correlation between crude protein text exists of the *Longissimus dorsi* muscle and the shear force in of the same muscle. More studies must be developed about quality of buffalo meat, to expand the knowledge on the traits being thus propitiated, better knowledge for the scientific community, demystifying the species mainly to the final consumer, who has another excellent red protein alternative of high biological value for their feeding.

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