EVALUATION OF HUMPBACK MUSCLE (*RHOMBOIDEUS M.*) TEXTURE FROM ZEBU BREED (*BOS INDICUS*)

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Background

Meat texture sensation is dictated by the presence of several factors including the amount of intramuscularly fat, water holding capacity, connective tissue and actomyosin complex (Avery and Bailey 1995). Collagen and its crosslinking are important factors to be considered (Shimokomaki, et al., 1972, Coró, et al., 2002) and other studies indicated that marbling degree accounts for 3 to 10.0% of the variation in texture of beef (Tatum, et al. 1980). Humpback m. is known in Brazil as *cupim* and it is an unique muscle from zebu breed (*Bos indicus*) and comprises of app. 1.0% of its total carcass. It is a very popular meat dish and served normally as barbecue. Lipid fraction represents nearly half of the basic chemical composition of 24 mo old (Pedrão et al., 2001) and in this paper we attempted to determine the influence of collagen, pyridinoline and lipid contents on *cupim* texture.

Objectives

Evaluation of *Rhomboideus* m. from Zebu (Brahman) breed (*Bos indicus*) texture in comparison to *Longissimus dorsi* m. from the same 24 mo old animal.

Methods

Animals: Six animals of 24 mo old zebu breed *(Bos indicus)* were slaughter using a commercial abattoir.

Samples: Six samples of both *Rhomboideus m* (Rb). and *Longissimus dorsi m.* (LD) were excised from the same carcass and adipose tissues were carefully dissected out and intramuscular samples were analyzed.

Collagen determination: It was based on Woessner technique (1961)

Lipid fraction - It was determined according to Folch et al. (1957).

Pyridinoline determination - It was performed by HPLC (AVERY et al. 1996).

Meat texture: Texture was measured by Warner Bratzler shear force using Texture Analyzer, TAXT2i model (Young *et al.*, 1994).

Microscopy studies: Samples were fixed with Bouin and stained with HE

Statistical analysis: Analysis was processed using Statsoft™ statistic for Windons 5.0 (1995)

Results and discussions

In Table 1, it can be observed that there is variation in texture measured by Warner Bratzler and Rb shows to be more tender than LD ($p<0.05$). It is not an obvious result taking into consideration the relative proportion of collagen crosslinks because there are app. over 10 times more Pyridinoline in Rb in comparison to LD. On the other hand, there are over 15 times more fat fraction mostly located intramuscularly in Rb in relation to LD and conversely almost twice as much protein fraction in LD and being moisture 1.5 times more in LD. Although not yet measured by taste panel in this experiment, it is known that Rb is a tough meat and there is a need for several hours of cooking or pressure cooker treatment before serving. It has been shown by Nishimura et al. (1999) that LD in Japanese Black steers has a tender meat because of high content of marbling when compared to a low fat content muscle as semitendinosus. In our case, however, despite of higher lipid fraction content, this fact is not enough to tenderize *cupim* and shear force is not a good measurement to indicate Rb texture. Finally, seems that collagen presence and its crosslinking seem to play important role towards texture on *Rhomboideus* m. despite of excess concentration of lipid fraction as it can be observed in Fig 1Aand B.

Conclusions

Rhombeideus m. is a special muscle and Warner Bratzler methodology is not a good parameter to measure its texture.

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Table 1 – Collagen, fat content, moisture (g/%) and Warner Bratzler texture of *Rhomboideus e L. dorsi* muscles from 24 mo old *Bos indicus*

Samples	Texture (Kg/F)	Collagen (g%)	Pyridinoline (mo/mol de colágeno)	Fat content (g%)	Moisture (g%)
Rhomboideus m.	5.81 (±1.34)	12.40 (±0.71)	0,452417 (±0.254)	47.7 (±8.92)	40.05 (±11.03)
L. dorsi m.	7.98 (±1.93)	9.56 (±0.62)	0,032389 (±0.032)	2.8 (±0.27)	72.72 (±3.03)

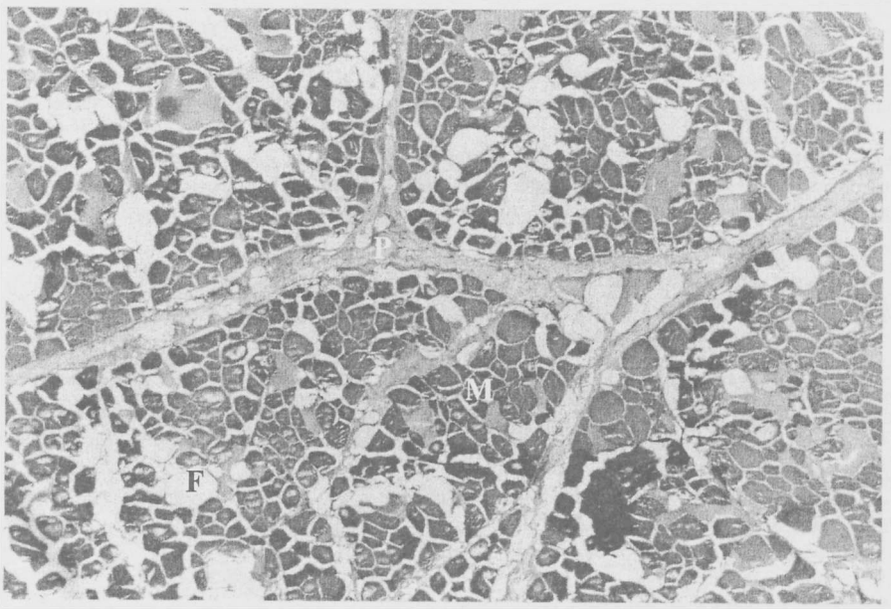

Figure 1A – Light microscope of Bos indicus *L. dorsi* m. Note the distribution of fat cells (F) and muscle cells (M). P: Perymisium.

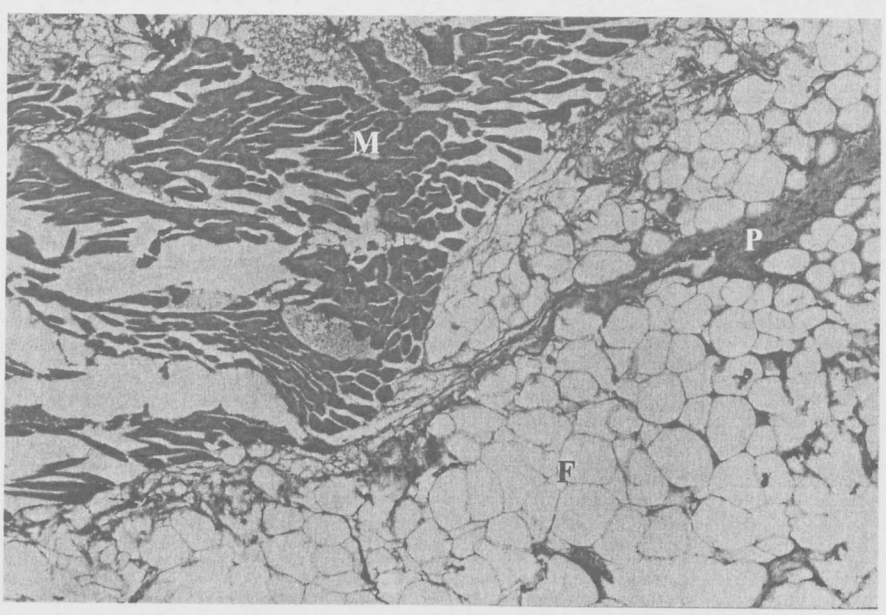

Figure 1B – Light microscope of Bos indicus *Rhomboideus* m. Note the higher distribution of fat cells (F) in relation to muscle cells. P: Perymisium.