HUMPBACK MUSCLE (*Rhomboideus* m)FROM ZEBU BREED, *Bos indicus*. LIPID FRACTION BIOCHEMICAL CHARACTERISATION

Mayka R. Pedrão[1,2] , Nilson E. de Souza[3], Makoto Matsushita[3] & Massami Shimokomaki.[1]

[1]Department of Food and Drugs Technology, Agricultural Research Centre, Londrina State University, P. O. Box, 6001, CEP 86051-970, Londrina, PR, Brazil, [2]Northern University of Parana, Av. Paris, 675, CEP 86041-120 Londrina, PR, Brazil, [3]Chemistry Department, Maringa State University, Av. Colombo 5790, CEP 87020-900, Maringa, PR, Brazil. -mail: mshimo@uel.br

Key words: fatty acid, *Longissimus dorsi*, *Bos taurus*, palatability

Background

There are approximately 160 millions beef cattle in Brazil and the majority of them is represented by *Bos indicus* which help the country to be a second beef meat producer country in the world. Humpback muscle popularly known as cupim in Brazil, is unique to zebu breed and comprises approx. 1.0% of its total cold carcass being very appreciated as barbecue dish by the population. It is believed that its biological origin was the necessity of this animal to have supply of nutrients in order to resist the long warm and dry season. One of its characteristic is the visible presence of high proportion of fat fraction and being relatively tough but few studies are available in relation to its chemical composition, collagen content and subcutaneous and intramuscular fats.

Objectives

This work reports the basic chemical composition and fatty acids profile of humpback muscle, *Rhomboideus m.* in comparison to *Longissimus dorsi* m. from the same animal.

Methods

Animals: Six animals 24 month old zebu breed *(Bos indicus)* were slaughter using a commercial abbatoir (Jataizinho, PR –Brazil) fed a native grasses. Animals were slaugther following commercial practices and carcasses were kept refrigerated for 24 hours.
Samples: Six samples of both *Rhomboideus m.* and *Longissimus dorsi m.* were excised from carcass and adipose tissues were carefully dissected out and intramuscular samples were analysed.
Basic chemical composition: Moisture, ash, and protein concentration was determined according to AOAC (1990). Lipid fraction was extracted from 15,0 g samples with chloroform:methanol (2:1, v/v) as described in the method of FOLCH et al. (1957).
Fatty acid profile: Methyl esters were prepared by transmethylation according to procedure of ISO (1978) using KOH 2molL^{-1} in methanol and n-heptane. Methylated fatty acids were analysed by gas liquid chromatography (Shimadzu) on a 50m x 0.25 mm and 0.20μm glass capillary column (Carbowax 20M) with a flame ionization detector. The temperature was programmed to 10K/min from 423K to 513K. Identification of sample fatty acids were made by comparing the relative retention times with standard fatty acids methyl esters (Sigma Chemicals). The detailed techniques were described elsewere (ROWE et al. 1999).
Statistical analyses : Analyses were made in duplicate and results were expressed as mean values ± standard deviations using Microsoft Excel Programme, 2000.

Results and Discussion

In Table 1, it is described the obtained basic chemical composition of both muscles. *Rhomboideus m.* presents over 12 to 15 times more lipid fraction and conversely approx. half moisture and protein fraction than *L. dorsi*. This value for LD is similar to the other reports (NISHIMURA et. al., 1999). This fat higher contents makes the raw *Rhomboideus* m. more tender than LD whereas cooked samples present similar texture. These results probably reflect the relative decrease of substantial amount of *Rhomboideus* m fat during their heat treatment (not shown). Table 2 shows the fatty acid profile of both muscles. SFA, MUFA and PUFA concentrations were approximately similar to both muscles. This similarity is also observed in comparison with the published reports for *Bos taurus* (CROUSE et al., 1989). The calculated 0.11 value for the ratio PUFA/SFA (Table 2) is similar to that reported in *Bos taurus* LD by ENSER et al. (1996).

Conclusion

Bos indicus Longissimus dorsi m. presents qualitatively similar fatty acids profile comparing to *Rhomboideus* m. The significant difference is related to quantitative amount of lipid in humpback muscle which affects its palatability and texture.

References

AOAC. 1990. 15th ed. Arlington.
CROUSE et al., 1989. J. Animal Sci. 67:2661-2668.
ELLIOT, et al. 1999. J. Animal Sci. 77:1919-1929.
ENSER, et al. 1996. Meat Sci. 42:443-456.
GARDEMER, 1998. 44th ICoMST. Barcelona, pp.106-119, Spain.
ISO, 1978. Method ISO#5509.
NISHIMURA, et al. 1999. J. Animal Sci. 77:93-104.

ROWE, et al. 1999. Meat Sci. 51:283-288.
YANG, et al. 1999. Meat Sci. 51:1-9.
ZEMBAIASHI, M. & NISHIMURA, K. 1996. Meat Sci. 43:83-92.

TABLE 1 - Basic chemical composition of *Rhomboideus* m. and *Longissimus dorsi* m. of 24 mo. old *Bos indicus* breed.

Percentage	*Rhomboideus* m.	*Longissimus dorsi* m.
Moisture	36.70 (±1.49)	73.34 (±1,77)
Ash	0.99 (±0.002)	0.99 (±0.0004)
Lipid fraction	48.82 (±6.8)	3.39 (±1.34)
Protein fraction	12.60 (±2.70)	21.18 (±2.12)

* - Expressed values in wet basis.

TABLE 2 –Amount of fatty acids (g/100g) polyunsaturated fatty acid (PUFA), monounsaturated fatty acid (MUFA) and saturated fatty acid (SFA), ratio PUFA/SFA relation linoleic acid/linolenic acid (C18:2w6/C18:3w6) of *Rhomboideus* m. and *Longissimus dorsi m* from 24 month old *Bos indicus* breed.

Total lipids (g/100g) of meat	*Rhomboideus m*	*L. dorsi m.*
SFA	40.2704	40.8843
MUFA	56.4556	55.2155
PUFA	3.274	3.9002
PUFA/SFA	0.0809	0.0954
w6/w3	0.6045	1.1729