CALCIUM CONCENTRATION IN MUSCLE Longissimus thoracis AND MEAT TENDERNES OF NELLORE CATTLE

Jessica Moraes Malheiros; J. C. S., Vieira*; C. E., Valencia-Enríquez; C. P., Braga; G. C., *Venturini; H. N., Oliveira; P. M., Padilha; L. A. L., Chardulo.*

Sao Paulo State University, Institute of Biosciencies, Department of Chemistry and Biochemistry, Sao Paulo, Brazil

jcavalcante-s@bol.com.br

Keywords: Beef cattle; FAAS; Meat quality; Shear force.

Introduction

The increased consumption of meat products is directly linked to the quality of marketed meat and the most important factor of quality ie the tenderness (WEZEMAEL et al., 2013) and consequently an increase in consumption, as the inconsistency this feature generate marketing problems for the meat industry. In this sense, considering the importance of the Zebu cattle (Bos indicus) for Brazilian agribusiness, the selection using a breeding program for tenderness emerges as a promising alternative for the production of naturally tender zebu meat (VELHO et al., 2008). The known calpain is calcium dependent proteases involved tenderize meat during the post-mortem period, along with the key degradation of myofibrils and structural proteins. Therefore, this study aims to quantify calcium in muscle tissue of three experimental groups in order to evaluate the calcium concentration of calcium with the meat quality of Nellore cattle.

Methods

Ninety animals were feedlot finished with average weight to 550 kg and 27 months. After slaughter, samples of the *Longissimus thoracis* muscle between 12 - 13th ribs were designed the tenderness analysis through shear force (SF) and myofibrillar fragmentation index (MFI). Through principal component analysis three contrasting groups for meat tenderness were formed: 15 animals of tender meat (5 animals per subgroup - M1, M2 and M3); 15 with intermediate values (I1, I2 and I3) and 15 tough meat (D1, D2 and D3). Approximately 2 g of muscle tissue from the pool of each experimental subgroup were ground in 20 mL deionized water using an Ultra-Turrax high shear mixer (Marconi – MA102/E), centrifugation at 13.000 rpm at 4 °C. The protein extracts were precipitated using an ice-cold 80% (v/v) acetone solution at a 1:4 sample:acetone ratio. Two protein pellets of each subgroup were transferred to test tubes, to which were added 500 uL sulfuric acid and 200 uL sodium peroxide. The set of test tubes was placed in block digestor Marconi at 40 °C and the acid extracts were transferred to test tubes measured of 5 mL and supplemente with deionized water and added 1 mL of lanthanum. The determination of calcium was realized in the pellet by flame atomic absorption spectroscopy (FAAS) (Moraes et al., 2013).

Results

In all pellets from the six experimental groups was detected the presence of concentration calcium.

Table 1. Results obtained of shear force, myofibrillar fragmentation index and quantification of calcium in the pellets of the muscle Longissimus thoracis of Nellore cattle.

	Shear force (Kg)	Myofibrillar fragmentation index	Calcium concentration (mg/g)
Pellet I 1	5.4 ± 0.6^{a}	54.1 ± 16.3^{a}	0.009 ± 0.005^{a}
Pellet I 2	5.5 ± 0.5^{a}	57.3 ± 19.4^{a}	0.0045 ± 0.0007^{a}
Pellet I 3	5.8 ± 1.1^{a}	49.9 ± 6.4^{ac}	0.025 ± 0.0056^{a}
Pellet M 1	4.0 ± 0.8^{b}	59.5 ± 3.5^{a}	0.327 ± 0.041^{bc}
Pellet M 2	4.1 ± 0.7^{b}	54.5 ± 10.1^{a}	0.1925 ± 0.08^{ab}
Pellet M 3	3.7 ± 0.9^{b}	53.4 ± 12.0^{a}	0.5345 ± 0.16^{bc}
Pellet D 1	7.3 ± 1.0^{c}	38.5 ± 6.7^{b}	0.6165 ± 0.1845^{bc}
Pellet D 2	7.5 ± 1.0^{c}	39.2 ± 4.6^{b}	0.8295 ± 0.0007^{c}
Pellet D 3	9.0 ± 1.7^{c}	43.4 ± 15.2^{bc}	1.728 ± 0.34^{d}

Conclusion

The proposed method for determining of calcium in meat samples using FAAS demonstrated higher calcium concentration in the pellets belonging to the subgroups of tough meat, that is, samples negatively relating to the tenderness of the meat.

References

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