

# A potential genetic marker for meat tenderness in the calpastatin gene in Nellore (*Bos indicus*) cattle



A. F. Rosa; M. E. Carvalho; S. L. e Silva; R. C. Gomes; M. N. Bonin; J. P. Eler; J. B. E. Ferraz; M. D. Poleti; A. G. Caritá; N. L. Campos; E. C. M. Oliveira; J. C. de C. Balieiro

<sup>1</sup>College of Animal Science and Food Engineering (FZEA), University of São Paulo - Brazil

<sup>2</sup>Luiz de Queiroz College of Agriculture (ESALQ), University of São Paulo - Brazil

## Introduction

Identification of the genes and/or polymorphisms underlying quantitative/qualitative traits, and an understanding of how these genes/polymorphisms interact with the environment or with other genes affecting economic traits might be the keys to successful application of marker-assisted selection in the commercial animal population .

## Objective

The aim of this study was to analyze the association between a single nucleotide polymorphism (SNP) in the calpastatin gene and meat tenderness in Nellore cattle and evaluate the allelic frequency of the SNP.

## Material & Methods



- 76 Nellore steers
- Feedlot Finished



Meat Samples  
Ageing 0, 7 or 14 days



Blood Samples  
DNA extraction



Real Time – PCR  
UGOCAST SNP  
(GenBank AY008267)



- WBS
- Unthawed samples
- AMSA (1995)

## Results

The results showed that the allele C was a little more frequent (0.51) than allele G (0.49) in the evaluated population and 22.4% of the population had GG genotype, whereas the frequencies for CC and CG genotypes were 23.7 and 53.9%, respectively (Table 1).

Table 1. Genotypic frequencies for CAST polymorphism.

| Marker | Alleles | Frequency | Percent |
|--------|---------|-----------|---------|
| CAST   | GG      | 18        | 22.4    |
|        | CG      | 41        | 53.9    |
|        | CC      | 17        | 23.7    |
|        | Total   | 76        | 100     |

It also was observed an interaction between CAST and aging time for Warner-Bratzler shear force (WBSF; kgf). As expected, aging increased meat tenderness for all genotypes. There were no differences among genotypes for WBSF at 0 and 7 days of aging. However, animals that presented the CC genotype had lower WBSF (softer meat) than those with GG. WBSF did not differ between CC and CG, and CG and GG as well.

Table 2. Least squared means for Warner-Bratzler shear force (WBSF) according to genotypic for CAST marker and time of maturation at 0, 7 and 14 days in the Nellore beefs.

| Marker | Genotype | WBSF (kg)                |                         |                          |
|--------|----------|--------------------------|-------------------------|--------------------------|
|        |          | 0                        | 7                       | 14                       |
| CAST   | GG       | 9.7 ± 0.6 <sup>Aa</sup>  | 8.8 ± 0.6 <sup>Ab</sup> | 8.1 ± 0.6 <sup>Bb</sup>  |
|        | CG       | 10.3 ± 0.3 <sup>Aa</sup> | 8.7 ± 0.3 <sup>Ab</sup> | 7.1 ± 0.3 <sup>ABc</sup> |
|        | CC       | 10.2 ± 0.6 <sup>Aa</sup> | 7.8 ± 0.6 <sup>Ab</sup> | 6.2 ± 0.6 <sup>Ac</sup>  |

## Conclusion

The SNP in the calpastatin gene can be used as a marker for meat tenderness in Nellore (*Bos indicus*) cattle in genetic selection programs.