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Association of a Single Nucleotide Polymorphism in M-Calpain Gene with Warner-Bratzler Shear Force in a Crossbred Brahman-Angus Population

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Objectives

Tenderness is a major factor influencing consumer satisfaction of beef products. The calpain-calpastatin system influences tenderness through the proteolysis of structural proteins. The purpose of this study was to investigate the impact of a Single Nucleotide Polymorphism (SNP) in the calpain gene, on beef tenderness. A SNP is a genetic marker with a known location on a chromosome, where a single nucleotide is replaced with another in some individuals.

Materials and Methods

In this study, steaks were taken from the *longissimus dorsi* of 623 crossbred Angus-Brahman steers. The steaks were aged for 14 d and tenderness was determined by Warner-Bratzler shear force (WBSF). DNA was extracted from a blood sample collected at slaughter, using the Qiagen DNeasy Blood and Tissue Kit. The SNP was genotyped by real-time PCR and high resolution melt curve analysis. The allelic and genotypic frequencies were calculated using Proc Frec procedure of SAS (SAS Inst. Inc., Cary, NC). An association analysis was performed using the general linear model procedure in SAS, to determine the association between the genotypes and WBSF values. Year, breed group, cookingloss, and genotypes for the SNP were used as fixed effects in the model.

Results

The CAPN4751 SNP was polymorphic in the multibreed population with genotypic frequencies of 23.2% CC, 71.2% CT and 5.6% TT. The genotypes for CAPN4751 was not significantly associated with Warner Bratzler Shear Force values in this population. Breed group, year and cooking loss were highly significant. The mean WBSF for purebred Angus was 3.9, 75% Angus 4.09, 50% Angus was 4.05, Brangus was 4.15, 25% Angus was 4.5, and purebred Brahman was 4.4.

Conclusion

Although CAPN4751 was not significant in this study, consistent with previous research a trend between higher Warner Bratzler Shear Force Values and a higher percent Brahman was found, indicating that Brahman tend to have tougher meat.

