

DETERMINING THE EFFICACY OF A BIOSENSOR TO  
DETECT CALPASTATIN, A MEAT TENDERNESS INDICATOR

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ABSTRACT

An instrumental tenderness detection system used at the time of grading to sort beef carcasses on their predicted tenderness would be valuable for the beef industry. A biosensor to accurately predict calpastatin, the inhibitor of the enzyme responsible for increased tenderness due to aging, has been investigated as a detection system.

*Longissimus dorsi* samples from between the 12<sup>th</sup> and 13<sup>th</sup> rib of the beef carcass (n = 21 and n = 11) were extracted at 0, 24, 36 and 48 h postmortem for trial one and at 0 and 48 hr for trial two. These samples were assayed for calpastatin by traditional laboratory methods and with the developed biosensors. The biosensor used in trial one was an optical fiber and trial two was a capillary tube. Warner-Bratzler shear force was also performed on a steak from each carcass. In trial one, correlations were generated from each sampling period to determine the most closely correlated sampling times between the traditional assay and the biosensor. The highest correlations between the calpastatin and optical fiber were taken at 48 hr postmortem, suggesting that this is the best time for use of the biosensor in an online grading system. The correlation was lower for the capillary tube but there was less variation in the 0 hr capillary tube than the 0 hr pre-column and post-column optical fiber, therefore this is a more promising system. This research further advances the development of the biosensor and makes online assessment of calpastatin one step closer to reality.