

# IMPACT OF DIET AND QUALITY GRADE ON PROTEOMIC ANALYSIS OF OXIDIZED PROTEINS IN BEEF

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## I. OBJECTIVES

The explanation of the relationship between marbling and beef tenderness is still unclear, highlighting the need to evaluate the relationship between these valuable aspects of a positive consumer eating experience. This study was conducted to evaluate the effects of feeding diets with different types of processed corn and with or without distillers grains on byproducts of oxidative stress and how that relates to tenderness and oxidative damage of proteins in beef steaks of differing quality grade.

## II. MATERIALS AND METHODS

Steers ( $n = 240$ ) were finished on diets containing dry rolled corn (DRC), DRC + 30% dried distillers grains, steam flaked corn (SFC), or SFC + 30% dried distillers grains. Cattle were fed 10 per pen. Only pens with both upper 2/3 Choice and Select-grade carcasses were sampled, with a goal of 2 (and a minimum of 1) of each grade per pen. Three pens per treatment met the selection criterion, and 36 carcasses were chosen (21 upper 2/3 Choice and 15 Select). Strip loins aged for 2 d postmortem were fabricated in steaks and evaluated for Warner-Bratzler shear force and proteomic analysis evaluating oxidative damage in proteins.

## III. RESULTS

Upper 2/3 Choice grade steaks were found to be more tender than Select grade steaks ( $P < 0.05$ ). Across comparisons, proteomic analysis revealed increased oxidative damage of proteins like heat shock, glycolytic, apoptotic, and structural proteins. Upper 2/3 Choice steaks were found to generally have increased oxidative damage in glycolytic, structural, and heat shock proteins, compared to Select quality grade, similar to those identified in previous research evaluating tender meat ( $P < 0.05$ ). Samples from cattle fed DRC had increased oxidative damage from feeding distillers grains, while the SFC-related treatments had the inverse.

## IV. CONCLUSION

Overall results support the relationship between marbling and tenderness and suggest that oxidative stress may be a factor involved in the phenomenon.

Keywords: distillers grains, marbling, oxidative stress, proteomics, tenderness