

Project Title: Beef Tenderness Instrument: Phase I — Technology Evaluation

Principle Investigator: W.N. Cobb: University of Denver Research Institute (DRI)

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Laymen's Summary

Denver Research Institute (DRI) developed an ultrasound technology for grading the tenderness of beef, which is ultimately to be used in packing plants. Phase I of this project was designed to assess the current accuracy of this ultrasound tenderness grading technology. The four goals of Phase I were 1) determine the meat sample variables to be tested in this experimental task 2) collect and analyze signal data on numerous controlled rib-eye samples 3) develop additional signal processing techniques to account for fat and connective tissue variations and 4) establish the correlation of tenderness grading technology with Warner-Bratzler Shear measurements.

DRI's grading technology has been in development since 1996. The technology involves an ultrasonic instrument that is passed over the rib-eye area perpendicular to the muscle fibers to measure reflective Ultrasound waves. The data generated from the reflected waves is fed into a computer, which then calculates a tenderness reading. Up until now, qualification of beef tenderness has been the USDA grading system, which is a subjective analysis of beef quality determined by a visual inspection of marbling. The possibility of augmenting the two processes could improve the predictability of tenderness substantially.

In Phase 1, 100 rib-eye samples were tested and analyzed independently by DRI tenderness grading technology then compared to Warner-Bratzler Shear force measurements. In relation to the measurements based on the force required to cut each sample, the DRI tenderness grade was 93 percent accurate. The results from the sample testing showed that tough meat could be separated from tender with an accuracy of 97 percent using DRIs tenderness grading technology.

The results gathered in Phase I demonstrated the feasibility of developing an ultrasonic instrument to predict the tenderness of beef carcasses. Following phases in this research project will involve design and development of an automated instrument to be used in packing plants.

