Project Title: Biochemical Characterization of Meat Tenderness

Principle Investigator(s): J. T. Keeton, R.M. Marburger and R. M. Maddock

Institution(s): Texas A&M University

Completion Date: July 1999

Layman's Summary:

A study was conducted to evaluate and test the stress relaxation technique (Texture Analyzer Test) for beef tenderness developed by Spadaro (1996). As well as, correlate the compressive values for tenderness with Warner-Brazler shear (WBS) and sensory panel profile data. The final objective looked at factors affecting palatability (USDA quality grade, sarcomere length, collagen solubility, protein fractions, water holding capacity, color and pH) with corresponding predictive models.

Forty-five *Longissimus dorsi* muscles from USDA graded carcasses were selected on the basis of tenderness, with three initial groups assigned (tender, intermediate and not tender). Later in the study the steaks were reassigned on the basis of overall sensory tenderness. The steaks were then aged for two different periods 0 and 14 days. Then assigned for testing; one steak for sarcomere length, collagen solubility, protein fractions, water holding capacity, color, pH, proximate analysis and Warner-Brazler shear analysis; two steaks were assigned for the Texture Analyzer test (TA) and the sensory test. The TA test consisted of a 3% compression applied to a small raw steak sample for 4 minutes with the muscle fibers oriented in a parallel and perpendicular direction.

The predictive tenderness values obtained were found to parallel those of Spadaro (1996) and yielded higher correlation than WBS. In addition, the results found that the compression model values accounted for more variation in raw steak tenderness and thus correlated higher with sensory panel tenderness than did the WBS. The factors that affect palatability were only slightly correlated with the compression model values. The significance of this study is that it verifies the application of an objective biomechanical strain measurement to raw steaks that effectively predicts overall sensory tenderness of cooked steaks. Continued research and development of this technology could result in a rapid, cost efficient and predictable method of measuring beef tenderness.

Funded by the Beef Checkoff