K

S

U

The Tenderometer as a Tool for Evaluating Beef Tenderness[1,2]

M.E. Dikeman, H.J. Tuma, and D.M. Allen

Numerous instruments have been developed to objectively measure tenderness, an important eating characteristic of beef. The Kramer shear press and Warner-Bratzler shear show the best relationships to taste panel tenderness scores. However, shear values of raw muscle are poorly correlated with shear values of cooked meat. An instrument that could be used in the beef cooler on raw carcass muscle to predict tenderness of cooked meat would be valuable.

The Tenderometer, which objectively measures the force required to push ten needle-type probes to a constant depth into the longissimus muscle, was developed for commercial use by Armour and Company. The original data indicated high correlations with Warner-Bratzler shear force and taste panel evaluations of cooked muscle.

This study provides Tenderometer data on predicting tenderness of the longissimus muscle of male cattle from different sex-treatments.

Sixty Hereford and 60 Angus male calves were randomly assigned (within each breed) to six treatment groups based on sex alteration. At approximately 200 days of age, the calves were weaned and placed in a commercial packing plant. After a 24 hr. chill, the wholesale rib was removed from the left side of each carcass and transported to Kansas State University. The longissimus muscle was probed with the Tenderometer in accordance with the manufacturer's procedure. Steaks from the eighth and seventh ribs were evaluated for tenderness by the Warner-Bratzler shear and a taste panel.

Results and Discussion

Correlations between quality scores and tenderness data are presented in table 29. The correlation between Warner-Bratzler shear and taste panel scores ($r = -.67$) agrees with correlations reported by other researchers, and indicates that tenderness results in this study are both accurate and reliable. However, correlations of Tenderometer values with Warner-Bratzler shear values and taste panel scores were low ($r = 0.22$ and $-.21$, respectively).

Armour and Company has reported that as marbling increases, Tenderometer values increase. Therefore, one uses a correction factor for different carcass grades. In our study, however, marbling was not related to Tenderometer readings ($r = 0.10$); therefore, correction factors were not used.

The Tenderometer is simple to operate. It would be practical and useful for predicting tenderness if it could be proved accurate. However, results from this study indicate that the instrument is not accurate or reliable for tenderness predictions.

Table 29. Pooled correlations between quality scores and tenderness data

	Warner-Bratzler shear	Taste panel tenderness	Taste panel flavor	Taste panel juiciness	Taste panel overall acceptability	Tenderometer
U.S.D.A. carcass grade	0.06	-.07	0.10	-.08	-.10	0.17
Marbling score	0.01	-.01	0.11	0.02	-.01	0.10
Fat in longissimus, %	0.01	0.10	0.14	0.17	0.09	0.20
Tenderometer value	0.22	-.21	-.01	0.13	-.15	1.00
Taste panel tenderness	-.67					