TENDERNESS

Tenderness has been identified as a primary determinant of eating satisfaction among U.S. beef consumers. Though data collected during the latest checkoff-funded National Beef Tenderness Survey reveals that beef tenderness has improved over time, more work is needed to ensure this important consumer satisfaction trait is as consistent as possible. Systems that facilitate production of consistently tender beef would assist in attaining industry goals by building consumer demand and adding value to cattle. Tenderness management involves control and verification of specific process in the beef chain – both before and after harvest – that influence tenderness of the final product.

Beef tenderness is a complex trait that is influenced by a variety of factors. Pre-harvest factors that affect beef tenderness include those that are inherent to the animals themselves (i.e. genotype, sex, age, temperament) and those associated with cattle production practices (i.e. diet, time on feed, use of growth enhancement technologies, handling/stress, health). Post-harvest factors that affect beef tenderness include individual muscle, USDA Quality Grade, muscle temperature and pH at the onset of rigor mortis, rate and extent of muscle temperature and pH decline over time, chilling period, chilling temperature, carcass suspension method and length of aging period.

Each of these factors has been researched and evaluated over time with much of this research as a result of checkoff funding. A majority of the results from this checkoff-funded work are available through the following resources found in print and online (www.beefresearch.org) .

- *2005 National Beef Tenderness Survey*
- *Carcass Merit Project: Finding Live Animal Traits for Better Beef*
- *Pre-Harvest Cattle Management Practices for Enhancing Beef Tenderness*
- *Pre-Harvest Factors Affecting Beef Tenderness in Heifers*
- *Post-Harvest Practices for Enhancing Beef Tenderness*
- *Industry Guide for Beef Aging*
- *Dry Aging of Beef*

Because of the importance of tenderness to eating satisfaction, consumers, producers, product development experts and channel representatives often ask about the tenderness ranking of beef muscles. A checkoff-funded fact sheet compiles the data from 60 years of tenderness and sensory research to create a definitive ranking of beef muscles based on Warner-Bratzler shear force values (an instrumental measure of cooked beef tenderness) and sensory panel evaluations of tenderness, flavor and juiciness. Of the 40 muscles ranked, the *psoas major* (tenderloin), *infraspinatus* (top blade/flat iron), *spinalis dorsi* (present in the ribeye & chuck roll), *serratus ventralis* (underblade/boneless short ribs), *multifidus dorsi* (present in the ribeye & chuck roll), *subscapularis* (chuck) and *teres major* (shoulder clod petite tender) muscles were classified as tender with the lowest reported Warner-Bratzler shear force values (below 3.9 kg).

These data can be utilized to identify raw materials for specialized uses and value-added products. This fact sheet, titled *Ranking of Beef Muscles for Tenderness*, is available in print through NCBA and is posted online at www.beefresearch.org.

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