Our Future is Meat Quality

Dr. Jerry Lipsey
Executive Vice President, American Simmental Association

Ultimately, cattle value will depend on the degree of acceptability of the food quality they deliver to consumers. Satisfaction derived from meat consumption depends on psychological and sensory responses unique among consumers (Principles of Meat Science, 1994). Certainly, cultures and societies place various magnitudes of importance on the wide array of traits related to satisfactory meat eating. However, as our world becomes "smaller", we display more and more similarities of how we describe beef quality.

We cannot manage, what we cannot measure. Therefore, many studies have been conducted to determine beef quality. The following comments focus on U.S. Consumers responses to beef quality. U.S. Consumers routinely respond with these issues concerning beef quality:

1. Looks, smells and tastes great
2. Free from waste fat, i.e. is nutritious
3. Free from contaminants and unnecessary additives
4. Does not threaten our lifestyle or environment
5. Worth the price
6. Always convenient

As cattle producers and agri-business people, we have responsibilities to maintain or improve the above categories. The past 2 decades have seen U.S. Seedstock Producers focus on the sensory factors of beef quality. This is not to ignore the importance of producing cattle with outstanding meat yield; however, essentially all fresh beef in the U.S. is marketed "totally trimmed". Since these beef cuts have no external fat, our consumers make their selections on the combination of price + visual impressions (color, texture, intermuscular and intramuscular fat, fat color, etc.) + reputation of label (USDA Choice vs. Certified Angus or Hereford Beef vs. Coleman's Natural Beef, etc). These factors all surround expectations for the sensory value of our beef products. Scientists from most nations have spent decades investigating beef palatability and most report tenderness as the key factor affecting eating desirability.

The factors of beef tenderness are becoming well understood. The primary difference in tenderness between cuts from the various muscles is the amount and maturity of connective tissue. Cuts from muscles that are involved in strenuous exercise, such as locomotion, have more connective tissue than cuts from less contractile muscles. Therefore, streaks from the round are less tender than those from the loin. In addition, animal maturity plays a role in beef tenderness. Beef harvested from older animals is less tender because their connective tissue becomes less tender. However, scientists were slow to explain the reason(s) why beef harvested from the same muscles of similar aged animals often had great differences in tenderness.

For example, British cattle produce more tender beef than Continental breeds. In turn, beef from Continental breeds is more tender than product from Zebu. These differences in tenderness are the result of postmortem activity of proteolytic enzymes (enzymes that breakdown muscle proteins), not differences in connective tissue content or maturity. Scientists have focused on 2 enzymes, Calpain and Calpastatin.

Calpain enzymes actively breakdown muscle fibers. This phenomena is well established and we have successfully used the process in "aging" beef 10 to 20 days postmortem. Because of Calpain, aged beef is more tender than freshly processed beef. On the other hand, Calpastatin reduces the effectiveness of Calpain. So, Calpastatin retards the effectiveness of aging beef. Even though we've understood these scientific concepts for many years, few and perhaps no breed associations have performance tested for product tenderness, let alone, conducted genetic evaluation in search of superior sires.

In the fall of 1996, the American Simmental Association developed a carcass merit program with the vision of identifying sires with superior genetic value for tender beef. To date, more than 3,000 progeny have been harvested and ribeye steaks have been evaluated for tenderness. Through this program, we have recorded tremendous genetic variation for beef tenderness. We also collected and stored DNA on from every steak harvest and tested for tenderness.

We were pleased to find that federal government scientists in both Australia and the U.S. were busy developing gene markers for beef tenderness. The Australian research has uncovered a marker for Calpastatin. Genetic Solutions, LTD., has licensed the marker and markets it worldwide under the brand GeneSTAR Tenderness. We have asked the WSF to consider funding a project that would evaluate the effectiveness of GeneSTAR Tenderness in our genetic evaluation technologies.

To date we have not been able to make agreeable arrangements between Genetic Solutions and WSF to test and validate the effectiveness of GeneSTAR Tenderness.