"ENHANCE TASTE"--AN OVERVIEW

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Introduction

At the conclusion of the NBQA-91 Strategy Workshop, participants and guests ranked the top 15 quality concerns of the beef industry (Smith et al., 1992). "Low overall palatability" and "inadequate tenderness" were ranked sixth and seventh, respectively. While compositional issues such as "low overall uniformity of beef" and "excess external fat" were at the top of the list, as cattle become leaner in years to come, palatability issues may become more important to the beef industry and replace concerns about excess fat.

Taste is a very important issue for beef. Beef commands the highest prices at the consumer level compared with other high volume proteins such as poultry and pork. It is thought that the taste of beef is why consumers are willing to pay more for it than either of these two competing center-of-the-plate items. This is especially evident in "white table cloth restaurant" settings where rib and loin steaks can be priced in the $20 to $30 range. When products cost this much, consumers have high expectations that the dining experience will be outstanding. When it is not, they question whether they are willing to return again and face possible disappointment.

This paper will present a brief overview of taste and tenderness and their importance to the beef industry.

In addition, a summary of some of the findings from the Customer Satisfaction Study will be presented.

Importance of Taste and Tenderness to the Beef Industry

The National Consumer Retail Beef Study (Savell et al., 1989) indicated that "taste" had a positive impact on consumer attitudes toward beef. In almost all studies of reasons why consumers purchase the foods that they do, "taste" is singled out as the most important factor.

Savell and Shackelford (1992) reported on the significance of tenderness to the meat industry. Based on the results they surveyed, they stated that tenderness level is very important to consumers but is quite variable in beef steaks and roasts. The National Beef Tenderness Survey (Morgan et al., 1991) reported that there was tremendous variation in the tenderness levels of steaks and roasts purchased at the retail level. While the cuts from the middle meats (rib and loin) were not the major source of this variation, cuts from the end meats (chuck and round) were.

Savell and Shackelford (1992) used some pricing logic to show that the marketplace did differentiate products based on expected palatability differences. For example, they compared the prices quoted for Prime, Upper Choice (Modest and Moderate marbling), Choice, Select and No Roll (no grade designation) NAMP 180 beef strip loins, short-cut, boneless at the time the paper was prepared. Substantial price differences were found among these products reflecting perceived value differences by those who purchase these cuts. Savell and Shackelford (1992) also charted retail prices of steaks and roasts compared to their Warner-Bratzler Shear force values (an objective measure of tenderness).

They found that there was a strong relationship between tenderness and the price paid of beef. Taste and tenderness are traits that consumers want in beef and they are willing to pay to get them.

Edward P. "Ned" Grace III of Bugaboo Creek Steak House and a member of the Response Panel for the NBQA-95 uses this example with his employees to explain how important it is to satisfy each and every consumer in the restaurant business. He states that one bad eating experience results in the affected person telling 12 people who then tell 8 people each who then tell five people each who then tell two people each. This results in 960 people hearing of the problem.

He also noted that only one out of 10 dissatisfied customers will complain to the restaurant. "Word of mouth" advertising is important in the restaurant business; negative "word of mouth" can tear down a business as fast as good "word of mouth" can build one.

Harris and Savell (1993), in a review of the impact of carcass maturity on eating quality, stated that steaks and roasts from a single tough carcass could influence an estimated 542 consumers based on the number of steaks and roasts generated from a carcass and the number of servings that could be derived from them. This figure represents a staggering statistic that reflects how important it is to ensure that beef delivers high eating quality every time that it is served.

These examples show the importance of providing products to the consumer that deliver eating enjoyment and satisfaction. Presented below are findings from the Customer Satisfaction project, the largest in-home research project ever conducted involving beef.

Customer Satisfaction

Although the major thrust behind the beef industry's Value Based Marketing agenda (Value Based Marketing Task Force, 1990) has been on reducing excess fat, ensuring that an acceptable eating experience is enjoyed by consumers is very important. This area is addressed as Consensus Point 4, which states, 'There is currently inadequate data to clearly understand, and therefore respond to varying consumer demands for quality." A big criticism of the beef industry in the past is the apparent lack of producing beef to specific targets. The beef industry generally attempts to sell what it produces rather than determine what the market wants and then adjust breeding and feeding programs to produce such.

Most will agree that there is more than one market for beef. The National Consumer Retail Beef Study (Savell et al., 1987, 1989) found that some consumers preferred Choice because of its taste characteristics while other consumers preferred Select because of its leanness. Today, markets exist for Prime, high and average Choice (Certified Angus Beef, Monfort's Chef's Exclusive, Excel's Sterling Silver), Choice, and Select. What the beef industry does not know is the size of these markets today and what will their size be in the short- and long-term.

Data are needed not only for large and small metropolitan markets, but for retail and foodservice sectors as well. Until more definitive information is available to tell the beef industry what it should be producing, there will be no real targets to aim for resulting in the possibility of having vast under- or oversupplies of particular qualities of beef that may cause market prices to vary tremendously.

A step in the right direction to learn what consumers want in beef is the Customer Satisfaction project (National Live Stock and Meat Board, 1995). This project, which was coordinated by the National Live Stock and Meat Board on behalf of the Cattlemen's Beef Promotion and Research Board, was conducted by Texas A&M University, Colorado State University, and Yankelovich Partners with cooperation from Texas Tech University and the Standardization Branch of the Agricultural Marketing Service of the U.S. Department of Agriculture. Top Loin (Strip) Steaks, Top Round Steaks and Top Sirloin Steaks from carcasses of different degrees of marbling: Modest and Moderate (representing average to high Choice or Top Choice), Small (Low Choice), Slight+ (High Select) and Slight- (Low Select) were distributed to consumers in Houston, Philadelphia, Chicago, and San Francisco. Each household (n=300 per city) prepared (cookery method and degree of doneness) the steaks as they usually do. Results of this study give additional insight into the consumer preferences of steaks of different qualities as prepared in the home.

Data were analyzed to determine the impact of USDA quality grade, Cut and City on Consumer Overall Like ratings. It should not be surprising that numerous interactions were found in the analysis. Two tables reporting important interactions are reported in Table I and 2. Table 1 shows the Cut by USDA quality grade interaction. Grade had the greatest impact on the Top Loin Steak with the Top Choice being rated higher than the remainder of the grades. High Select cuts did not differ from Low Choice or Low Select; however, Low Choice did differ from Low Select. Grade had no effect on the Top Sirloin Steak. The Top Choice Top Round was rated higher than the other grades of Top Round Steaks, but no other grade-related differences were found. Across all USDA quality grades, Top Loin Steaks were rated higher than Top Sirloin Steaks and Top Sirloin Steaks were rated higher than Top Round Steaks.

Table 1. Least-Squares Means for Cut by USDA quality grade effect on Consumer. Overall Like ratings (23 =like extremely; 1=dislike extremely)

Cut	Low Select	High Select	Low Choice	Top Choice
Top Loin (Strip)	18.8	18.9	19.1	19.3
Top Sirloin	18.0	17.9	18.1	18.0
Top Round	16.7	16.7	16.9	17.1

The Cut by City effect interaction is reported in Table 2.

Among the four cities surveyed, consumers in Houston gave the highest ratings for each cut. Consumers in San Francisco rated Top Loin Steaks the lowest. The Top Sirloin Steaks was rated the lowest among the cities by those consumers in San Francisco and Philadelphia. The Top Round Steak received the lowest ratings by consumers in Philadelphia. Within each city, Top Loin Steaks were rated higher than Top Sirloin Steaks and Top Sirloin Steaks were rated higher than Top Round Steaks.

The most perplexing aspect of this table is that city was such a significant factor in determining how consumers rated steaks. In other words, products that may be acceptable in one city may not be rated as such in other cites.

Table 2. Least-Squares Means for Cut by City effect on Consumer Overall Like ratings (23 =like extremely; 1 =dislike extremely)

Cut	Chicago	Houston	Philadelphia	San Francisco
Top Loin (Strip)	19.1	19.6	19.0	18.5
Top Sirloin	18.0	18.8	17.7	17.6
Top Round	17.1	17.8	16.0	16.5

Data were analyzed within cut, and cooking method and degree of doneness were added to the model to determine the singular and combined effects of these factors on customer satisfaction. For this report, only information from the Top Loin Steak will be shown. Reported in Table 3 are the least-squares means for the effect of degree of doneness on the Top Loin Steak. The highest ratings were given to those steaks cooked to Medium Rare or less. The lowest ratings were given to those steaks cooked to Medium Well. Steaks cooked to Medium or Well Done or more were rated similarly and between the two extremes. It was proposed that steaks cooked to Well Done or more may have been preferred because those consumers liked the flavor of meat cooked this way.

Table 3. Least-Squares Means for degree of doneness effect on Consumer Overall Like ratings of Top Loin Steaks (23 = like extremely; 1 =dislike extremely)

Medium rare or less	Medium	Medium well	Well done or more
19.3	19.0	18.7	19.0

Table 4 presents the effect of USDA quality grade on Overall Like ratings. Top Choice Top Loin Steaks were rated the highest while Low Select Top Loin Steaks were rated the lowest. High Select Top Loin Steaks were rated intermediate in Overall Like ratings to the remaining grades but did not differ from either the Low Select or Low Choice steaks.

Table 4. Least-Squares Means for USDA quality grade effect on Consumer Overall Like ratings of Top Loin Steaks (23 =like extremely; 1=dislike extremely)

Low Select	High Select	Low Choice	Top Choice
18.7	18.7	19.0	19.3

A Cooking method by City effect was found for Overall Like ratings of Top Loin Steaks (Table 5). In Chicago, steaks cooked by indoor grill generally were rated the highest while those broiled were rated the lowest. In Houston, steaks that were pan fried, outdoor grilled, or broiled generally were rated the highest while those that were cooked over an indoor grill were the lowest. In Philadelphia, steaks that were outdoor grilled were rated the highest while all other cooking methods were rated lower. In San Francisco, steaks cooked by indoor grilling or pan frying received the highest ratings while those cooked by other methods were rated lower. Ratings given to the Top Loin Steaks by consumers in Chicago and Houston generally were higher than those given by consumers in Philadelphia and San Francisco, regardless of cooking method. Again, as was stated earlier, consumers have different preferences for the method of cookery based on the city in which they live. Determining why a particular city responded the way it did in this study is quite perplexing.

Table 5. Least-Squares Means for cooking method by city effect on Consumer Overall Like ratings of Top Loin Steaks (23 =like extremely; 1 =dislike extremely)

Cooking method	Chicago	Houston	Philadelphia	San Francisco
Outdoor gril	19.1	19.7	19.3	18.3
Broil	18.7	19.4	18.7	18.3
Indoor grill	19.4	18.5	18.5	19.1

Pan fry	19.1	19.9	18.6	18.9
Other	19.4	19.7	18.6	18.3

In summary, the findings of the Customer Satisfaction project show some of the factors that affect the taste and tenderness of beef. USDA quality grade, cut, city, degree of doneness, and cookery method can and do impact the customer satisfaction ratings of beef steaks. This is especially important as we see the number of interactions of these factors and how interrelated they can be. We must be careful not to oversimplify our pursuit of taste and tenderness by saying, 'just cook it less well done" or 'just make it have more marbling" or 'just teach them how to cook it.' Factors that affect these important ts are very complex, and problems with eating quality will not go away with superficial solutions.

References

Harris, J.J., and J.W. Savell. 1993. Impact of carcass maturity on the tenderness of beef from young cattle. Backgrounder, Department of Animal Science, Texas A&M University, College Station, TX 77843-2471.

Morgan, J.B., J.W. Savell, D.S. Hale, R.K. Miller, D.B. Griffin, H.R. Cross, and S.D. Shackelford. 1991. National Beef Tenderness Survey. J. Anim. Sci. 69:3274.

National Live Stock and Meat Board. 1995. Beef Customer Satisfaction. Report to the industry: A comprehensive in-home product test among frequent beef consumers. Developed and managed by the National Live Stock and Meat Board with Texas A&M University, Colorado State University, and Yankelovich Partners, Inc.

Savell, I.W., R.E. Branson, H.R. Cross, D.M. Stiffler, J.W. Wise, D.B. Griffin, and G.C. Smith. 1987. National Consumer Retail Beef Study: Palatability evaluations of beef loin steaks that differed in marbling. J. Food Sci. 52:517.

Savell, J.W., H.R. Cross, J.J. Francis, J.W. Wise, D.S. Hale, D.L. Wilkes, and G.C. Smith. 1989. National Consumer Retail Beef Study: Interaction of trim level, price and grade on consumer acceptance of beef steaks and roasts. J. Food Qual. 12:251.

Savell, J.W., and S.D. Shackelford. 1992. Significance of tenderness to the meat industry. Proc. Recip. Meat Conf. 45:43.

Smith, G.C.9 J.W. Savell, R.P. Clayton, T.G. Field, D.B. Griffin, D.S. Hale, M.F. Miller, T.H, Montgomery, J.B. Morgan, J.D. Tatum, and J.W. Wise. 1992. Improvincr the consistency and competitiveness of beef - A blueprint for total quality management in the fed-beef industry. The final report of the National Beef Quality Audit - 1991, conducted by Colorado State University and Texas A&M University, for the National Cattlemen's Association on behalf of the Cattlemen's Beef Promotion and Research Board.

Value Based Marketing Task Force. 1990. The War on Fat! A report from the Value Based Marketing Task Force, Beef Industry Council of the National Live Stock and Meat Board, Chicago, Illinois, and National Cattlemen's Association, Englewood, Colorado.