

Project Summary

Consumer Preference of Steak Thickness in the Retail Display Case from the Beef Strip Loin, Ribeye Roll and Top Sirloin when Cut to a Constant Weight

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Background

The beef industry has labored with the issue of producing steaks and other cuts of beef of uniform size to meet the demands of foodservice and retail consumers. The lack of size uniformity of rib and loin primals makes it difficult to ensure consistency in the end product due to disparities in cooking time, plate coverage and palatability. Over the past two decades, average carcass weight has increased and so has consumer acceptance of increased ribeye area (REA) (Dunn et al, 2000; Sweeter et al. 2004).

The National Beef Quality Audit of 1991 reported the average REA at 83 cm² with a range of 47 to 147 cm² (Lorenzen et al., 1993). In 1995, the National Beef Quality Audit determined average REA to be 83 cm² (Boleman et al., 1998). Average REA increased to 85 cm² in 2000 with an increased shift in range of 50 to 150 cm² (McKenna et al., 2002). Dunn and others (2000) were able to identify a range for REA acceptability of 77 to 97 cm².

Although Sweeter and coworkers (2005) were unable to identify an optimum REA in a retail setting, there was a noticeable willingness among consumer panelists to pay \$1.50/kg more for larger ribeyes (105 to 119 cm²) than smaller ones (<90 cm²).

Portion control in the fabrication of beef retail cuts is often dictated by product weight. However, larger *longissimus* cuts that are marketed in a retail case are often cut to the same or similar thickness as smaller *longissimus* cuts to prevent excessive thinness of larger steaks to facilitate preparation to desired doneness. In foodservice, the institutional purchasing of beef cuts is more directly the result of product weight. Thus, heavy-weight subprimals could be cut too thinly in order to fulfill product weight requirements. In this study, a retail consumer panel determined the acceptability of steaks of varying surface areas that are fabricated to the same portion weights.

The objectives for this project were to determine:

1. Consumer acceptance of strip loin, ribeye and top sirloin steak size when based on a constant weight of each steak;
2. Carcass selection criteria on ribeye size and carcass weight to achieve optimum consumer acceptance of strip loin, ribeye and top sirloin steaks;
3. Consumer's willingness to pay premiums for thicker cut strip loin, ribeye and top sirloin steaks.

Methodology

Five carcasses were selected from each of the following weight and ribeye groups to obtain a range of steak sizes and thicknesses (G1 – 226 to 271 kg/70.9 – 78.1 cm²; G2 – 272 to 316 kg/78.7 – 85.8 cm²; G3 – 317 to 361 kg/86.5 – 93.5 cm²; G4 – 362 to 407 kg/94.2 – 101.3 cm²; G5 – 408 to 452 kg/101.9 – 109.3 cm²). All carcasses were a yield grade of 1 or 2 and a USDA quality grade of Low Choice. All subprimals (Ribeye Roll, IMPS 112A; Striploin, IMPS 180; and Top Butt, IMPS 184) were further processed into individual steaks that weighed 345 g each for ribeye and strip loin steaks and 284 g each for top sirloin steaks. Steaks were individually packaged in Styrofoam trays and over-wrapped with polyvinyl chloride (PVC).

For steak selection, two steaks from each carcass (n=50/steak type) were randomly selected and displayed for consumer preference testing. Consumers were asked to select three steaks from each steak type and rank their selections based on color, marbling, texture and thickness.

For Pricing Selection, steaks were sorted by thickness and ten of each steak type were assigned to each of the three price labels (thin = \$8.99/lb ribeye and strip steaks and \$4.99/lb sirloin steaks; average thickness = \$9.99/lb ribeye and strip steaks and \$5.99/lb sirloin steaks; thick = \$10.99/lb ribeye and strip steaks and \$6.99/lb sirloin steaks). Steaks were displayed for consumer viewing and selection. Consumers were informed that all steaks weighed the same and weight and price were marked on each retail package. Consumers were asked to select the three steaks they would purchase from each of the steak types and rank their selections based on price, color, marbling, texture and thickness.

Findings

Steak selection

As weight groups and ribeye requirements went up, steaks decreased in thickness (Table 1). Based on carcass groups, consumers selected ribeye steaks from G5 more often ($P < 0.05$) than any other carcass group (Figure 1). There were no differences ($P > 0.05$) based on carcass group for strip loin and sirloin steaks (Figure 1). Male consumers selected ribeye steaks from heavier weight groups (G4 and G5) more frequently ($P < 0.05$) than other weight groups, whereas female consumers did not have a preference for ribeye steaks. Also, male and female consumers showed no preference ($P > 0.05$) among weight groups in their selection of strip loin and sirloin steaks. Consumers making less than \$20,000.00/year selected ribeye steaks and sirloin steaks from G5 more than any other carcass group. Steaks from G5 had an increase in surface area and may have given the appearance that the steak was heavier in weight. There was a tendency ($P = 0.06$) for those making under \$20,000/year to select strip loin steaks from G3 and G4 a higher percentage of the time than other groups. Consumers under the age of 20 selected ribeye steaks from G5 more ($P < 0.05$) than any other carcass group. Consumers between the age of 40 and 49 tended ($P = 0.07$) to select steaks from G3, G4 and G5. There were no differences ($P > 0.05$) in selection percentage of ribeye, strip loin or sirloin steaks by panelists relative to their reported beef consumption history. Consumers selected thickness as their number one priority 26.9%, 32.2 % and 33% of the time for ribeye, strip loin and sirloin steaks, respectively when given the choice of selecting each based on color, marbling, texture and thickness (Figure 2).

Steak selection based on pricing

There were no differences ($P > 0.05$) between male and female consumers for ribeyes based on price; however, 54.3 % of males and 54.5 % of females were willing to pay at least a \$1.00/lb premium for the ribeye steaks they selected. Similarly, there were no differences ($P > 0.05$) between males and females for strip loin steaks based on price; however, 68.4 % of males and 61.2 % of females selected strip steaks with a premium of \$1.00/lb or more. Age groups included group 1 (under 20 years), group 2 (20 – 29 years), group 3 (30 – 39 years), group 4 (40 – 49 years), group 5 (50 – 59 years) and group 6 (60 years or older). Age groups 1, 2, 4 and 5 (27.6%, 21.5%, 16.2%, and 28.0%, respectively) were less likely to select the highest priced thickest ribeye steaks. There were no differences ($P > 0.05$) among age groups for percentage of consumers selecting strip loin steaks and sirloin steaks for any premium thickness group. For ribeye steaks, differences ($P < 0.05$) only existed between consumers that earned less than \$20,000/year or more than \$60,000/year, with both groups selecting the lowest price steaks more often than the highest price steaks. There were no differences

($P > 0.05$) among income groups in the selection of sirloin steaks or strip loin steaks. Consumers that consumed beef two, three and four times a week were more likely to select sirloin steaks from the middle priced group. The same trend was not observed in the ribeye or strip loin steaks. Consumers who consumed beef more than four times a week were most likely to select the lowest priced (thinnest) ribeye steak. Consequently, more than 50% of consumers would pay at least a \$1.00 premium for steaks based on color, marbling, texture and thickness. When price premiums were added and price was added to the priority list, thickness still remained a priority for consumers as ribeye, strip loin and sirloin steaks were selected based on thickness 22.6%, 27.9% and 26.0% of the time, respectively (Figure 3).

Table 1. Average thickness of steaks from each weight group

group	500 cwt	600 cwt	700 cwt	800 cwt	900 cwt
Ribeye	3.8 ^a	2.8 ^b	2.8 ^b	2.5 ^c	2.1 ^c
Sirloin	3.8 ^a	3.5 ^a	3.0 ^b	2.8 ^b	2.2 ^c
Strip	3.5 ^a	2.8 ^b	2.7 ^b	2.3 ^c	2.3 ^c

^{a,b,c} Means in the same row with different superscripts are different

($P < 0.05$)

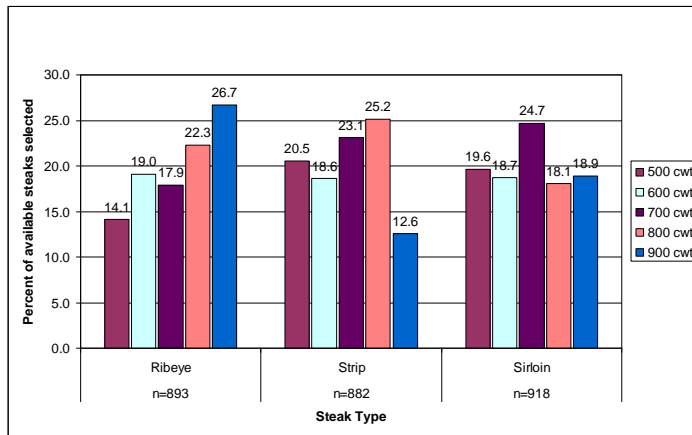


Figure 1. Steak selection from various carcass weight groups

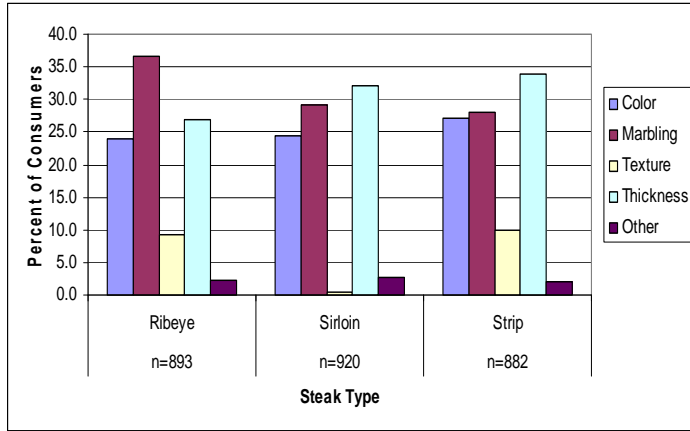


Figure 2. Percentage of consumers selecting steaks segmented by carcass weight based on first priority

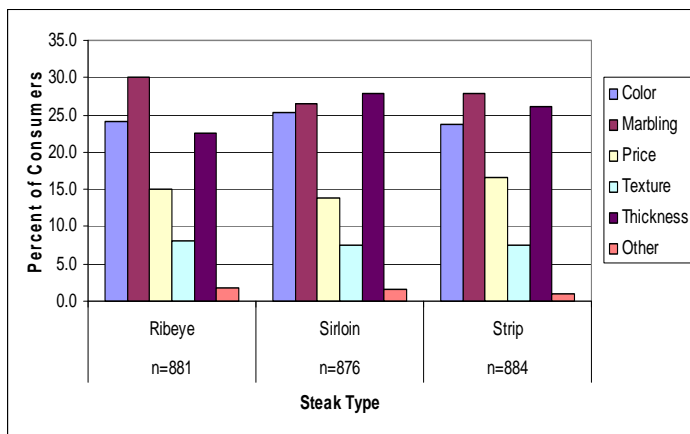


Figure 3. Percentage of consumers selecting steaks segmented by price based on first priority

Implications

By understanding consumers' preferences, the industry can optimize beef production. The data shows that there is a segment of the industry that can handle each of the thicknesses produced by the different carcass groups, and with this information, the beef industry can improve the sorting and marketing of these muscles. This data indicates that consumers would pay a minimum of \$1.00/lb for steaks that are thicker. To capture the premiums for thicker steaks would allow the beef industry to increase their profit margins and potentially funnel those funds producers.



Strip Steaks (L – Thick steak \$10.99/lb and R – Thin steak \$8.99/lb)

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