

PALATABILITY ASSESSMENTS OF BEEF TOP LOIN STEAKS PORTIONED BY WEIGHT OR BY THICKNESS SOURCED FROM VARIOUS CARCASS WEIGHT/RIBEYE SIZE COMBINATIONS

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I. OBJECTIVES

The study objectives were (1) to determine whether carcass weights and ribeye sizes influence consumer acceptance of beef top loin steaks and (2) to determine whether differences exist in palatability between steak portions cut by thickness and those by weight.

II. MATERIALS AND METHODS

Beef carcass sides ($n=90$) were selected to be USDA Choice (Small marbling only) and to meet a 3×3 treatment scheme of ribeye area (REA) sizes (83.9 to 89.8 cm², 90.3 to 96.1 cm², and 96.7 to 102.6 cm²) and hot carcass weights (HCW) (340.6 to 385 kg, 386.0 to 430.9 kg, and 431.4 to 476.3 kg). Beef strip loins were obtained, vacuum packaged, boxed, and shipped to a collaborating purveyor. Subprimals were passed through a Marel[®] intelligent portion cutter (M Series 3000, Marel[®], Lenexa, KS) intelligent portion cutter to generate steaks with 2 target endpoints: (1) portion thickness of 3.18 cm and (2) portion weight of 340 g. Steaks were assigned to either consumer sensory panel ($n=360$) or Warner-Bratzler shear (WBS) force ($n=180$) determinations, individually vacuum packaged, transported in insulated containers, and flash frozen for 24 h at -40°C before storage at -20°C until analyses were performed. Steaks were thawed (2°C to 4°C) for approximately 28 h before being cooked on grated, nonstick electric grills preheated to a surface temperature of $177^{\circ}\text{C} \pm 2^{\circ}\text{C}$. Steaks were flipped at internal temperatures of 35°C and were removed from the grills at 70°C . Cooked steaks for WBS force evaluation were placed on metal trays in a single layer, covered with plastic wrap, and stored (2°C to 4°C) for approximately 12 to 16 h before six 1.3-cm cores were removed for WBS force determinations. Steaks for consumer panels (IRB2019-0820M) were held in an Alto-Shaam oven set at 60°C for not more than 20 min before serving to panelists, who scored steak samples on 9-point scales (9 = like extremely; 1 = dislike extremely). Analysis of variance was performed wherein the main effects of REA, HCW, and portioning method (thickness or weight) along with the REA \times HCW interaction were included.

III. RESULTS

There were REA \times HCW interactions for WBS values for both steaks portioned by thickness ($P=0.031$) and by weight ($P=0.014$). In both cases, the trend was for the lowest WBS values to be from the lightest HCW/smallest REA combinations with the highest WBS values among the largest REA categories regardless of HCW category. Regardless of these trends, WBS values were all extremely low and met most thresholds for “very tender” classifications. When portioned by thickness, there were REA \times HCW interactions for overall liking ($P=0.042$) and flavor liking ($P=0.006$). In both cases, there were significant differences among the palatability ratings for HCW within the largest REA category, whereas HCW did not impact these ratings within the other 2 REA categories. It is not clear why this occurred. When portioned by weight, only overall liking ($P=0.42$) and tenderness liking ($P=0.009$) were impacted by REA with the highest ratings given to the smallest REA category. No palatability trait was influenced by HCW.

IV. CONCLUSION

Carcass weight and ribeye size do impact beef steak palatability. Fortunately, all palatability ratings and shear force values were in ranges thought to be highly acceptable.

Keywords: beef, carcass weight, palatability, ribeye area, Warner-Bratzler shear force