

2017 Reciprocal Meat Conference – Meat and Poultry Quality

Meat and Muscle Biology™



Evaluating Animal Well-Being and Temperament on Steak Meat Quality and Taste

F. L. Yang*, F. W. Pohlman, K. S. Anschutz, J. J. Ball, P. Hornsby, and J. L. Reynolds

Animal Science, University of Arkansas, Fayetteville, IN, USA

Keywords: color, display, meat quality, sensory, steak
Meat and Muscle Biology 1(3):82

doi:10.221751/rmc2017.076

Objectives

The purpose of this study was to compare meat quality and taste profile of steaks from longissimus dorsi with different temperament.

Materials and Methods

Calves were processed and scored for docility/temperament in the chute (1-docile, 2-restless, 3-nervous, 4-flighty, 5-aggressive, 6-very aggressive). Groups 5 and 6 were not observed and groups 3 and 4 were combined. Steers were housed with access to pastures then transferred to research feedlots until harvest and processed when back-fat reached a minimum of 1.27 cm. Carcasses were aged for 14 d before the 6th to 12th rib section were removed, frozen, cut into 2.54 cm steaks, and individually packed. For simulated retail display and instrumental color analysis, steaks were thawed overnight at 6°C and placed on polystyrene foam trays with absorbent pads and overwrapped with poly-vinyl chloride film, then placed in a commercial chest type display case at 2°C under deluxe warm white fluorescent lighting. Instrumental color was measured on d 0, 1, 2, 3, 5, and 7 of simulated retail display using a Hunter-Lab MiniScan SE spectrophotometer. Samples were read using illuminant A/10° observer, evaluated for CIE (L*, a*, and b*) color values, reflectance measurements from 400 to 700 nm to estimate oxymyoglobin, and hue angle and saturation index values were calculated. For sensory panel analysis, steaks were thawed overnight at 6°C and cooked on an electric griddle set at 205°C to an internal temperature of 70°C. A 6 member trained panel evaluated steak samples over 4 d under sodium color neutralizing lights for myofibrillar

tenderness, connective tissue amount, overall tenderness, juiciness, and beef flavor intensity on an 8-point scale. Color was analyzed as a 3x6 factorial arrangement with docile group, display day, and docility score and display day interaction as the main effects. Sensory panel data was analyzed with docility score group as the main effects with panelist and taste day as random effects

Results

Docile groups affected color with groups 1 and 2 being lighter (L*; $P < 0.05$), and group 2 being yellower (b*; $P < 0.05$) and greater ($P < 0.05$) hue angle than the other groups. There was no difference ($P > 0.05$) between docile groups for redness (a*), saturation index, and oxymyoglobin ratio. Display days affected color with d 0 being redder (a*; $P < 0.05$), yellower (b*; $P < 0.05$), greater ($P < 0.05$) saturation index, and greater ($P < 0.05$) oxymyoglobin ratio. There were no differences ($P > 0.05$) in lightness between display days and there was no interaction ($P > 0.05$) for any of the color attributes measured. For taste panel, docile groups 1 and 2 were more tender ($P < 0.05$) in myofibrillar tenderness, less ($P < 0.05$) connective tissue, overall more tender ($P < 0.05$), and more ($P < 0.05$) juicy than groups 3 through 4. Group 2 was more ($P < 0.05$) intense in beef flavor with groups 3 through 4 being least intense in beef flavor and group 1 being intermediate. There was no difference ($P > 0.05$) in off-flavor between the docile groups.

Conclusion

Docility affected lightness, yellowness, and hue angle. Docility also affected taste with the nervous-flighty group having negative impact on taste.