



Relationship between Physiological Maturity and Retail Shelf Life in Heifer Carcasses

K. C. Salove*, M. J. Colle, J. M. Rogers, S. J. Gray, M. Scott, D. M. Kerby, J. A. Nasados, R. P. Richard, and M. E. Doumit

Animal and Veterinary Science, University of Idaho, Moscow, ID, USA

Keywords: beef, color, heifer maturity, lipid oxidation
Meat and Muscle Biology 1(2):59

doi:10.221751/rmc2016.056

Objectives

Our objective was to determine the relationship between carcass maturity and retail fluid loss, color stability, and lipid oxidation of strip loin and bottom (outside) round steaks.

Materials and Methods

Right sides of A ($n = 24$), B ($n = 23$), and C ($n = 24$) maturity heifer carcasses were used. Carcasses under 30 mo of age based on dentition, and with a “small” (Sm) to “moderate” degree of marbling were selected. Beef strip loins (IMPS 180) and outside rounds (IMPS 171B) obtained from these carcasses were purchased from AB Foods (Toppenish, WA) and transported to the University of Idaho Meat Science Laboratory. Following a 14-d aging period, wholesale cuts were removed from vacuum packaging and ischiatic heads were removed from outside rounds to produce trimmed flats. Two 2.54 cm-thick steaks were cut from the trimmed flats and anterior ends of strip loins. One steak was used to measure retail fluid loss and color stability and the other was used to measure lipid oxidation. Steaks were placed in white Styrofoam trays with the freshly cut surface exposed and overwrapped with an oxygen permeable PVC film. Steaks used to determine retail color stability were weighed prior to packaging and displayed in a glass-fronted retail display case at 2.6°C for 6 d. Steaks were allowed to bloom for at least 60 min and then two objective color measurements per steak were taken using a Hunter MiniScan EZ. This represented d 0 of retail display, and subsequent color measurements were taken on d 1, 2, 3, 4, 5, and 6. The instrument was set to illuminant A and Commission International de l’Eclairage (CIE) L^* , a^* , and b^* values were recorded. Three evalu-

ators measured oxygenated lean color, surface discoloration, % discoloration, amount of browning, and color uniformity on each day of retail display. Following 6 d of retail display, steaks were removed from packaging and reweighed to determine retail fluid loss. Thiobarbituric acid reactive substances (TBARS) were quantified in samples obtained from steaks on d 0, 2, 4, and 6 of retail display. Data were analyzed using the Mixed Model procedure of the Statistical Analysis System (SAS Inst. Inc., Cary, NC) and significance was determined at $P < 0.05$.

Results

Marbling scores of the carcasses were not different across maturity groups ($P = 0.79$). Average marbling scores were Sm⁹³, Sm⁹⁹, and Sm⁹⁸ for A, B, and C maturities, respectively. Heifer carcass maturity did not affect retail fluid loss in either strip loin or bottom round steaks, or color stability of strip loin steaks ($P > 0.20$). However, the amount of browning in B maturity bottom round steaks was less ($P < 0.05$) than C maturity steaks. Furthermore, a maturity by day of retail display interaction was observed for bottom round oxygenated lean color ($P < 0.001$). Lean color of A, B, and C maturity steaks was similar until d 3 of retail display, after which C maturity steaks darkened at a faster rate than A or B maturity steaks. For bottom round steaks, a maturity by day of retail display interaction was observed for TBARS values. Interestingly, lipid oxidation in A versus B and C maturity steaks occurred faster from d 4 to 6 of retail display.

Conclusion

In conclusion, advanced skeletal maturity in heifer carcasses under 30 mo of age has little or no negative effect on retail product characteristics.