2019 Reciprocal Meat Conference – Meat and Poultry Quality

Meat and Muscle Biology™

Dry Aging of High Ultimate pH Beef

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Keywords: dark cutters, flavor, meat, palatability, sensory
Meat and Muscle Biology 3(2):55-56

Objectives

Dry aging is a process in which water is removed from the meat by evaporation. As meat loses water, the flavor compounds are concentrated, resulting in stronger flavor. Meat pH may be important when dry aging as it relates to the ability of muscle to bind water. Therefore, this study aimed to evaluate pH effects on water loss when dry aging and the effects on meat quality characteristics. Dry aging of dark cutting (DC) beef may improve flavor and increase yield.

Materials and Methods

Six USDA low Choice and six dark cutting (DC) carcasses with the same degree of marbling were selected and boneless strip loins from both sides were obtained. *Longissimus* muscle pH was measured, and carcasses were classified as DC (pH = 6.69), or control (pH = 5.47). Then, strip loins from each animal were assigned to 2 aging methods (wet or dry). The 4 treatments included 2 dry aging (DRY and DRY-DC) and 2 wet-aging treatments (WET and WET-DC). Dry aging occurred in individual dry-aging chambers at 50% relative humidity and 2200 RPM fan speed. The chambers (86 cm Length × 48 cm Width × 35 cm Height) have built-in weighing scales that can continuously monitor weight loss (± 5 g). Wet and dry-aged loins were aged in the same cooler for 45 d at 1°C.After aging, loins were fabricated into steaks and evaluated for trim loss, yield, tenderness (WBSF), color, discoloration, lipid oxidation, and sensory analysis (flavor) via triangle test (n = 32). Steaks assigned for color and lipid oxidation were placed under retail display (RD) at 2°C for 7 d. Rate of moisture loss and color data were analyzed as a split plot design with repeated measures. The TBARS data were analyzed as a split-plot design. All the other data were analyzed as a completely randomized design. Chamber (loin) was considered the experimental unit. Data were analyzed using the PROC GLIMMIX procedure of SAS with $\alpha = 0.05$.

Results

Wet-aged treatments had lower moisture loss, trim loss and higher yield than dry-aged treatments ($P < 0.05$). However, no differences in rate of moisture loss ($P = 0.51$),

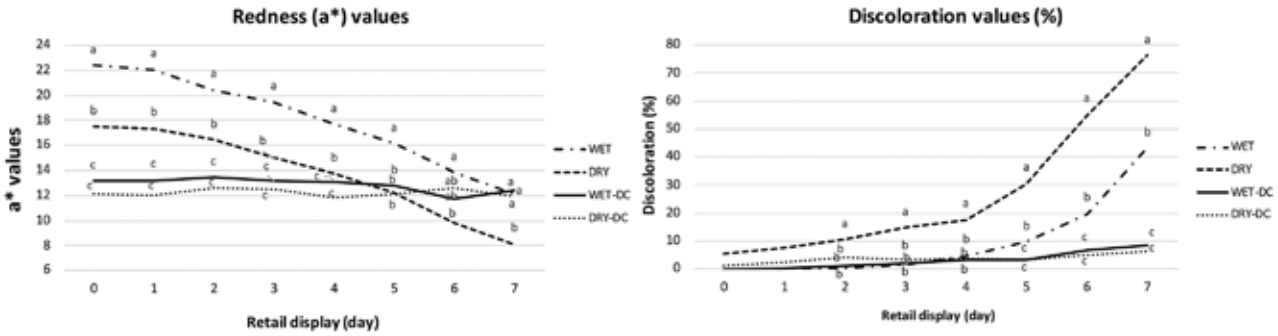

Figure 3. a) Effect of ultimate pH (Dark cutters [DC] vs. Normal) and aging method (Wet vs. Dry) on objective redness (a*) values of strip loins steaks aged for 45 d through 7 d of retail display. b) Effect of ultimate pH (Dark cutters [DC] vs. Normal) and aging method (Wet vs. Dry) on discoloration (%) of strip loins steaks aged for 45 d through 7 d of retail display. a-c Means within a day with different superscripts are different (P < 0.005).

total moisture loss ($P = 0.96$), trim loss ($P = 0.69$), or yield ($P = 0.75$) between DRY-DC and DRY were found. There were no differences among treatments for WBSF ($P = 0.67$). In general, DRY-DC and WET-DC steaks had the lowest lightness (L*) values, redness (a*) values (Fig. 3a), and yellowness (b*) values over the first 5 d of RD ($P < 0.05$). Discoloration scores for DC steaks remained low throughout the RD period (Fig. 3b). DRY steaks had greater TBARS values than any other treatment at 0 d RD. At 4 and 7 d of RD, DRY-DC and WET-DC steaks had the lowest TBARS values, DRY steaks had the highest, while WET was intermediate ($P < 0.001$). Results from the triangle test indicated a detectable difference between DRY-DC versus DRY ($P = 0.01$), DRY-DC versus WET-DC ($P = 0.01$), DRY-DC versus WET ($P = 0.01$), and WET-DC versus WET ($P < 0.01$). Panelists frequently made unsolicited comments which suggested inferior eating satisfaction associated with DC flavor (wet or dry), although they were not asked questions regarding preference.

Conclusion

Ultimate pH did not affect the rate and total moisture loss in dry aged beef. Results suggest that neither yield nor flavor were positively affected by dry aging of DC beef.