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Color and Lipid Stability of Dry Aged Beef During Retail Display

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Objectives

There has been an increased interest in merchandising dry-aged steaks at the retail level. Further understanding of the influence of the dry aging process on meat color and lipid stability is needed to ensure dry-aged beef products can be merchandised without adverse impacts on retail display life. Therefore, this study aimed to determine color and lipid stability of steaks from dry-aged beef loins over 7 d (d) of retail display.

Materials and Methods

Sixteen USDA low Choice boneless strip loins were assigned to one of four aging treatments: vacuum (Wet), dry-aging at 50% relative humidity (RH) (RH50), dry-aging at 70% RH (RH70), or dry-aging at 85% RH (RH85). Dry-aged loins were placed in each assigned dry aging chamber, while wet aged counterparts were aged in vacuum bags in the same cooler. Loins were aged for 42 d at 1°C. After aging, loins were trimmed of dehydrated lean/fat and fabricated into steaks. Steaks were trimmed of subcutaneous fat, and placed on foam trays, overwrapped with oxygen permeable film and placed under retail display (RD) conditions for 7 d at 2°C. Objective color measurements were taken once daily from d 0 to 7 of RD. Trained visual color panelists (n = 6) evaluated surface discoloration from d 0 to 7 of RD once daily. Lipid oxidation was measured via thiobarbituric acid reactive substance assay (TBARS) at 0, 4, and 7 d of RD. Color data were analyzed as a split-plot repeated measures design with treatment as the whole-plot and RD time as the repeated measures. TBARS data were analyzed as a split-plot design with aging treatment as the whole-plot, and RD time as the split-plot. In this study, chamber (loin) was considered the experimental unit. Data were analyzed using the PROC GLIMMIX procedure of SAS with $\alpha = 0.05$.

Results

For all three-color scales, a RD effect was found ($P < 0.001$). In general, L*, a* and b* values decreased as RD time increased, regardless of the aging treatment. Wet-aged steaks had higher L* ($P < 0.05$), a* ($P < 0.05$), and b* values ($P < 0.001$) than any other dry-aged treatment. No differences in L*, a*, and b* values among dry aging treatments were found ($P < 0.05$). A 2-way interaction between treatment and RD for discoloration was observed ($P < 0.05$). No differences were found among treatments over the first 2 d of RD ($P > 0.05$). Samples began to diverge on Day 3 of RD. Dry-aged steaks had greater discoloration scores ($P < 0.05$) than wet-aged steaks at 4, 5, 6, and 7 d of RD. However, no differences in discoloration scores among RH treatments were found. There was a RD effect on TBARS values ($P < 0.001$). Greater TBARS values were found as RD progressed from d 0 to d 4 and d 7, regardless of the aging treatment. A treatment effect was observed for lipid oxidation ($P < 0.05$). Dry-aged steaks had higher TBARS values than wet-aged steaks. No differences in TBARS values among dry aging treatments were found.

Conclusion

Dry aging of beef resulted in decreased lightness and redness values and increased lipid oxidation compared to wet aging. Results suggest that with prolonged RD dry aging of beef has the potential to reduce color and lipid stability compared to wet-aging and thus reduce display life. Dry-aged steaks met the 20% discoloration threshold and overcame the acceptability threshold of 2.28 mg of malonaldehyde/kg at d 4 of RD, indicating that dry-aged steaks can be merchandised in the retail level for 3 d without detrimental effects on color and lipid oxidation.

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