



Effects of Dry-Aging on Color and Oxidation Stabilities of Beef Loins

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Objectives

Dry-aging is a traditional process to store whole carcasses or unpackaged primals/sub-primals under a controlled environment. Due to its known positive impacts on palatability attributes, dry-aging has been typically practiced in local meat processors or small meat purveyors for upscale butcher shops and/or gourmet restaurants. While there is an increasing demand from local consumers to purchase dry-aged beef from a retail market, there is little information on how dry-aging affects color and oxidation stabilities of beef muscles. Therefore, the objective of this study was to evaluate the effect of dry-aging on color and oxidation stabilities of beef loins. To measure the objectives, the conventional dry-aging (DA) of sub-primal loins was compared with two other aging methods— vacuum packaged wet-aging (WA) and dry-aging in a high water permeable bag (DAW).

Materials and Methods

Paired beef loins (*M. longissimus lumborum*) from 9 beef carcasses were obtained at 7 d postmortem, cut into two sections, and assigned to three different aging methods (DA, WA, or DAW) for 28 d at 2°C and 78% relative humidity. After aging, initial trimming of dried surface was made. Then, one steak (2.54 cm thick) was cut from each aged section, overwrapped with PVC film, and displayed for 7 d under a simulated display condition. Instrumental and visual color evaluations were performed during 7 d of display. The 2-thiobarbituric acid reactive substances (TBARS) and heme/non-heme iron contents were measured for 0 and 7 d of samples. The experimental design was a balanced incomplete block design with three aging methods allocated to the loin sections from 9 beef carcasses in a saturated arrangement ($n = 12$; 9 carcasses

$\times 2$ loins $\times 2$ sections = 36 sections for 3 treatments). All data were analyzed using the PROC MIXED procedure of SAS (SAS Inst. Inc., Cary, NC), and least squares means for all traits were separated (F test, $P < 0.05$) by using least significant differences generated by the PDIF option.

Results

DAW beef loin steaks exhibited the most rapid decreases in CIE a^* (redness) and visual lean color scores, and sharp increases in hue angle and visual discoloration scores during 7 d of retail display. Conversely, beef steaks from WA and DA treatments showed similar hue angle values during display ($P > 0.05$), although a slightly higher visual discoloration was observed in DA steaks compared to WA at d 7 ($P < 0.05$). The TBARS values were affected by different aging types ($P < 0.05$), where DAW showed the highest accumulation of lipid oxidation followed by DA and WA at the end of display. The heme and non-heme iron contents were not affected by either aging types or display time ($P > 0.05$).

Conclusion

The results from this current study found that dry-aging in a high water permeable bag resulted in the most rapid discoloration and accelerated lipid oxidation during retail display. Steaks from the conventionally dry-aged beef loins seem to have similar color and lipid oxidation stabilities compared to the wet-aged beef counterpart at least up to 5 d of retail display. This observation indicates that steaks from dry-aged beef loins can be likely merchandised in the retail consumer level, once the proper initial trimmings are made. Further studies determining pro-oxidant factors of DAW causing more lipid oxidation and discoloration compared to DA and WA should be warranted.