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Impacts of Various Dry-Aging Methods on Meat Quality and Palatability Attributes of Beef Loins from Cull Cow

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Objectives

Beef from cull cows has been traditionally perceived as low-quality/value meat due to its inferior flavor and tenderness. Given the negative consumer perception of highly processed fresh meat, there is a need to develop a natural post-harvest aging system to improve eating quality attributes of beef products, particularly from cull cows. Dry aging has been practiced for decades as a traditional and natural butchery process, which is also known to improve palatability characteristics. Thus, the main objective of this study was to evaluate the impact of different dry-aging methods on meat quality, microbiological properties and palatability attributes of loins from cull cow beef.

Materials and Methods

Paired beef loins from 13 carcasses (Holstein, 30+ mo) were obtained at 5d postmortem, divided into 4 equal length sections and randomly assigned to four aging methods: wet-aging (WA), dry-aging (DA), dry-aging in water permeable bag (DWA) and UV-light dry-aging (UDA; 2 treatment/day, 5 J/s/treatment). Sections were aged for 28d at 2°C, 65% RH and 0.8 m/s air flow. After aging, dry-aged sections (DA, DWA and UDA) were trimmed of dehydrated surface, and trim loss and total saleable yield were recorded. The pH, proximate composition, shear force, water-holding capacity, initial color (instrumental and trained panelist), lipid oxidation (2-thiobabituric acid reactive substances, TBARS), microbial properties (aerobic plate count (APC), lactic acid bacteria (LAB), and yeast and mold (YM) counts) and trained sensory evaluation (11 panelists) were determined. Experimental design was a balanced complete block design. All data were analyzed using PROC MIXED procedure of SAS, and least squares means for all traits were separated ($P < 0.05$).

Results

DA and UDA had a substantial moisture loss during the aging process, accompanied with higher trim loss compared to other methods ($P < 0.05$). This resulted in DA having the lowest yield followed by UDA, DWA and WA with the highest saleable yield ($P < 0.05$). No significant differences were observed on cook loss, WBSF and TBARS between the treatments. DWA had the lowest pH out of all treatments ($P < 0.05$). UDA had the lowest moisture content and highest drip loss ($P < 0.05$). Color measurement showed that both DA and WA had significantly higher L* and lower b* values compared to UDA and DWA ($P < 0.05$). However, a* and lean surface color were not significantly different between the treatments ($P > 0.05$). For the trim, UDA had the lowest microbial growth among all treatments ($P < 0.05$). For the lean, UDA had the lowest count for LAB ($P < 0.05$), WA had the lowest in YM ($P < 0.05$) and no difference was found for APC between treatments ($P > 0.05$). Trained sensory panelist found that UDA and WA had higher fat and sour flavor ($P < 0.05$), and a trend ($P = 0.07$) of higher oxidized flavor when compared to DWA and DA.

Conclusion

The results showed that dry-aging would result in no adverse impact on shear force, cooking loss, initial color and lipid oxidation of mature beef loins. Further, sour and oxidized flavor was lower in dry-aged beef, indicating its potential as value adding process. UV light application minimized microbial growth during dry-aging process, although more analyses are needed to understand its full impact on dry-aged meat quality. Further studies on determining the consumer acceptability as well as flavor-related compound analyses are currently under investigation.