

Meat quality and acceptability of dry-aged beef from cull cows slaughtered at 60 or 80 months old (#62)

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Introduction

The meat quality of the cull cows is much lower than that of steers, thus lowering its acceptance [1]. Dry aging could overcome the weakness of low-marbled beef produced from cull cows. Previous study revealed that the quality of dry-aged beef from Hanwoo cattle of different sexes slaughtered at different ages (28-month-old steers and 48-month-old cull cows) is not different, regardless of the aging method used [2]. To confirm previous results and to provide new information, this study aimed to compare the quality of dry-aged beef from cull Hanwoo cows slaughtered at 60 or 80 months old.

Methods

The carcasses from cull Hanwoo cows with a quality grade of 3 and from two different age groups (63.5 ± 2.5 months old, n = 4 and 87.8 ± 4.5 months old, n = 4) were selected. Whole *longissimus thoracis et lumborum* from the 11th rib to the last *lumbar vertebrae*, including the back fat, was immediately transferred to a commercial dry aging plant at 24-h postmortem. The samples were placed on stainless steel gratings and aged in darkness for 40 days at a temperature of 2°C ± 1°C, a relative humidity of 85% and an air flow of 2 m/s. The day-0 samples were frozen at -24°C and used for comparison study.

The color of the meat (after 90 min of blooming) was recorded using a chromameter (CR-400, Konica Minolta Sensing Inc., Japan). The pH of meat was measured using a pH meter (SevenEasy pH, Mettler-Toledo GmbH, Switzerland). Water-holding capacity was determined using centrifugation method [3]. Cooking loss was determined after the steak was cooked until the core temperature of 72°C was reached. Shear force measurement was performed using a TA-XT2i Plus (Stable Micro Systems, UK) with a constant speed of 200 mm/min. A total of 25 untrained panelists (college students) were participated to evaluate tenderness, juiciness, flavor and overall acceptance of skillet-roasted samples using a seven-point hedonic scale, ranging from very unacceptable (score 1) to very acceptable (score 7). The steak was cut into 2-cm cubes prior to serving. Drinking water was provided to cleanse the palate.

Two way analysis of variance (ANOVA) was used for determining the effect of age, aging period and their interactions. General linear model was used for analyzing acceptability test data. The mean values were separated by Duncan's multiple range test at the 5% level of significance using R-version 3.3.3.

Results

The meat quality of dry-aged beef obtained from cull Hanwoo cows slaughtered at either 60 or 80 months old was comparable. Regarding the age at slaughter, no significant differences were found on color, pH, water-holding capacity, cooking loss and shear force value (Table 1). Aging increased color variables at initial blooming and cooking loss. No significant changes in pH were found from the beginning of aging to day 40. The water-holding capacity decreased after aging. Aging significantly tenderized the meat. Therefore, current results are in line with those of previous study [2]. Table 1. Meat quality traits of beef from cull cows slaughtered at 60 or 80 months old (mo) before and after dry aging

Variable	60 mo (before)	60 mo (after)	80 mo (before)	80 mo (after)	Standard error
Lightness (L*)	36.0 ^b	41.0 ^a	35.0 ^b	39.7 ^a	0.32
Redness (a*)	21.7 ^b	25.2 ^a	21.9 ^b	24.4 ^a	0.25
Yellowness (b*)	11.6 ^b	13.7 ^a	11.8 ^b	13.0 ^a	0.22
pH	5.60	5.63	5.57	5.56	0.01
Water-holding capacity (%)	64.2 ^a	50.6 ^b	65.5 ^a	49.7 ^b	0.89
Cooking loss (%)	27.6 ^b	33.1 ^a	29.2 ^b	33.6 ^a	0.35
Shear force (kgf)	6.16 ^a	1.80 ^b	6.93 ^a	2.19 ^b	0.41

^{a-b} Mean values are significantly different according to aging period (p<0.05).

No significant effect of age at slaughter was found for any of the acceptability variables (Table 2). Dry aging increased the score of tenderness and overall acceptance but did not affect the score of juiciness and flavor. Therefore, the dry-aged beef obtained from either 60-month-old or 80-months-old Hanwoo cows are comparable and still acceptable. Table 2. Acceptability towards beef from cull cows slaughtered at 60 or 80 months old (mo) before and after dry aging

Variable	60 mo (before)	60 mo (after)	80 mo (before)	80 mo (after)	Standard error
Tenderness	3.30 ^b	5.10 ^a	3.20 ^b	5.10 ^a	0.21
Juiciness	4.10	4.70	4.00	4.70	0.12
Flavor	4.70	4.70	4.60	4.60	0.07
Overall	4.10 ^b	4.80 ^a	3.70 ^b	4.80 ^a	0.12

^{a-b} Mean values are significantly different according to aging period (p<0.05).

Conclusion

Dry aging can be applied to both age groups with comparable results.

Acknowledgement

This study was supported by 2018 Research Grant from Kangwon National

University (No.C1014779).

References

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Notes