

Influence of Wet-Aging on Bloom Time of Beef Top Butts

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Introduction

The visual appearance of meat quality impacts a consumer's decision to purchase a product at the retail case. Consumers have indicated that color was the single most important factor influencing their meat purchase decision. There is little available information, however, concerning factors affecting bloom development in vacuum-packaged subprimal cuts.

Objective

To evaluate the effect of muscle and postmortem aging period on ability of vacuum-packaged beef subprimal cuts to bloom

Materials and Methods

Over an 18 wk trial, 60 USDA Select top butts (*gluteus medius*; GM)

- Allocated randomly to one of 6 aging periods (0, 7, 14, 21, 28, and 35 d; 10 subprimals/aging period)
- Each week - GMs aged the appropriate days were faced
- Two 2.54-cm-thick steaks were cut from each subprimal

Instrumental color readings

- Hunter Miniscan XE
 - (illuminant A and a 10° observer)
- Three readings/steak immediately after cut from subprimal, at 10-min intervals from 0 to 120 min.
- L*, a*, b*
- Spectral data
- After 120 min, each steak was vacuum-packaged and frozen (-20°C)

Instrumental tenderness

- Steaks were thawed overnight at 2°C
 - Cooked to an internal temperature of 71°C in a forced air convection oven
- Steaks equated to room temperature (21°C)
 - Six 1.27-cm-diameter cores removed parallel to muscle fiber
 - WBSF analysis

Statistical analysis

- Analyzed as a CRD using PROC MIXED (SAS, Cary, NC)
 - Main effects: Age, Time, and Age*Time
 - Error Term: Subprimal within age
 - Repeated Measure: Time
- Least squares means computed and separated by PDIF option when significant ($P \leq 0.05$)

Conclusions

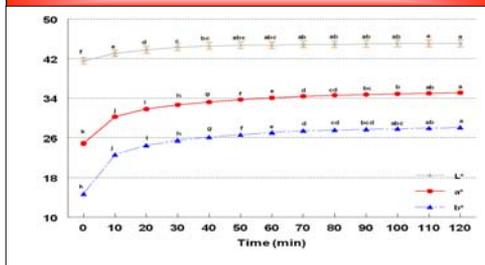
The largest change in color (L*, a* and b*) was within the first 10 min after fabrication, and results indicated that color stabilized at approximately 70 min after exposure to air. Furthermore, color development was reduced in GM steaks from subprimals aged 21 d or longer.

Acknowledgements

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Results

Within muscle variation of L*, a*, and b*



Variation of hue angle over time

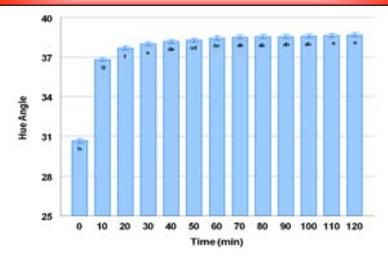
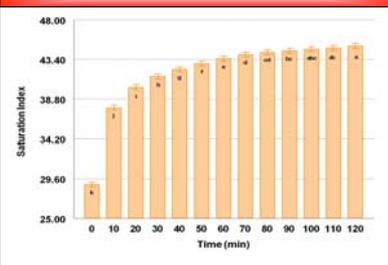


Table 1. Influence of aging periods on the instrumentally measured color of beef *gluteus medius* steaks

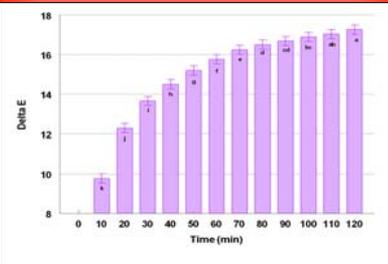
Age	Quality Trait					
	L* ¹	a* ¹	b* ¹	Hue Angle ²	Chroma ³	ΔE ⁴
0	44.37	32.86 ^c	25.70 ^{bc}	37.81 ^c	41.74 ^c	15.17 ^{bc}
7	44.31	33.98 ^b	26.76 ^b	38.01 ^b	43.28 ^b	15.57 ^a
14	42.66	33.39 ^b	25.82 ^b	37.47 ^c	42.24 ^b	15.58 ^a
21	43.75	32.98 ^b	25.53 ^c	37.51 ^{cd}	41.73 ^c	15.46 ^b
28	44.73	32.36 ^b	25.07 ^c	37.53 ^{cd}	40.96 ^c	14.59 ^b
35	46.15	32.39 ^b	25.17 ^c	37.63 ^c	41.04 ^c	14.49 ^b
SEM	1.233	0.166	0.239	0.148	0.272	0.327

¹L* = a measure of darkness to lightness (a greater L* value indicates a lighter color); a* = a measure of redness (a greater a* value indicates a redder color), and b* = a measure of yellowness (a greater b* value indicates a more yellow color).
²Hue angle = $(\tan^{-1} b^*/a^*)$.
³Saturation index is a measure of the total color/vividness of color (a higher value indicates a more vivid color/more total color).
⁴Total color changes (ΔE) is calculated as follows: $\Delta E = \sqrt{(L^*_2 - L^*_1)^2 + (a^*_2 - a^*_1)^2 + (b^*_2 - b^*_1)^2}$.
⁵Within a column, least squares means lacking a common superscript letter differ ($P < 0.05$).

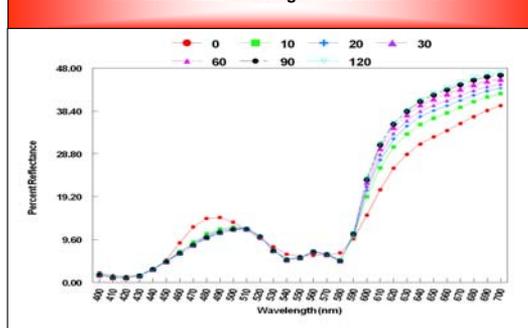
Variation of saturation index (C*) over time



Change in color over time (Delta E)



Reflectance values of the *gluteus medius* over time



0 min (14d)



120 min (14d)