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EFFECTS OF HOT-FAT TRIMMING ON RETAIL DISPLAY COLOR OF THREE BEEF MUSCLES

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Summary

Steaks from subprimal cuts from carcass sides that were either hot-fat-trimmed to .25 inch or not hot-fat-trimmed (control) were used to determine trimming effects on retail display color. After 14 days storage in vacuum bags at 30°F, subprimals were cut into 1-inch-thick steaks for evaluation. Specific muscles that were evaluated were the loin strip (longissimus lumborum), inside round (semimembranosus only), and the chuck clod (triceps brachii only). The steaks were packaged in polyvinylchloride (PVC) film and displayed. The loin strip steaks from hot-fat-trimmed sides were more discolored ($P < .05$) than from nontrimmed controls at 0, 3, and 4 days display, but both had acceptable color through 4 days of display. Treatments were not different for inside round steaks ($P > .05$); the deep location was less red ($P < .05$) than the location closer to the muscle surface. Chuck clod steaks were not affected by trimming ($P > .05$). The location closest to the muscle surface was brightest red, and the deep location was darkest ($P < .05$). All inside round and chuck clod steaks were unacceptable in appearance by day 3 of display. Hot-fat trimming did not degrade the display color of these two muscles and overall effect of hot-fat trimming on beef steak display life was minimal.

(Key Words: Beef, Color, Hot Fat Trim.)

Introduction

Hot-fat trimming of beef carcasses is increasing, because it allows faster chilling of carcass meat and faster fabrication of chilled carcasses, but its effect on display-color life of retail cuts needs to be determined.

Our objectives were to determine display color of several locations of each of three different beef muscles that were prepared as retail cuts from vacuum packaged subprimal cuts that had been stored at 30°F for 14 days. The study compared hot-fat trimming to .25 inch with control sides that were not trimmed prior to chilling.

Experimental Procedures

Nine steer carcasses ranging in hot, untrimmed, carcass weight from 700 to 800 lb and in fat thickness from .40 to .60 inch were selected. The hot-fat trimming treatment was assigned randomly to right and left sides. Those sides were trimmed to approximately .25 inch external fat. After spray chilling at 34°F for 8 hours and storage at 34°F until 72 hours post-mortem, sides were fabricated into primal and subprimal cuts, according to National Association of Meat Purveyors (NAMP) specifications. The strip loins (NAMP 180), inside rounds (NAMP 168), and chuck clods (NAMP 114) were vacuum packaged and stored at 30°F for 14 days before 1-inch steaks were cut from each. The first steak was a "facing" steak, and the second was used for display. The loin strip steaks were removed from the anterior end; inside round steaks were removed from the proximal (itch bone) end; and chuck clod steaks were cut from the long head, perpendicular to the grain. Steaks were placed on styrofoam trays with a soaker pad, wrapped with polyvinylchloride film (high oxygen permeability) and displayed at 34°F with one daily defrost cycle. After

the initial (0 time) color evaluation, steaks were displayed continuously under 150-foot candle Deluxe Warm White fluorescent lighting. Visual appraisal by a seven-member experienced panel was used to evaluate color on day 0, 1, 2, and 3 for all muscles. The loin strip also was evaluated on day 4. The loin strip evaluation was an average of the entire muscle. The deep and superficial (close to muscle surface) locations of the inside round (semimembranosus) were evaluated separately. The chuck clod (triceps brachii) was evaluated separately at three locations -- the lateral head, the deep longitudinal (long), and close-to-surface longitudinal (long) head. Visual scores were estimated to the nearest .5 on a 5 point scale where 1 = bright red, 2 = dull red, 3 = slightly dark red or brown, 4 = dark red or brown, and 5 = very dark red or brown.

Results and Discussion

Consumers likely would discriminate against steaks with visual scores greater than 3.0 (Table 1). Loin strip hot-fat-trimmed steaks were darker than controls ($P<.05$)

on days 0, 3, and 4, but both treatments were of acceptable appearance, even at 4 days of display.

No difference was noted between hot-fat-trimmed and control steaks for inside round; however, there was a location within muscle effect. The deep location was more discolored ($P<.05$) than the superficial (close to surface) location on days 1, 2, and 3. Steaks from both treatments were unacceptable in appearance by day 3.

The chuck clod (triceps brachii) was a more complex muscle with three locations to evaluate. The only difference between hot-fat-trimmed and control steaks ($P<.05$) was on day 2 in the lateral location where the hot-fat-trimmed steaks were more discolored than the control. From day 1, location within the muscle differed ($P<.05$). The superficial long location was the brightest red throughout, the deep long location was the most discolored, and the lateral was intermediate. Color of steaks from both treatments was unacceptable by day 3 of display.

Table 1. Visual Scores of Muscle Display Color^a

Muscle, Treatment	Display Day				
	0	1	2	3	4
Loin strip					
Hot fat trimmed (HFT)	1.31 ^b	1.66	2.18	2.51 ^b	2.84 ^b
Control	1.19 ^c	1.57	2.29	2.32 ^c	2.57 ^c
Inside round (semimembranosus)					
Deep HFT	1.51	2.36 ^c	3.01 ^c	3.49 ^c	
Deep control	1.48	2.39 ^c	3.10 ^c	3.36 ^c	
Close to surface HFT	1.75	2.10 ^b	2.62 ^b	3.18 ^b	
Close to surface control	1.62	2.19 ^b	2.75 ^b	3.06 ^b	
Chuck clod (triceps brachii)					
Lateral HFT	1.77	2.73 ^c	3.26 ^d	3.66 ^c	
Lateral control	1.66	2.59 ^c	3.09 ^c	3.49 ^c	
Deep long HFT	1.75	2.97 ^d	3.30 ^d	3.73 ^c	
Deep long control	1.73	2.91 ^d	3.37 ^d	3.69 ^c	
Close to surface (superficial)					
Long HFT	1.76	2.51 ^b	2.77 ^b	3.24 ^b	
Long control	1.73	2.39 ^b	2.82 ^b	3.17 ^b	

^aVisual scores were 1 = bright red, 2 = dull red, 3 = slightly dark red or brown, 4 = dark red or brown, and 5 = very dark red or brown.

^{bcd}Means of the same muscle and column with different superscripts differ ($P<.05$).