EFFECTS OF QUALITY GRADE, AGING PERIOD, BLADE TENDERIZATION, AND DEGREE OF DONENESS ON TENDERNESS OF INSIDE ROUND STEAKS

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Summary

We used 162 inside rounds to determine the influence of different quality grades, postmortem aging periods, blade tenderization passes, and degree of doneness on thawing and cooking losses and Warner-Bratzler Shear force (WBS, tenderness). Select (SEL), Choice (CHO), and Certified Angus Beef™ (CAB) inside rounds were aged for 7, 14, or 21 days and not tenderized (0X) or blade tenderized one (1X) or two (2X) times. Steaks from each inside round were assigned randomly to final endpoint cooking temperatures of 150, 160, and 170°F. Percentage of thawing loss was higher (P<.05) for steaks aged 7 days than steaks aged 14 and 21 days. For CHO steaks only, cooking loss was higher (P<.05) for the 2X group compared to the 0X and 1X groups. Steaks aged 14 and 21 days had lower (P<.05) WBS than steaks aged 7 days. Cooking loss and WBS were higher (P<.05) with each increase in endpoint cooking temperature. Postmortem aging (14 or 21 days) and lower endpoint cooking temperatures were the most effective methods to improve WBS of inside round steaks.

(Key Words: Beef, Tenderness, Blade Tenderization, Aging, Quality Grade.)

Introduction

Cuts from the round are generally less tender than those from the rib and loin. This presents a merchandising challenge. Different quality grades, aging periods, blade tenderization passes, and endpoint cooking temperatures may affect tenderness. Our objective was to determine the influence of these variables on tenderness of inside round steaks.

Experimental Procedures

The procedures for this study followed those described in a previous article (strip loin, pg. 127), except we used 162 inside rounds (IMPS 168) to obtain inside round (semimembranosus) steaks.

Results and Discussion

Thawing losses were similar (P>.05) for steaks of all quality grades and blade tenderization treatments (Table 1). Steaks aged 14 and 21 days had less (P<.05) thawing loss than steaks aged 7 days. Cooking losses were similar (P>.05) for all postmortem aging periods. A USDA quality grade × blade tenderization interaction (P<.05) was observed for cooking loss (Table 2). For SEL and CAB steaks, cooking loss was similar (P>.05) among blade tenderization treatments. However, CHO steaks tenderized 2X had greater (P<.05) cooking loss than CHO steaks not tenderized. For the 0X group, SEL steaks had more (P<.05) cooking loss than CHO and CAB steaks. However, quality grade treatments had similar (P>.05) percentages of cooking losses for steaks blade tenderized either 1X or 2X. Warner-Bratzler Shear values (WBS) were similar (P>.05) for quality grades and blade tenderization treatments (Table 1). Steaks aged 14 or 21 days had lower (P<.05) WBS values than those aged 7 days. As endpoint cooking temperature increased (Table 3), percentage of cooking loss and WBS increased (P<.05).

For foodservice, a WBS of 8.6 lbs (3.9 kg) has been used as a limit for a rating of at least "slightly tender". Although many treatment combinations had steaks that didn't meet this limit (Table 4), increasing endpoint temperatures resulted in increasing numbers of steaks with WBS over 8.6 lbs. The CAB grade had fewer steaks with WBS values above 8.6 lbs than CHO or SEL grades, and steaks blade tenderized 2X had fewer values above this limit than steaks in the 0X or 1X groups. Select and Choice steaks aged 14 or 21 days tended to have fewer steaks with WBS values above 8.6 lbs than steaks aged 7 days.

Quality grade and blade tenderization treatments had minimal effect on tenderness (WBS) of inside round (semimembranosus) steaks. Aging for at least 14 days and lower endpoint cooking temperatures (150°F) were the most effective ways to improve tenderness (WBS).

Table 1. Thawing Loss, Cooking Loss, and Warner-Bratzler Shear Force (WBS) Means of Inside Round Steaks for Different Quality Grades, Aging Periods, and Blade Tenderization Passes[a]

	Quality Grade			Aging Period, days			Blade Tenderization			
Item	SEL	CHO	CAB	7	14	21	0X	1X	2X	SE
Thawing loss, %	1.93	1.83	1.72	2.37[c]	1.62[b]	1.47[b]	2.07	1.72	1.68	.15
WBS, kg	3.69	3.71	3.58	3.84[c]	3.59[b]	3.55[b]	3.74	3.67	3.58	.06

[a]Quality Grades (SEL=Select, CHO=Choice, CAB=Certified Angus Beef™); Blade Tender-ization (0X=not blade tenderized, 1X=blade tenderized one time, 2X=blade tenderized two times).

[b,c]Means within a row within postmortem age with different superscripts differ (P<.05).

Table 2. Cooking Loss Means of Inside Round Steaks as Affected by Interaction of USDA Quality Grade and Blade Tenderization

	Blade Tenderization Treatment[a]			
Grade[b]	0X	1X	2X	SE
SEL	31.81[e]	31.09	30.80	.51
CHO	29.44[cf]	31.05[cd]	31.56[d]	.51
CAB	30.16[f]	30.68	31.29	.51

[a]0X= not blade tenderized, 1X=blade tenderized one time, 2X=blade tenderized two times.

[b]SEL=Select, CHO=Choice, CAB=Certified Angus Beef™.

[c,d]Means within CHO row with same superscript letter do not differ (P>.05).

[e,f]Means within a column with different superscripts differ (P<.05).

Table 3. Cooking Loss and Warner-Bratzler Shear Force (WBS) Means of Inside Round Steaks at Different Endpoint Cooking Temperatures

	Endpoint Cooking Temperature, °F			
Item	150	160	170	SE
Cooking loss, %	25.31[a]	31.11[b]	36.20[c]	.27
WBS, kg	3.28[a]	3.73[b]	3.97[c]	.05

[a,b,c]Means within a row with different superscripts differ (P<.05).

Table 4. Number of Inside Round Steaks with Warner-Bratzler Shear Force Values Greater than 8.6 lbs (3.9 kg)

BT	Cooked	SEL[a]			CHO			CAB			
Treatment[b]	Temp., °F	7[c]	14	21	7	14	21	7	14	21	Total
	150	0	2	0	1	0	0	0	1	1	5
0X	160	3	4	3	5	0	3	2	2	1	23
	170	4	4	3	5	4	3	3	4	2	32
	150	2	0	0	2	0	0	0	2	1	7
1X	160	2	2	4	3	4	2	1	2	2	22
	170	3	1	4	5	5	4	3	3	5	33
	150	0	0	0	3	1	0	1	0	0	5
2X	160	3	1	1	3	1	0	1	0	2	12
	170	5	2	3	3	2	1	2	1	1	20
Total		22	16	18	30	17	13	13	15	15	159

[a]SEL=Select, CHO=Choice, CAB=Certified Angus Beef™.

[b]0X = not blade tenderized, 1X = blade tenderized one time, 2X = blade tenderized two times.

[c]Days of postmortem aging.