51st International Congress of Meat Science and Technology
August 7-12, 2005 – Baltimore, Maryland USA

RETAIL CUTTING CHARACTERISTICS FOR RIB AND LOIN SUBPRIMALS FROM TWO GRADE GROUPS

K. L. Voges*, K. D. Pfeiffer, B. E. Baird, D. A. King, H. K. Johnson, D. B. Griffin, J. W. Savell

Meat Science Section, Department of Animal Science, Texas Agricultural Experiment Station, Texas A&M University, 2471 TAMU, College Station, TX 77843-2471, USA

Key Words: Beef; Retail cutting test; Retail merchandising; Time allocation; Yield

Introduction

CARDS (Computer Assisted Retail Decision Support) is a computer software program that was developed so retailers could evaluate the price/value relationship of beef subprimals (Garrett et al., 1991). This program continues to serve as a valuable reference to assist retailers in the process of making meat purchasing and merchandising decisions.

Research previously conducted on beef retail yield and fabrication times (Garrett et al., 1991) led to research on pork (Lorenzen, Griffin, Dockerty, Walter, Johnson, & Savell, 1996a; Lorenzen, Walter, Dockerty, Griffin, Johnson, & Savell, 1996b), lamb (Lorenzen et al., 1997), and veal (McNeill, Griffin, Dockerty, Walter, Johnson, & Savell, 1998), and allowed for CARDS program development for these species. CARDS was designed originally for the retail sector; however, the foodservice industry later requested similar information. Weatherly et al. (2001) determined cutting yields and time requirements for beef subprimals as they were portioned into ready-to-cook foodservice cuts.

We undertook the process of updating the database with cuts not previously evaluated, because it had been more than a decade since the original data were generated for the Beef CARDS program. Because of the extensive number of cutting tests conducted and the need to narrow the scope to be reported, the information presented herein encompasses the rib and loin cuts.

Objectives

The objective of this study was to perform a thorough evaluation of rib and loin cuts included in the present version of Beef CARDS in order to pinpoint deficiencies and/or inconsistencies in the data and to obtain current yield and time data for a new updated list of subprimals. Another objective of this research was to improve and expand the existing Beef CARDS for the exiting Beef CARDS program for the benefit of the retail and foodservice industry.

Methodology

Product selection

Beef subprimals (n = 120) from the rib and loin (Table 1), representing USDA Choice and Select grades, were obtained from a major beef processor and shipped to the Rosenthal Meat Science and Technology Center at Texas A&M University. Selected subprimals represented the normal weight variation and standard packer fat trim levels associated with commodity boxed beef. Specifications for all subprimals complied (within packer variations) with Institutional Meat Purchase Specifications (IMPS) as described by USDA (1996) and NAMP (2003).

Table 1
USDA (1996) Institutional Meat Purchase Specifications (IMPS) descriptions of rib and loin subprimals used for retail cutting tests

IMPS #	Subprimal
109E	Beef Rib, Ribeye Roll, Lip-On[a], Bone-In
112	Beef Rib, Ribeye Roll
112A	Beef Rib, Ribeye, Lip-On[a]
112A Modified	Beef Rib, Ribeye, Lip-On[a] Modified (1 × 1)[c]
175	Beef Loin, Strip Loin (1 × 0)[d]
180	Beef Loin, Strip Loin, Boneless (1 × 0)[d]
184E	Beef Loin, Top Sirloin, Boneless, 2 Pc[e]

[a] Lip = *M. serratus dorsalis, M. longissimus costarum* and related intermuscular fat lateral to the *M. longissimus thoracis* (USDA, 1996).
[b] (1 × 1) = Lip does not exceed 2.54 cm.
[c] IM = Individual muscle.
[d] (1 × 0) = The flank side shall be lateral to, but not more than 2.54 cm from, the *M. longissimus lumborum* at the rib end to a point on the sirloin end immediately lateral to the *M. longissimus lumborum* (USDA, 1996).
[e] Pc = Piece.

Cutting tests

A refrigerated cutting room in the Rosenthal Meat Science and Technology Center was modified to simulate a retail market environment for the purpose of conducting controlled retail yield tests. Meat merchandisers from different regions of the United States and with extensive retail meat industry cutting experience were enlisted for this study. Discussion between meat merchandisers and investigators resulted in the development of merchandising schemes for each subprimal to represent best current industry practices. Universal Product Code (UPC) descriptions (Industry-Wide Cooperative Meat Identification Standards Committee, 2003) were used as the naming convention for retail cuts.

The cutting tests were conducted as follows. Vacuum packaged subprimals were weighed before and after opening, and purge loss was determined. Subprimals were cut

following defined merchandising schemes, retail cuts, unless otherwise specified, were trimmed not to exceed 0.32 cm of fat, and when trimmings were generated, the targeted visual lean percentage was 90%. Processing times were recorded as an estimate of labor requirements for each merchandising scheme. Timed activities for each cutting test included two major phases: opening (retrieval of the subprimal from vacuum-packaged bag) and cutting (removal of external and seam fat, connective tissue, and separation of individual muscles, as well as producing tray-ready retail cuts as applicable). The two phases were combined for total processing time. After each cutting test, technicians recorded weights of all cuts, lean trimmings, fat trim, and bone ensuring at least 99% recovery of subprimal weight.

Ribeye Rolls, Lip-On, Bone In (IMPS #109E) were merchandised two ways. One style consisted of cutting the bone-in ribeye rolls into three Ribeye Roasts, Lip-on, Bone In (UPC 1193): the 6^{th} and 7^{th} rib section, the 8^{th} and 9^{th} rib section, and the 10^{th} through 12^{th} rib section. For the second style, the ribeye roll was cut into 3.2 cm Ribeye Steaks, Lip-On, Bone In (UPC 1197).

Ribeye Rolls (0 × 0) (IMPS #112) were knife-cut end-to-end into 2.54 cm Ribeye Steaks (UPC 1209). Ribeye Rolls, Lip-On (2 × 2) (IMPS #112A) and (1 × 1) (IMPS #112A Modified) were merchandised two ways. One style consisted of the subprimal being cut into 2.54 cm Ribeye Steaks, Lip-On, Boneless (UPC 1203) and the second style consisted of cutting 2.54 cm Ribeye Steaks, Lip-On, Boneless (UPC 1203) throughout the small (posterior) end with the large (anterior) end remaining intact as a Ribeye Roast, Lip-On, Boneless (UPC 1194).

Strip Loins (IMPS #175) and Strip Loins, Boneless (IMPS #180) were cut into 2.54 cm Top Loin Steaks (UPC 1398) and Top Loin Steaks, Boneless (UPC 1404), respectively. Center-cut strip steaks and vein steaks (steaks that had *M. gluteus medius* on both sides of the cut) were recorded separately.

Top Sirloins, Boneless, 2 Pc (IMPS #184E) were vacuum packaged together. Bag opening time, initial weight, bag weight, and purge weight were collectively measured before separate cutting tests were performed on the Beef Loin, Top Sirloin Butt, Center-Cut, Boneless (IM) (IMPS #184B) and the Beef Loin, Top Sirloin, Cap (IM) (IMPS #184D). Top Sirloin Steaks, Boneless, Cap Off (UPC 1426) and Top Sirloin Cap Steaks, Boneless (UPC 1421) were cut 2.54 cm thick and perpendicular to muscle fiber orientation.

Statistical analysis

The experiment was planned as a completely randomized design. Data were analyzed, by subprimal, using SAS (SAS Institute, Inc., Cary, NC) PROC GLM with quality grade tested as the main effect. Least squares means were generated, and when an alpha-level of $P < 0.05$ was found, least squares means were separated with the PDIFF option.

Results & Discussion

Retail yields and processing times for the rib and loin subprimals cut are reported in Tables 2-11. These cutting tests will be useful to beef merchandisers in making informed purchase and cutting decisions to optimize value of closely-trimmed beef subprimals. Having standardized cutting tests, including time requirements to perform various tasks,

allow the beef industry to have benchmark information not previously available in the public domain.

Roast percentage and total saleable yield was very similar between U.S. Select and U.S. Choice bone-in ribeye rolls cut into roasts (IMPS #109E) (Table 2). U.S. Choice bone-in ribeye rolls portioned into steaks produced a greater amount of trimmed fat and purge than the U.S. Select bone-in ribeyes resulting in cutting and total time to be significantly higher in U.S. Choice bone-in ribeye rolls (Table 3). Total saleable yield was higher in the initial cutting style fabricated into roasts (95%) compared to subprimals cut into steaks (90-95%).

Table 2
Least squares means of retail yields (%) and processing times (s) for fabrication of Beef Rib, Ribeye Roll, Lip-On, Bone In (IMPS #109E), cut into roasts from different USDA quality grades

Item	UPC[a]	U.S. Choice (n=6)	U.S. Select (n=6)	SEM[b]	*P*-value
Net weight, kg		7.80	8.33	0.20	0.11
Retail yield		%			
Ribeye roast, lip-on, bone in	1193				
6^{th} – 7^{th} rib roast		24.20	25.74	0.57	0.09
8^{th} – 9^{th} rib roast		27.06	27.27	0.52	0.78
10^{th} – 12^{th} rib roast		43.62	42.03	0.66	0.12
Lean trimmings (90% lean)	1653	0.75	0.47	0.31	0.54
Fat		4.09	4.32	0.65	0.81
Purge		0.29	0.19	0.08	0.42
Cutting loss		0.01	0.00	0.03	0.63
Total saleable yield		95.62	95.51	0.63	0.90
Processing time, per subprimal		s			
Bag opening time		11.4	17.8	1.2	0.004
Trimming/cutting time		120.7	126.0	24.1	0.88
Total time		132.1	143.9	24.3	0.74

[a] UPC = Universal product code.
[b] SEM is the standard error of the least squares means.

U.S. Choice boneless ribeye rolls (0 × 0) (IMPS #112) displayed a slight increase in the amount of fat produced, as well as the time necessary to cut boneless ribeye steaks and U.S. Select ribeye rolls produced a higher percentage of trimmed ribeye steaks (Table 4). U.S. Select boneless ribeye rolls (2 × 2) (5.08 × 5.08) (IMPS #112A) cut only into steaks required a significantly longer cutting time, thus resulting in a significantly longer total processing time (Table 5) when compared to U.S. Choice ribeye rolls. U.S. Choice ribeye rolls tended to be fatter and U.S. Select ribeye rolls produced a higher percentage of total saleable product (Table 5 and 6). In the second cutting style, including steaks and roasts, total saleable yield was very similar between grade groups (Table 6). When comparing cutting styles, a greater percentage of fat and lean trim was produced from the cutting style containing all steaks.

Table 3
Least squares means of retail yields (%) and processing times (s) for fabrication of Beef Rib, Ribeye Roll, Lip-On, Bone In (IMPS #109E), cut into steaks, from different USDA quality grades

Item	UPC[a]	U.S. Choice (n=6)	U.S. Select (n=6)	SEM[b]	*P*-value
Net weight, kg		7.50	6.40	0.78	0.5
Retail yield		%			
Ribeye steak, lip-on, bone in	1197	87.52	90.13	0.63	0.08
Lean trimmings (90% lean)	1653	2.99	2.35	0.64	0.50
Fat		8.08	6.33	0.84	0.18
Purge		0.28	0.17	0.09	0.41
Cutting loss		1.12	0.96	0.07	0.13
Total saleable yield		90.51	92.48	0.86	0.14
Processing time, per subprimal		s			
Bag opening time		12.8	12.7	1.6	0.95
Trimming/cutting time		319.8	264.4	16.9	0.05
Total time		322.7	277.1	17.3	0.05

[a] UPC = Universal product code.
[b] SEM is the standard error of the least squares means.

Table 4
Least squares means of retail yields (%) and processing times (s) for fabrication of Beef Rib, Ribeye Roll (IMPS #112), from different USDA quality grades

Item	UPC[a]	U.S. Choice (n=6)	U.S. Select (n=6)	SEM[b]	*P*-value
Net weight, kg		4.44	3.67	0.32	0.23
Retail yield		%			
Ribeye steak	1209	95.18	97.24	1.02	0.29
Lean trimmings (90% lean)	1653	1.88	0.83	1.03	0.55
Fat		1.81	1.31	0.29	0.34
Purge		1.19	0.68	0.45	0.51
Cutting Loss		0.00	0.00	0.00	0.00
Total saleable yield		97.06	98.07	0.24	0.10
Processing time, per subprimal		s			
Bag opening time		8.1	6.6	1.0	0.42
Trimming/cutting time		102.1	69.0	7.3	0.08
Total time		110.2	75.6	8.2	0.10

[a] UPC = Universal product code.
[b] SEM is the standard error of the least squares means.

Table 5
Least squares means of retail yields (%) and processing times (s) for fabrication of Beef Rib, Ribeye Roll, Lip-On (IMPS #112A) cut to include steaks from different USDA quality grades

Item	UPC[a]	U.S. Choice (n=6)	U.S. Select (n=6)	SEM[b]	*P*-value
Net weight, kg		6.34	6.85	0.21	0.11
Retail yield			%		
Ribeye steak, lip on, boneless	1203	84.08	84.91	0.76	0.44
Lean trimmings (90% lean)	1653	3.78	4.28	0.47	0.47
Fat		11.13	9.89	0.89	0.33
Purge		0.95	0.84	0.23	0.72
Cutting loss		0.06	0.11	0.06	0.55
Total saleable yield		87.87	89.19	0.91	0.32
Processing time, per subprimal			s		
Bag opening time		11.7	11.3	1.2	0.85
Trimming/cutting time		221.2	272.3	16.5	0.05
Total time		232.7	283.6	16.3	0.05

[a] UPC = Universal product code.
[b] SEM is the standard error of the least squares means.

Table 6
Least squares means of retail yields (%) and processing times (s) for fabrication of Beef Rib, Ribeye Roll, Lip-On (IMPS #112A), cut into steaks and roasts from different USDA quality grades

Item	UPC[a]	U.S. Choice (n=6)	U.S. Select (n=6)	SEM[b]	*P*-value
Net weight, kg		7.21	6.61	0.25	0.12
Retail yield			%		
Ribeye steak, lip-on, boneless	1203	43.54	49.08	2.96	0.21
Ribeye roast, lip-on, boneless	1194	44.19	38.00	2.66	0.12
Lean trimmings (90% lean)	1653	2.97	3.89	0.46	0.18
Fat		8.47	8.02	0.91	0.73
Purge		0.80	0.89	0.21	0.78
Cutting loss		0.03	0.13	0.08	0.39
Total saleable yield		90.70	90.97	0.92	0.83
Processing time, per subprimal			s		
Bag opening time		11.8	10.9	1.1	0.61
Trimming/cutting time		198.4	213.6	22.0	0.63
Total time		210.2	224.5	21.2	0.63

[a] UPC = Universal product code.
[b] SEM is the standard error of the least squares means.

U.S. Choice boneless ribeye rolls (1 × 1) (2.54 × 2.54) (IMPS #112A modified) required significantly more fat trimming than U.S. Select ribeye rolls (Table 7). U.S. Select ribeye rolls also produced a greater amount of purge, as well as 3.2 % more ribeye steaks.

U.S. Select bone-in strip loins (IMPS #175) tended to have a greater percentage of center top loin steaks and consequently a higher percentage of saleable yield when compared to U.S. Choice bone-in strip loins (Table 8). Retail yields and processing times for boneless strip loins (IMPS #180) are presented in Table 9. U.S. Select strip loins had a significantly greater percentage of purge loss when compared to the U.S. Choice strip loins. The retail cutting percentages are relatively similar between U.S. Choice and U.S. Select grade strip loins; however, there does appear to be a slight increase in the percentage of U.S. Select lean trim.

U.S. Choice center-cut top butts had a greater percentage of trimmable fat ($P < 0.04$), as well as a greater amount of lean trim, thus resulting in a requirement for a longer cutting time (Table 10). U.S. Select center-cut top butts also tended to produce a slightly higher percentage of steaks thus resulting in a higher saleable yield. U.S. Choice top sirloin caps (IMPS #184D) had a higher percentage of steaks when compared to the U.S. Select top sirloin caps (Table 11). U.S. Select top sirloin caps possessed a higher percentage of purge loss when compared to their U.S. Choice counterparts. Saleable yield for U.S. Choice top sirloin caps (98%) was higher than Weatherly et al. (2001) findings, which reported yields to be between 94 and 96%.

Table 7
Least squares means of retail yields (%) and processing times (s) for fabrication of Beef Rib, Ribeye Roll, Lip-On, Modified 1 × 1 (2.54 × 2.54 cm) (IMPS #112A modified), from different USDA quality grades

Item	UPC[a]	U.S. Choice (n=6)	U.S. Select (n=6)	SEM[b]	*P*-value
Net weight, kg		4.26	6.25	2.19	0.26
Retail yield		%			
Ribeye steak, lip-on, boneless	1203	40.98	44.18	2.16	0.37
Ribeye roast, lip-on, boneless	1194	47.11	45.97	2.41	0.75
Lean trimmings (90% lean)	1653	2.51	2.28	1.14	0.89
Fat		9.40	6.33	0.72	0.02
Purge		0.00	1.06	0.95	0.41
Cutting loss		0.22	0.19	0.14	0.90
Total saleable yield		90.60	92.43	1.40	0.42
Processing time, per subprimal		s			
Bag opening time		7.3	11.9	0.3	0.01
Trimming/cutting time		140.1	149.3	15.8	0.70
Total time		147.4	161.2	15.7	0.57

[a] UPC = Universal product code.
[b] SEM is the standard error of the least squares means.

Table 8
Least squares means of retail yields (%) and processing times (s) for fabrication of Beef Loin, Strip Loin (IMPS #175) from different USDA quality grades

Item	UPC[a]	U.S. Choice (n=6)	U.S. Select (n=6)	SEM[b]	*P*-value
Net weight, kg		6.36	6.00	0.60	0.38
Retail yield			%		
Top loin steak, bone in (center)	1398	60.94	66.75	2.40	0.14
Top loin steak, bone in (vein)[c]	1398	17.62	15.44	1.53	0.35
Lean trimmings (90% lean)	1653	4.36	3.62	0.54	0.37
Fat		12.45	12.22	1.28	0.91
Purge		0.37	0.29	0.11	0.62
Cutting loss		1.36	1.25	0.11	0.48
Total saleable yield		82.93	85.81	1.60	0.25
Processing time, per subprimal			s		
Bag opening time		13.5	12.8	2.4	0.84
Trimming/cutting time		435.8	427.1	12.5	0.64
Total time		449.3	440.0	13.8	0.65

[a] UPC = Universal product code.
[b] SEM is the standard error of the least squares means.
[c] Steaks with the *M. gluteus medius* present on both cut surfaces.

Table 9
Least squares means of retail yields (%) and processing times (s) for fabrication of Beef Loin, Strip Loin, Boneless (IMPS #180) from different USDA quality grades

Item	UPC[a]	U.S. Choice (n=6)	U.S. Select (n=6)	SEM[b]	*P*-value
Net weight, kg		4.87	4.71	0.32	0.73
Retail yield			%		
Top loin steak, boneless (center)	1404	67.39	66.88	1.43	0.81
Top loin steak, boneless (vein) [c]	1404	17.92	17.04	1.58	0.70
Lean trimmings (90% lean)	1653	1.88	2.35	0.42	0.50
Fat		11.26	11.21	0.89	0.97
Purge		1.50	2.36	0.08	<0.001
Cutting loss		0.04	0.16	0.08	0.30
Total saleable yield		87.20	86.27	0.82	0.45
Processing time, per subprimal			s		
Bag opening time		8.5	8.5	0.6	0.99
Trimming/cutting time		223.2	227.2	9.9	0.78
Total time		231.7	235.7	10.1	0.79

[a] UPC = Universal product code.
[b] SEM is the standard error of the least squares means.
[c] Steaks with the *M. gluteus medius* present on both cut surfaces

Table 10
Least squares means of retail yields (%) and processing times (s) for fabrication of Beef Loin, Top Sirloin Butt, Center-Cut, Boneless, (IM) (IMPS #184B) from different USDA quality grades

Item	UPC[a]	U.S. Choice (n=6)	U.S. Select (n=6)	SEM[b]	*P*-value
Net weight, kg		3.65	4.21	0.07	0.04
Retail yield			%		
Top sirloin steak, boneless, cap off	1426	79.39	82.72	1.41	0.17
Lean trimmings (90% lean)	1653	10.26	9.32	0.96	0.53
Fat		8.82	6.03	0.68	0.04
Purge		0.12	0.25	0.04	0.14
Cutting loss		0.00	0.00	0.01	0.86
Total saleable yield		89.65	92.05	1.21	0.24
Processing time, per subprimal			s		
Trimming/cutting time		147.7	133.2	11.8	0.43

[a] UPC = Universal product code.
[b] SEM is the standard error of the least squares means.

Table 11
Least squares means of retail yields (%) and processing times (s) for fabrication of Beef Loin, Top Sirloin, Cap (IM) (IMPS #184D) from different USDA quality grades

Item	UPC[a]	U.S. Choice (n=6)	U.S. Select (n=6)	SEM[b]	*P*-value
Net weight, kg		0.66	0.82	0.06	0.08
Retail yield			%		
Top sirloin cap steak, boneless	1421	75.06	73.23	1.98	0.55
Lean trimmings (90% lean)	1653	23.17	24.84	2.14	0.61
Fat		0.00	0.00	0.00	-------
Purge		1.56	2.66	0.53	0.24
Cutting loss		0.22	0.23	0.44	0.98
Total saleable yield		98.22	98.07	0.80	0.90
Processing time, per subprimal			s		
Trimming/cutting time		9.5	9.3	1.3	0.90

[a] UPC = Universal product code.
[b] SEM is the standard error of the least squares means.

Conclusions

In addition to providing these cutting tests for comparative purposes, there are several key points to be made based on our findings. USDA quality grade had little or no effect on retail cutting yields and processing times for subprimals from the rib and loin. Some historical differences in retail yield between USDA quality grades may have been due to the differences in trimmable fat now being removed at the packer level. Therefore, beef merchandisers may choose to utilize either U.S. Choice or U.S. Select rib and loin subprimals based on parameters other than yield.

Even though many of the cutting tests revealed relatively high retail yields (ranging from 80.27% to 98.22%), there still are missed yield opportunities because of fat trim, purge and cutting losses. To further increase retail yields from the rib and loin subprimals, efforts can not be focused exclusively on reducing fat trim specifications, but may need to include methods of minimizing purge and increasing cutting efficiencies. Retail yields for a class of subprimals are based on two key factors: purchase specifications and merchandising schemes. Purchase specifications allow retailers to select from a variety of products to find those that closely match how products should be merchandised based on historic consumer preference and seasonal demand. Evidence of how purchase specification and merchandising scheme impacts retail yields is best demonstrated by our ribeye cutting information.

References

Garrett, R. P., Theis, R. W., Walter, J. P., Griffin, D. B., Savell, J. W., Johnson, H. K., Dockerty, T. R., Allen, J. W., & Pierson, T. R. (1991). Communicating Cutability to the Retailer. Final Report to the National Live Stock and Meat Board. College Station, TX: Dept. Animal Science, Texas A&M University.

Industry-Wide Cooperative Meat Identification Standards Committee. (2003). Uniform retail meat identity standards. Centennial, CO: Cattlemen's Beef Board and National Cattlemen's Beef Association.

Lorenzen, C. L., Griffin, D. B., Dockerty, T. R., Walter, J. P., Johnson, H. K., & Savell, J. W. (1996a). Subprimal purchasing and merchandising decisions for pork: relationship to retail yield and fabrication time. Journal of Animal Science,. 74, 5–12.

Lorenzen, C. L., Walter, J. P., Dockerty, T. R., Griffin, D. B., Johnson, H. K., & Savell, J. W. (1996b). Subprimal purchasing and merchandising decisions for pork: relationship to retail value. Journal of Animal Science, 74, 13–17.

Lorenzen, C. L., Martin, A. M., Griffin, D. B., Dockerty, T. R., Walter, J. P., Johnson, H. K. & Savell, J. W. (1997). Influence of wholesale lamb marketing options and merchandising styles on retail yield and fabrication time. Journal of Animal Science, 75, 1–6.

McNeill, M. S., Griffin, D. B., Dockerty, T. R., Walter, J. P., Johnson, H. K., & Savell, J. W. (1998). Retail yield and fabrication times for veal as influenced by purchasing options and merchandising styles. Journal of Animal Science, 76, 1613–1620.

NAMP. (2003). The meat buyers guide. Reston, VA: North American Meat Processors Association.

USDA. (1996). Institutional meat purchase specifications for fresh beef products-PDF version. Washington, DC: USDA Agricultural Marketing Service. Available: http://www.ams.usda.gov/lsg/imps100.pdf. Accessed 06 November 2003.

Weatherly, B. H., Griffin, D. B., Johnson, H. K., Walter, J. P., De La Zerda, M. J., Tipton, N. C., & Savell, J. W. (2001). Foodservice yield and fabrication times or beef as influenced by purchasing options and merchandising styles. Journal of Animal Science, 79, 3052–3061.