

Variation in Composition and Sensory Properties for Beef Short Ribs

Justine J. Hosch
Kim A. Varnold
Lasika S. Senaratne-Lenagala
Jerilyn E. Hergenreder
M.E. Semler
M.D. Chao
Chris R. Calkins¹

Summary

Beef short ribs (2-12) were collected from both sides of 10 Choice beef carcasses. Short ribs from the left side were utilized in a yield assessment and the right sides were prepared for a trained sensory panel. Ribs 9-12 had the greatest percent fat per rib and lower percent lean. Ribs 5-7 were intermediate in percent lean. Rib 5 was similar to ribs 9-10 for tenderness, and ribs 11-12 were rated least tender. Ribs 6-8 were rated highest for juiciness and ribs 5 and 11 were rated least juicy. No differences in off-flavor intensity existed among samples. These data suggest differences in short rib fabrication could be used to add value to the carcass.

Introduction

Historically rib short ribs (6-8) are valued 40% above chuck short ribs (2-4). The *Serratus ventralis* is a large fan-shaped muscle that overlies the ribs, and thus comprises a large component of lean present in short ribs. Sensory properties and yield differences between individual short ribs is unknown. Modifications to the chuck-rib break would result in a divergence of short rib offerings. In addition, beef ribs 9-12 are currently boned and marketed as finger meat, but the ventral portion of these ribs contains sizeable lean tissue. Therefore the objective of this was to

determine composition and sensory differences among short ribs.

Procedure

Twenty short rib sub-primals were identified on both the left and right side of Choice, YG 3 carcasses weighing between 800 and 850 lb. The carcasses entered commercial production, with the chuck and rib primals separated at the 5-6 rib junction. Short ribs were removed from the chuck primal (ribs 2-5) and from the rib primal (ribs 6-12), were vacuum packaged and aged for 21d post mortem at 2°C. Ribs 9-12 were fabricated from the ventral half of beef ribs 9-12, as the dorsal half had minimal lean tissue.

Yield Evaluation

Prior to fabrication, the chuck and rib short ribs from the left side were weighed whole and distances of width, length, and depth were measured using a cloth measuring tape. Each rib was individually cut from its respective sub-primal, dividing the lean in half between ribs.

Each rib was then boned, and the associated bone, lean, and fat from each rib was physically separated and weighed.

Sensory Evaluation

Chuck and rib short ribs from the right side of the carcass were sliced into ¼-inch slices using a band saw. Each rib was separated from their subsequent counterpart by dividing the lean between ribs in half. This cutting style allowed for the lean associated with an individual rib to be sampled during panel sessions. Indi-

vidual short rib slices were cooked on a Rival 11 inch square electric skillet at 204°C for 45 seconds per side. Short rib pieces were then transferred to a second frying pan at 149°C for four minutes time per side. Cooked short rib slices were then kept in a preheated countertop warmer no longer than 15 minutes prior to serving.

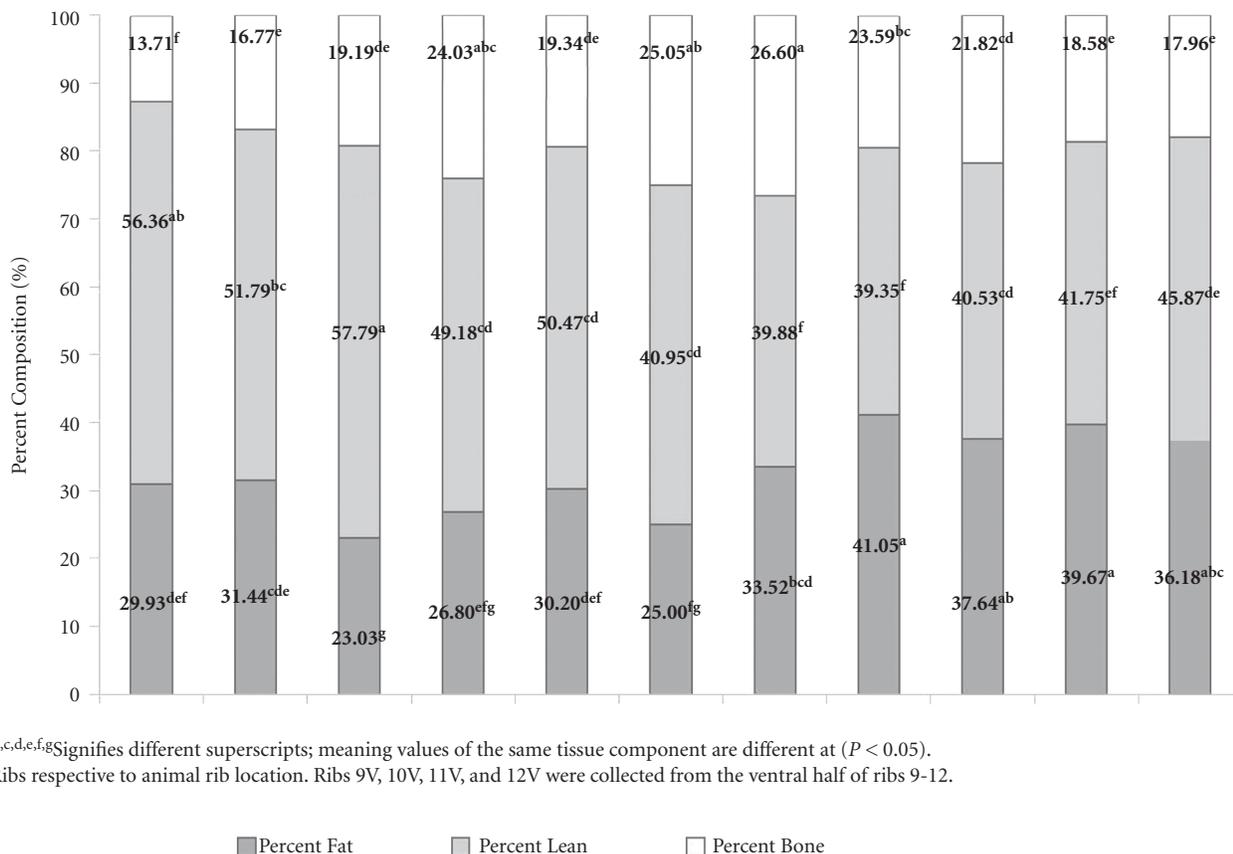
For sensory analysis, ribs 2-12 were served to a trained taste panel to distinguish organoleptic differences between rib locations based on 8-point scales for tenderness (1 = extremely tough – 8 = extremely tender), juiciness (1 = extremely dry – 8 = extremely juicy), and off flavor intensity (1 = extremely mild – 8 = extremely intense).

Results

Ribs 9-12 had the largest percentage of separable fat per rib (over 35%) and thus lower percentage lean on a rib-by-rib basis (Figure 1). Similar in fat composition, ribs 4, 5, and 7 had the least amount of fat present (23-26%). Ribs 5-7 were similar and intermediate in percent lean at roughly 50%. Ribs 5-8 contained a greater percentage of bone, with ribs 2-4, 6, 11, and 12 having less than 20% bone per rib.

In taste panel ratings, ribs 2-4, and 6-9 were similar in tenderness and were rated the most tender among samples (Table 1). Rib 5 was similar to ribs 9 and 10 for tenderness, and ribs 11 and 12 were rated least tender among samples. Ribs 6-8 were rated highest for juiciness, and ribs 5 and 11 were rated least juicy. There were no differences in off-flavor intensity among samples.

By evaluating the ventral half of short ribs from ribs 9-12, it was determined they offered similar sensory properties to that of chuck



^{a,b,c,d,e,f,g}Signifies different superscripts; meaning values of the same tissue component are different at ($P < 0.05$).
¹Ribs respective to animal rib location. Ribs 9V, 10V, 11V, and 12V were collected from the ventral half of ribs 9-12.

Figure 1. Least square means for short rib composition based on physical separation of tissue.

Table 1. Least square means for short rib sensory analysis

| Rib ² | Sensory property ¹ | | |
|------------------|-------------------------------|---------------------|-------------------|
| | Tenderness rating | Juiciness rating | Off-flavor rating |
| 2 | 5.07 ^{abc} | 4.76 ^{bcd} | 2.47 |
| 3 | 5.11 ^{abc} | 4.89 ^{bcd} | 2.27 |
| 4 | 5.21 ^{ab} | 4.72 ^{cd} | 2.21 |
| 5 | 4.72 ^d | 4.05 ^f | 2.36 |
| 6 | 5.40 ^a | 5.29 ^a | 2.63 |
| 7 | 5.28 ^{ab} | 5.08 ^{ab} | 2.46 |
| 8 | 5.32 ^{ab} | 5.01 ^{abc} | 2.44 |
| 9V | 5.02 ^{bcd} | 4.81 ^{bcd} | 2.12 |
| 10V | 4.81 ^{de} | 4.61 ^{de} | 2.52 |
| 11V | 4.31 ^e | 4.30 ^{ef} | 2.47 |
| 12V | 4.29 ^e | 4.72 ^{cd} | 2.38 |

^{a,b,c,d,e,f}Means in the same column with different superscripts are significantly different ($P < 0.05$).

¹Sensory property ratings based on an 8-point hedonic scale: tenderness (1 = extremely tough – 8 = extremely tender), juiciness (1 = extremely dry – 8 = extremely juicy), and off flavor intensity (1 = extremely mild – 8 = extremely intense).

²Ribs respective to animal rib location. Ribs 9V, 10V, 11V, and 12V were collected from the ventral half of ribs 9-12.

short ribs. By adding the ventral half of ribs 9-12 to US beef short rib offerings, an added 2.86 lb of short ribs would be available, compared to 1.5 lb from this location that would be marketed as beef rib fingers.

Given the similarities in tenderness, and increased yield values, short ribs from the chuck sub-primal could be added to that of the rib short rib sub-primal. Chuck short ribs could also be sold at a value similar to that of rib short ribs.

¹Justine J. Hosch, graduate student; Kim A. Varnold, graduate student; Lasika S. Senaratne, graduate student; Jerilyn E. Hergenreder, graduate student; Chris R. Calkins, professor, University of Nebraska–Lincoln Department of Animal Science, Lincoln, Neb.