

Project Summary

Cow Muscle Profiling—Phase A

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Background

The 1999 National Market Cow and Bull Beef Quality Audit revealed that 43 percent of cow beef is sold as boxed beef. Results of the Muscle Profiling research previously conducted by University of Nebraska revealed that there were opportunities to add value to cuts from the chuck and round from fed cattle fabricating those muscles in different ways. It is reasonable to assume that the same results could be achieved with whole muscle cuts from market cows.

There is adequate information available about meat palatability and muscle characteristics for the longissimus dorsi in older animals, however there has been little research evaluating these parameters for other muscles in market cow carcasses.

The objective of the Cow Muscle Profiling study was to help fill that knowledge gap by:

- 1) Characterizing the effects of carcass weight, fat thickness, body type, muscling level and skeletal maturity on yield, dimensions and shear force of 21 muscles from cow carcasses.
- 2) Determining the effects of those same factors on sensory properties of 10 muscles from cow carcasses.
- 3) Evaluating the composition, pH, water holding capacity, collagen content, myoglobin (heme iron) content, and color of 21 muscles from market cow carcasses.

This report summarizes information for Objective 3 (listed above).

Methodology

Carcasses (n = 138) were selected from four federally inspected plants in various geographic locations throughout the United States, and were obtained over a period of five months during 2001. Chuck (IMPS 113), round (IMPS 158) and loin (IMPS 172) primals were further fabricated into 21 individual muscles or muscle groups (listed below).

<i>Adductor</i>	<i>Biceps femoris</i>	<i>Complexus</i>
<i>Deep pectoral</i>	<i>Gluteus medius</i>	<i>Infraspinatus</i>
<i>Latissimus dorsi</i>	<i>Longissimus dorsi</i>	<i>Multifidus/Spinalus dorsi</i>
<i>Psoas major</i>	<i>Rectus femoris</i>	<i>Semimembranosus</i>
<i>Semitendinosus</i>	<i>Serratus ventralis</i>	<i>Supraspinatus</i>
<i>Teres major</i>	<i>Tensor fascia latae</i>	<i>Triceps brachii</i>
<i>Vastus intermedius</i>	<i>Vastus lateralis</i>	<i>Vastus medialis</i>

All muscles and muscle groups were denuded of external fat and were allowed to bloom for approximately one hour before an objective color measurement of the external surface was taken. These measurements were obtained with a Hunter Lab® Mini-Scan XE Plus (Reston, VA). In addition, samples were analyzed for pH, expressible moisture or water holding capacity, proximate composition (moisture, ash, fat and protein), collagen and heme iron concentration.

Findings

This study only completed the first phase of the Cow Muscle Profiling project, which included the selection and fabrication of carcasses, the measurement of color and water holding capacity, and partial completion of the analyses for composition (fat, moisture, ash) collagen, and heme iron.

A few significant trends can be noted based on the data collected to date. Generally, the pH of cow beef is higher than for young steers and heifers based on the data collected from fed cattle (A maturity) during the original Muscle Profiling research. Information collected during this project also indicated the muscles from cow beef are quite lean, with the overall average ranging from five to six percent. In this population, beef cattle tended to have smaller carcasses and to be leaner than dairy cattle. There was about a 20 percent range in muscle means for water holding capacity, indicating some muscles are better at retaining moisture than others.

Another interesting factor to note, which was discovered during the course of carcass selection, was a much greater population of dairy cow carcasses than beef cow carcasses.

Implications

This study marks the beginning of a compilation of information about the characteristics of various muscles from cow carcasses. This information should be useful as the industry works to add value to beef products derived from older animals, which should in turn increase returns for producers.

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