Effects of Different Cooking Methods on Cooking Yields, Fat, and Moisture Change in Retail Beef Cuts
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Introduction

Dietitians and consumers often need information regarding food plans, food preparation, and nutrient values for meats (before and after cooking). Therefore, data for beef has been developed, with a focus on cooking yields, moisture, and fat change. Cooking yields describe changes in food weight due to moisture loss, water absorption, or net fat gains/losses during food preparation and cooking. To address needs for up-to-date beef data, a nationwide Nutrient Data Improvement (NDI) study was recently conducted by the USDA Nutrient Data Laboratory (NDL), Colorado State University, Texas A&M University, and Texas Tech University with support from National Cattlemen’s Beef Association.

Objectives

To determine moisture and fat content of raw and cooked cuts and calculate cooking yield, moisture, and fat change.

To determine the effect of cooking methods (roasting, grilling, braising) on cooking yield, fat change, and moisture change in beef roasts and steaks.

Methodology

Roasts (2” thick) and steaks (1” thick) from chuck, rib, and loin were collected from six US regions using a statistical sampling plan designed so that it represented quality grade, yield grade, genetic type, and gender proportions in retail beef. 15 chuck, rib, and loin cuts (n=36 animals per cut) were cooked according to study protocols developed by NDL. Data (n=15 cuts) were compared for roasts and steaks cooked by 3 different methods: 3 cuts were roasted to 60°C internal temperature in a non-stick aluminum roasting pan with rack, 9 cuts were grilled to 70°C internal temperature using a two-sided electric grill, and 3 cuts were braised to 120°C internal temperature in a non-stick Dutch oven with water added. Raw and cooked weights and proximate data were used to calculate cooking yield, fat and moisture change. Tables 1 and 2 show the fat and moisture values of raw cuts.

Quality control: Analytical quality control was assured by using standard reference materials and in-house control materials.

Data were analyzed by multi-way mixed model analysis of variance to test for cut differences among 3 different cooking methods, braised cuts had lowest yield and grilled cuts had highest yield on average. (Figure 1) Moisture content varied from 60 to 73 g/100g for raw cuts whereas moisture was 53 to 64g/100g for cooked cuts. Fat content varied from 5 to 21 g/100g for raw cuts whereas fat was 8 to 24 g/100g for cooked cuts. (Table 1 and 2) Among 3 different cooking methods, braised cuts had lowest yield and grilled cuts had highest yield on average. (Figure 1) Percent fat and moisture change after cooking varied among cuts in roasting and grilling (p < 0.05), but did not significantly vary among cuts which were braised. (Figures 2 and 3) The highest mean moisture loss occurred in braising (31%), compared to roasting (19%) and grilling (21%) (p < 0.05). (Figure 2) Percent fat change differed from cut to cut and within cooking methods: 9 cuts showed a net fat loss and 6 cuts had a net fat gain per 100 grams. (Figure 3)

References


Support is from the Beef Checkoff

![Graph showing cooking yields for different cooking methods.](image-url)