Comparison of Cooking Yields and Fat and Moisture Retentions in Retail Beef Cuts
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Introduction
The Nutrient Data Laboratory (NDL) at the USDA is tasked to obtain current representative beef data for consumer and research use.
NDL recently conducted a nationwide Nutrient Data Improvement (NDI) study in collaboration with Colorado State University, Texas A&M University, and Texas Tech University and with support from National Cattlemen’s Beef Association (NCBA), to determine the effects of cooking on factors such as cooking yields, retentions, and changes in nutrient content.
Cooking yields describe changes in food weight due to moisture loss, water absorption, and/or net fat gains/losses during food preparation and cooking.
True retention is defined as the measure of the proportion of the nutrient remaining in the cooked food in relation to the nutrient originally present in the raw food.
Data results from NDL studies are developed through the Nutrient Databank System (NDBS), and released by the Nutrient Data Laboratory (NDL) as tables of Cooking Yields and Nutrient Retention Factors for foods.

Objectives
To determine fat and moisture content of cooked roast and steak cuts for calculating cooking yield, and fat and moisture change and retentions.
To determine the effect of different cooking methods (roasted versus grilled) and cut size (roast versus steak) on cooking yield, and percentage of moisture and fat retained after cooking.
To determine differences in fat change and moisture change after cooking roast and steak cuts using 2 cooking methods.

Methodology
Up to 72 animals were obtained from six representative US locations using a statistical sampling plan so that samples represented quality grade, yield grade, genetic type, and gender proportions present in retail beef.
Roast (2” thick) and steak (1” thick) samples from the chuck, rib, and loin were prepared from their respective primals.
Roast cuts were roasted to internal temperature of 60°C using a non-commercial oven and steaks were grilled to 70°C internal temperature using a two-sided electric grill.
Four pairs of cuts (n = 36 animals per cut) including chuck eye, tenderloin, ribeye bone-in lip-on, and ribeye boneless lip-on were analyzed at qualified laboratories.

Calculations
Cooking yields were calculated using the following formula

\[ \text{Cooking Yield} = \frac{\text{Weight of Cooked Portion}}{\text{Weight of Raw Portion}} \times 100 \]

Percent moisture and fat change were calculated using the following formula, where EP is edible portion

\[ \text{Percent Moisture Change} = \frac{\text{Weight of Cooked Portion} - \text{Weight of Raw Portion}}{\text{Weight of Raw Portion}} \times 100 \]

\[ \text{Percent Fat Change} = \frac{\text{Fat Content of Cooked Portion} - \text{Fat Content of Raw Portion}}{\text{Fat Content of Raw Portion}} \times 100 \]

Results
Chuck and tenderloin roasts had higher cooking yields (p < 0.05) and retained more moisture compared to respective steaks. (Figure 1 and Table 1)
Ribeye bone-in lip-on and ribeye boneless lip-on roasts had lower cooking yield (77% and 76%) and retained less moisture (63% and 84%) than the respective steaks with 85% and 83% cooking yield and 72% moisture retention (p < 0.05). (Figure 1 and Table 1)
Fat retention in tenderloin steak and ribeye bone-in steak were higher than in the respective roasts (NS). (Table 1)
Fat change varied among cuts and size of cuts. The difference was significant only between the ribeye bone-in lip-on roast and steak pair (p < 0.05). (Figure 2)

Conclusion
Cooking yield data including amount of fat and moisture retained and amount of fat and moisture changes after cooking provide researchers, nutritionists, and consumers at retail level with valuable data for selection and cooking of retail cuts.

References

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