

2018 Reciprocal Meat Conference – Meat and Poultry Quality and Composition- Measurement and Prediction

Meat and Muscle Biology™



Nutrient Analysis of Raw Beef Variety Meat Items

H. Kesterson*, D. R. Woerner, T. E. Engle, J. N. Martin, R. J. Delmore, and K. E. Belk

Center for Meat Safety & Quality, Department of Animal Sciences, Colorado State University, Fort Collins, CO, 80523, USA

*Corresponding author. Email: hannahk55@yahoo.com (H. Kesterson)

Keywords: nutrients, nutrition, offal, variety meat
Meat and Muscle Biology 2(2):35

doi:10.221751/rmc2018.030

Objectives

The objective of this study was to expand the availability of nutrient data for beef variety meat items and to provide relevant data to update the USDA Food Composition Database. Previous to this study, much of the nutritional information for these items was outdated, and was imputed, rather than true analytical data.

Materials and Methods

Beef heart, liver, kidney, tongue, honeycomb tripe, oxtail, and marrow bones were obtained from 3 different processing facilities (Texas, Nebraska, Kansas) in the United States. Rocky mountain oysters (beef testicles) and beef blood were obtained from separate, single facilities. Standardized dissection procedures were used to yield the following separable components: lean tissue, external fat, internal fat, and refuse. Each of the separable components from each sample, excluding refuse, were homogenized individually, immediately following dissection. Three composites of each item were created and were frozen (-80°C) until further analysis. For items containing separable fat, all fat homogenates of the same item and fat type (internal or external fat) were combined to produce a single fat composite per item. Nutrient analysis occurred at USDA-ARS approved laboratories using validated methods and standards. Proximate analysis (protein, ash, moisture, fat), fatty acid profile, ICP minerals, cholesterol, vitamin A, vitamin E, vitamin D, 25-hydroxy vitamin D, and vitamin K analysis were performed for heart, liver, kidney, tongue tripe, oxtail, bone marrow, rocky mountain oysters, and blood. Additionally, B-vitamin content was analyzed for heart, liver, kidney, and tongue. Using R statistical software, mean and standard error of the mean of nutrient values were calculated from the 3 composites of each item.

Results

The protein content of the variety meat items ranged from 1.25 to 19.91g per 100 g of separable lean. Fat content of bone marrow was 77.09g per 100 g, while all other items contained between 1.15 and 11.20g fat per 100 g separable lean. The fatty acid found to be most prevalent (as a percentage of total fatty acids in each sample) for both lean and fat tissue was oleic acid, a monounsaturated fatty acid. Vitamin B₁₂ was the most abundant B-vitamin in all samples analyzed, varying between 54.27 and 849.00 $\mu\text{g/g}$ of separable lean. Each of the items discussed in this study qualifies for at least one “Good Source” or “Excellent Source” labeling claim as regulated by the USDA based on the separable lean component. “Good source” indicates that a product contains 10 to 19% of the Daily Value (DV) or Recommended Daily Intake (RDI) per RACC (reference amount customarily consumed) for that nutrient, while “Excellent Source” designates that the food contains at least 20% of the DV or RDI per RACC for that nutrient. Vitamin K₂ has been studied recently in regard to beneficial effects on human health. Although there is not an established daily reference value for vitamin K₂, this nutrient was present in all samples analyzed and results are reported for 13 forms of vitamin K₂.

Conclusion

This study provides current, analytically derived nutrient information for U.S. beef variety meat items. Results reflect that these variety meat items could be beneficial in providing essential vitamins and minerals as a component of a healthy diet. This data will be valuable for use by the meat industry, those selling variety meats, researchers, dietetic professionals, and consumers.