



PROJECT SUMMARY PRODUCT QUALITY

BEEF
RESEARCH

Identifying the Influence of Rate of Cooking, Cooking Temperature, and Degree of Doneness on Compounds and Components Related with Flavor and Tenderness – Phase II

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Collaborator I - Identifying the Influence of Rate of Cooking, Cooking Temperature, and Degree of Doneness on Compounds and Components Related with Flavor and Tenderness – Phase II

Background and Objective

Since it is expected that consumers will pay more for beef, the outstanding flavor of beef must be maintained and/or improved in order to keep the beef consumers continually satisfied. Importance of beef flavor in the marketplace is underscored by the fact that consumers' flavor preferences are reflected in beef purchase decisions (Sitz et al., 2005).

Very recent research sponsored by Beef Checkoff funds demonstrated that differences in steak thickness, cooking method, cooking temperature, and cooking rate influence overall eating satisfaction of steaks and beef flavor (Shubert, 2015). Therefore, the present study evaluated the effects of cooking temperature and degree of doneness as major contributors to steak tenderness and flavor development, as well as quantifying compositional changes that occurred as a result of cooking. Findings of this research should help with development of an optimized set of cooking procedures to improve the steak eating experience.

Methods


A total of 20 combinations of cooking temperature and degree of doneness were evaluated. Steaks were used as the experimental unit, and treatments were applied to individual steaks. Treatments were assigned to n= 30 replicates over steaks obtained from 90 carcasses. Strip loins were paired and sliced producing a total of 24 steaks per carcass. Steaks were cooked at a randomly assigned oven temperature until it reached an internal peak temperature. Following cooking procedures, each steak was cut into 3 layers (surface, middle, and center), and layers were composited for further analysis. Each layer was analyzed for proximate composition, collagen content, and volatile flavor compounds.

Important Findings

The results obtained indicate that cooking rate (oven temperature) and final internal temperature (degree of doneness) have significant influences on collagen content, proximate composition and volatile flavor compounds. Compositional changes as a result of cooking method will help to explain observed sensory differences in previous studies. The sensory performance of beef is significantly influenced by cookery.

Industry Impact

Recent consumer research and the most recently conducted National Beef Quality Audit continue to indicate that beef flavor is a fundamental driver for beef demand. Additionally, recently completed research aimed at steak cookery method has identified that production practices, specifically days on feed and breed type, considerably influence the flavor attributes of beef. Even further, muscle to muscle differences also influence the flavor of beef. Results of the current study further explain factors influencing beef flavor. These data can be used as a tool by the foodservice industry to assess the sensory attributes that varying cooking rate and degree of doneness combinations possess in order to adequately select a cooking method that fits their needs to create a combination that has the greatest chance of delivering the consumer a satisfactory eating experience.



References

- Shubert, D. M. (2016). Discovering consumer preferences for steak thickness and common food service cookery methods for beef strip loin steaks (Doctoral dissertation, Colorado State University. Libraries).
- Sitz, B. M., Calkins, C. R., Feuz, D. M., Umberger, W. J., & Eskridge, K. M. (2005). Consumer sensory acceptance and value of domestic, Canadian, and Australian grass-fed beef steaks. *Journal of Animal Science*, 83(12), 2863–2868. Retrieved from <http://jas.fass.org/content/83/12/2863.abstract>

Graphs/Tables

Figure 3. Principal component analysis based on volatile compounds from cooked steaks to multiple degrees of doneness using varied oven temperatures.

