

# Project Summary

## Differentiation of Beef Flavor across Muscles and Quality Grades Phase II

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## Project Summary

### Background

Flavor is defined by consumers as equally important to tenderness for customer satisfaction (Lorenzen et al., 2003). However, flavor in beef is not a “single” attribute. Beef flavor consists of multiple attributes, and good quality flavor can be defined differently in various beef products. Also, off-flavor in one beef product may be different than off-flavor for another product. Before the beef industry can move ahead on addressing flavor in beef and beef cuts, two issues need to be addressed. First, a full beef lexicon has to be developed that identifies all the flavor components that are present in beef. The industry cannot develop systems for identifying beef flavor if it does not know what “beef flavor” is there. Second, characterization of beef flavor in major beef cuts differing in Quality grades is needed as a baseline. This information is critical to the beef industry moving toward addressing beef flavor and issues related to it.

### Methodology

The beef flavor lexicon was developed by Kansas State University in Phase I of the project. The lexicon was provided to three trained, expert sensory panels. Each panel trained for a minimum of 20 days using the same standard samples. Each panel conducted validation using the same validation samples. After completion of training and validation, each panel evaluated 98 beef samples. Samples were from Choice (n=48) and Select (n=48) beef carcasses and from eight cuts (bottom round roast, eye of round roast, inside round roast, knuckle roast, flat iron steak, top sirloin steak, top loin steak and tenderloin steak). Steaks and roasts were cooked using standard methods and internal temperature was monitored. Each location provided sensory panelists with double distilled, deionized water, saltless saltine crackers and fat-free ricotta cheese as palate cleansers. Panelists were seated in individual booths with red filtered lights. Samples were served to panelists in random order and each panelist received 2-0.5 inch cubes from each steak or roast. Panelists evaluated each sample for aroma and flavors defined in the beef lexicon.

### Findings

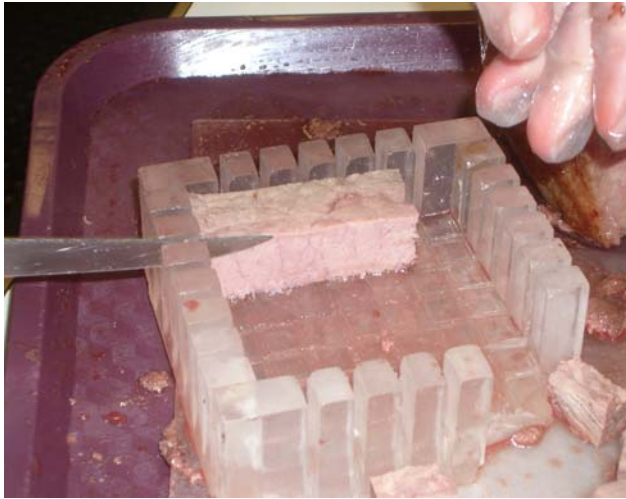
Choice steaks and roasts were higher in fat, livery and overall sweet flavor than Select steaks and roasts. Eye of round roasts were lowest in beefy, brown/roasted and fat-like aroma, and beef, brown/roasted, bloody/serumy and fat-like flavor attributes. In general, eye of round roasts were considered to be slightly lower in overall flavor or less beefy than other roasts from the round. Top loin steaks had lower bloody/serumy aroma than flat iron and top sirloin steaks and lower bloody/serumy flavor than top sirloin and tenderloin steaks. These results indicate that the top loin steak is slightly lower in flavor than the other three steaks. Also, flat iron steaks had similar beefy aroma and flavor as top sirloin and top loin steaks, but flat iron steaks tended to be higher in fat-like aroma and flavor and similar to tenderloin steaks in liver-like flavor and lower in sour flavor attributes. Steaks had slightly higher umami flavor than roasts. Bottom round, inside round and knuckle roasts were intermediate in beefy aroma and flavor; and steaks were highest in beefy aroma and flavor. Roasts were lower in fat-like aroma and flavor than steaks. Bottom round roasts were highest in liver-like flavor attribute.

While differences were found for aroma and flavor attributes across the three panels, application of the beef lexicon was successfully implemented by the three locations. For some aroma and flavor

attributes, panelists in location one rated one- to two-points higher, but these differences were most likely more due to a need for additional training and not due to insufficiencies in the beef flavor lexicon. Based on these results, the beef flavor lexicon could be published in combination with the suggested training exercises for use by meat scientists across the world.

### **Implications**

Following this development of a beef flavor lexicon, characterizing flavor and variation of flavor for multiple muscles across quality grades will assist the beef industry in more effective marketing and trouble-shooting beef flavor issues.



After cooking, steaks and roasts were cut into 0.5 inch cubes using a grid to assure that panelists received the same size pieces across all treatments

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