

## 2018 Reciprocal Meat Conference – Consumer Topics

## Meat and Muscle Biology™



## Influence of Cook Method and Degree of Doneness on Beef Flavor Attributes in Flap and Skirt Steaks

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### Objectives

Beef flavor is very complex and the most important driver for consumer acceptance. Cooking method, Quality grade, and cooked internal temperature may affect beef flavor. In this study, 3 beef cuts (outside skirt, inside skirt, and flap), 2 Quality grades (USDA Choice and Select), 3 cooking methods (pan fry, pan grill, and outside grill), and 3 internal cook temperature endpoints (58°C, 70°C, and 80°C) were used to better understand trained descriptive beef flavor and texture attributes, and Warner-Bratzler shear force (WBSF) tenderness.

### Materials and Methods

Meat sources were purchased as subprimals in 6 reps for each cut and were fabricated into 10.16 cm wide steaks. The USDA upper two thirds Choice and USDA Select inside skirt, outside skirt, and flap steaks were cooked using a pan fry, pan grill, or outside grill methods. The steaks were cooked to an internal temperature of either 58.3, 70 or 80°C to represent medium rare, medium and well-done steaks. The steaks were evaluated by an expert trained meat descriptive panel for beef flavor and texture attributes. The trained panel descriptive flavor attributes, and WBSF were analyzed using Proc Means and Proc GLMMIX procedures of SAS (version 9.4, SAS Inst. Inc., Cary, NC) with a predetermined  $\alpha$  of 5%.

### Results

Cooking method and internal cook temperature endpoint tended to impact beef flavor to a greater extent than USDA Beef Quality grade for outside skirt, inside skirt and flap steaks. Internal cook temperature endpoint affect-

ed beef identity, brown, bloody/serumy, metallic, burnt, smokey-charcoal, and juiciness ( $P < 0.05$ ). Pan frying tended to result in more off-flavor development and outside grilling was more often associated with positive flavor attributes. Choice steaks tended to have more positive beef flavor attributes such as beef identity, umami, brown and roasted. Quality grade affected fat-like, cardboardy, juiciness, muscle fiber tenderness and beef flavor ( $P < 0.05$ ) for all 3 cuts. Pan grilling tended to result in intermediate flavor for steaks when compared to steaks cooked using outside grilling and pan frying cooking methods. The flavor attributes generally affected by cooking method included beef identity, brown, metallic, smokey-charcoal ( $P < 0.05$ ).

Treatments had an effect on flap tenderness measured by WBSF, Choice flap steaks were more tender ( $P < 0.05$ ) than Select flaps and flap steaks cooked to 80°C were less tender ( $P < 0.05$ ) than other internal temperatures. Pan-grilled flap steaks were more tender ( $P < 0.05$ ) than steaks from the other cooking methods. For inside skirts, there was no effect ( $P > 0.05$ ) for Quality grade on tenderness measured by Warner-Bratzler shear force values. However, inside skirts cooked to 58°C were more tender than other internal temperature endpoints, and pan-grilled skirts were more tender than other cooking methods ( $P < 0.05$ ). Lastly, for WBSF measurements, treatments had no impact ( $P > 0.05$ ) on outside skirt steaks.

### Conclusion

In the beef industry, beef flavor is a driver of consumer acceptability. This research was conducted to assist in the development of the Beef Flavor Myology tool that will aid in determining factors that impact beef flavors across various cuts, cooking methods, marbling levels, and cooked internal temperature.