



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

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### Objectives

It has been well established that cooking method, marbling level, and cooked internal temperature endpoint affect beef flavor, the most important driver of consumer acceptance. However, beef cuts respond differently to cooking method and cooked internal temperature endpoint based on their inherent chemical characteristics.

### Materials and Methods

Treatments were: beef cuts (inside round, bottom round, and eye of round); USDA beef quality grade (upper two-thirds Choice and Select); cooking methods (pan grill, stir fry, stew no marinade, stew marinade, and roast); and internal cook temperature endpoints (58, 70, and 80°C). The pan grill cook method included 0.25 and 0.75 in samples from each muscle type. The stir fry cook method treatment was limited to 0.25 in cuts, which were cut into 1.00 in strips prior to cooking. The marinated and non-marinated stew cook method treatments included 0.25 and 0.75 in samples from each muscle. These samples were then cut into 0.25 × 1.00 × 1.00 in and 0.75 × 1.00 × 1.00 in samples prior to cooking. Stew marinated samples were marinated with 118 mL water, 90 mL lemon juice, 30 mL canola oil, 5 mL salt, and 2.5 mL pepper. Two lb roasts were cut from bottom round and eye of round subprimals and inside round subprimals were cut into 2.00 in roasts prior to cooking. An expert descriptive beef flavor and texture attribute panel evaluated each sample using 16-point scales for flavor and texture attributes. Warner-Bratzler shear force (WBSF) were determined. The trained panel results and

WBSF values were analyzed using Proc Means and Proc GLMMIX procedures of SAS (version 9.4, SAS Institute, Cary, NC) with a predetermined  $\alpha$  of 5%.

### Results

Quality grade impacted flavor for the inside round ( $P < 0.05$ ). USDA quality grade had minimal effect on tenderness as expected, as beef round cuts are highly active muscles in the animal and contain considerable amounts of connective tissue. Cooking method and internal cook temperature endpoint, or cooking time for the stewing cooking treatment, impacted beef flavor to a greater extent ( $P < 0.05$ ). When pan fried, thicker cuts resulted in more positive flavor attributes. For cuts that were roasted, cooking to higher internal temperatures resulted in higher levels of beef identity, roasted, and umami flavors and less serummy/bloody flavors, as well as decreased tenderness ( $P < 0.0001$ ), especially in inside round roasts. Marinated round cuts were more tender than their non-marinated counterparts ( $P < 0.0001$ ). Cuts that were thinner and had longer cooking times were more tender but had more off-flavor attributes ( $P < 0.05$ ).

### Conclusion

Cut thickness, cooking method, length of cooking or internal cook temperature endpoint, and presence of marinade affected flavor and texture of bottom round, eye of round, and inside round cuts. This data will be useful in providing consumer and food service personnel recommendation on how to maximize the flavor and texture of beef round cuts.