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New Zealand and U.S. Consumer Assessment of Various Slow Cooked Muscles from New Zealand Beef

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Objectives

A consumer study was conducted to measure sensory differences between country (United States and New Zealand) and muscle or muscle group for 11 different cuts of New Zealand beef when using a slow cook method.

Materials and Methods

Beef sourced from New Zealand was slow cooked and tested by untrained consumers ($n = 360$) in either the United States ($n = 180$) or New Zealand ($n = 180$) following the Australian MSA (Meat Standards Australia) testing protocols (US ethics code 503510, NZ ethics code 503743). Subprimals were collected at 2 commercial abattoirs in New Zealand and were aged 7 to 10 d postmortem. Subprimals were fabricated into slow cook samples, focusing on the following muscles or muscle groups for slow cooking: *adductor femoris*, *pectoralis profundus*, *supraspinatus*, *triceps brachii*, *semitendinosus*, foreshank, *gracilis*, hindshank, *vastus lateralis*, *serratus ventralis*, thin flank (*obliquus externus abdominus* and *rectus abdominus*). The denuded muscles were cut into cubes, vacuum packaged (22 cubes per bag) and frozen at -20°C . Paired samples were divided between New Zealand (NZ) and the United States (US). Testing was conducted in Lubbock, TX or Dunedin, NZ. Each sample was browned for 90 s and then transferred to a steamer pan, then simmered at 93°C to 95°C for 2 h. Consumers scored each sample for tenderness, juiciness, flavor liking, overall liking using 100-mm line scales for each trait. Data were analyzed using PROC GLIMMIX in SAS to determine if the fixed effects of country, muscle group, or their interaction influenced eating quality ($\alpha = 0.05$).

Results

No interactions were detected between country and muscle ($P > 0.05$). Country influenced ($P = 0.05$) juiciness scores only, while muscle impacted all response variables ($P < 0.01$). The U.S. consumers scored samples juicier ($P = 0.05$) than NZ consumers, regardless of muscle. For juiciness, the same 4 muscle groups were consistently rated higher ($P < 0.05$) than the remaining muscle groups—*serratus ventralis*, *gracilis*, hind shank, and thin flank, with scores ranging from 5.7 to 68.6. The *serratus ventralis* was also rated higher for flavor and overall liking ($P < 0.05$) with scores of 64.8 and 66.5, respectively. On the opposite end of the scale, the *vastus lateralis* consistently scored lower ($P < 0.05$) for juiciness, flavor and overall liking than the remaining muscle groups, with scores ranging from 32.8 to 42.7 for tenderness, juiciness, flavor liking, and overall liking. In addition, *pectoralis profundus* was rated as one of the least tender muscles ($P < 0.05$).

Conclusion

Only minor differences in juiciness perceptions existed between US and NZ consumers when evaluating samples that were slow cooked, while tenderness, flavor liking, and overall liking were scored similarly between the 2 countries. Of the 4 muscle groups that were consistently rated greater than the remaining muscles, average scores for those traits would classify samples as good everyday quality based on the scoring system. However, of the 3 muscles that were consistently scored lower than the remaining muscles, average scores for those traits would likely result in samples being classified as unsatisfactory for the slow cook method. For slow cook methods, the same results outside of juiciness were achieved for both participating countries, indicating that palatability evaluations and comparisons among different muscles are not country dependent.