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Consumer Sensory Evaluation of Grass-Fed, Angus, and Commodity Ground Beef

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Objectives

Ground beef is one of the major sources of animal protein in the U.S., accounting for approximately 40% of beef consumption per capita. Several studies have looked at the flavor profile between grass-fed and grain-fed beef to identify if omega-3 fatty acids found in grass-fed ground beef play a key role in consumer flavor acceptability. Consumer sensory evaluation was conducted to evaluate consumer palatability ratings of grass-fed ground beef in comparison to Angus and commodity ground beef.

Materials and Methods

Grass-fed, Angus, and commodity 80/20 ground beef was obtained from local retail stores and a commercial meat processing facility. For each treatment 14 different production lots were used, and each lot contained 2.26 kg of ground beef. Ground beef patties were manually formed into 113 g patties using a template, crust frozen, vacuum packaged with 2 patties per package, and stored at -40°C for approximately 8 d. The remaining product was vacuum packaged and frozen at -40°C for consumer evaluation and moisture, fat, protein, and pH determination. Frozen ground beef patties were thawed for 24 h prior to consumer sensory analysis. Patties were cooked to 71°C initial internal temperature using a clamshell grill (Cuisinart, East Windsor, NJ) and held for approximately 5 min to allow a post-cook temperature rise to 74°C . Cooked ground beef patties were cut into 4 wedge-shaped pieces, and immediately served to panelists. A total of 98 consumers were recruited from Manhattan, KS and adjacent areas and rated the samples using 100-point continuous line scales with anchors at both ends and the midpoint on electronic tablets. Patties were rated for tenderness,

juiciness, flavor liking, texture liking, and overall liking, and each sample was rated as acceptable or unacceptable for each palatability trait.

Results

Moisture, fat, and protein content of commodity, grass-fed, and Angus ground beef used in this study were similar ($P > 0.05$). Commodity ground beef had a pH that was higher ($P < 0.05$) than Angus and grass-fed ground beef by 2.6 and 6.8%, respectively, which may have been contributed the result of lean finely textured beef as a component of this treatment. Consumers tended to rate grass-fed ground beef 4 and 6% lower ($P = 0.06$) for flavor and texture liking, respectively than Angus and commodity ground beef. Angus and commodity ground beef were rated higher ($P < 0.01$) for overall liking compared to grass-fed ground beef. Consumers found tenderness and juiciness similar ($P > 0.05$) for all 3 types of ground beef. Overall, Angus ground beef was preferred ($P < 0.05$) to grass-fed ground beef with an overall acceptability of 94.9 vs. 82.5%, while commodity ground beef had a similar ($P > 0.05$) overall acceptability to Angus and grass-fed ground beef. Consumers indicated no difference ($P > 0.05$) for tenderness acceptability, juiciness acceptability, and texture acceptability among the 3 ground beef treatments. Commodity ground beef had the highest ($P < 0.05$) flavor acceptability, while Angus and grass-fed ground beef had similar ($P > 0.05$) acceptability percentages for flavor.

Conclusion

Consumers rated grass-fed, Angus, and commodity ground beef similar for all palatability traits, except overall liking, in which consumers preferred Angus and commodity over grass-fed ground beef.