Sensory acceptability and chemical characteristics of healthy rib-eye steaks from forage-finished steers

Damin Dennir Torrico, Wannita Jirangrat, Guillermo Scaglia, Fatemeh Malekian, Marlene Janes, Kenneth McMillin and Witton Prinyawiwatkul

INTRODUCTION
Numerous studies have demonstrated the need to increase intakes of polyunsaturated fatty acids (PUFA), especially those belonging to the omega-3 (n-3) group, in the diets of infants and adults (Radda et al. 2008). The intake of n-3 fatty acids is an important determinant in decreasing risk for coronary heart disease. The n-3 requirement can be addressed by modifying diets to increase the consumption of polyunsaturated fats. For example, increasing the consumption of n-3 PUFA is associated with certain sensory attributes including flavor, juiciness, tenderness and overall acceptability. The availability of grass-finished beef during the whole year can be increased by feeding steers on forage. However, housing and foraging can affect the structural and chemical properties of muscle foods (Miller et al. 1988).

Material and Methods


table 1
<table>
<thead>
<tr>
<th>Treatment</th>
<th>Overall Appearance</th>
<th>Overall Beef Flavor</th>
<th>Juiciness</th>
<th>Tenderness</th>
<th>Overall Liking</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>5.92±0.85</td>
<td>5.11±0.22</td>
<td>61.43%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S2</td>
<td>5.63±0.65</td>
<td>4.86±0.18</td>
<td>67.12%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S3</td>
<td>6.09±1.70</td>
<td>5.94±1.82</td>
<td>85.11%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S4</td>
<td>5.46±1.45</td>
<td>4.92±2.36</td>
<td>74.09%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Mean values* for the proximate and fatty acids analyses of the rib-eye steaks.

RESULTS

- Consumers determined overall acceptance and purchase intent of each product, based on sensory liking, using the binomial (yes/no) model.
- Sensory analysis was used to evaluate the sensory acceptability, chemical characteristics and microbial safety of rib-eye steaks from forage-finished steers and one commercial steak cooked by grilling and/or 2-sided grilling using Hispanic consumers. In addition to this, acceptability of the health-related components was also assessed.

Table 3: Treatment comparison among the mean consumer acceptance scores.

- The overall purchase intent of the rib-eye steaks was potentially healthier than grain-fed commercial steaks and have market potential toward Hispanic population.

Table 4: Mean consumer acceptance scores for overall appearance and overall appearance of the forage-ribs and their positive purchase intent.

- The results indicated that there are significant differences among all rib-eye steaks (P<0.05) among steaks treatments regarding the mean consumer acceptance scores. For juiciness, tenderness and overall liking, C (freezing and cooking method) and S3 (freezing and cooking method) presented higher mean scores compared to other treatments. Differences among forage-finished steaks treatments could be due to differences in sensory panels or quality of the grasses used.

Table 5: Mean consumer acceptance scores for sensory attributes of rib-eye steaks cooked by the grilling method (frozen stored during 3 months).

- Sensory analysis was used to evaluate the sensory acceptability, chemical characteristics and microbial safety of rib-eye steaks from forage-finished steers and one commercial steak cooked by grilling and/or 2-sided grilling using Hispanic consumers. In addition to this, acceptability of the health-related components was also assessed.

Table 6: Profile of within canonical structure (%) describing variables that underlie group differences.

In conclusion, steers finished on forage and grass-finished steaks could be products of choice and offer the benefits of high-quality beef products, better for the health and nutrition. The results of this study demonstrated that forage finished steaks are promising product to be marketed. Further research is needed for understanding the behavior of forage finished steaks and the mode of processing that could be more acceptable to consumers.

DISCUSSION

Consumer acceptability of different cooked rib-eye steaks (frozen started for 3 months): For all sensory attributes, no significant differences were found between cooking methods except for S3 where the grilling method had a higher mean score compared to 2-sided grilling. For overall appearance and overall beef flavor, no significant differences were found (P<0.05) among steaks treatments regarding the mean consumer acceptance scores. For juiciness, tenderness and overall liking, C (2-sided grilling and/or grilling) and S3(grilling) presented higher mean scores compared to other treatments. Differences among forage-finished steaks treatments could be due to differences in sensory panels or quality of the grasses used.

CONCLUSIONS

Cooking methods did not cause significant differences in liking scores. Purchase intent was affected by the fact of knowing the health benefits of steaks obtained from forage-fed cattle. Overall liking of all steaks was negatively affected by the loss of juiciness and tenderness. Consumer acceptance scores between ideally harvested and Safoni finished stored rib-eye steaks were somewhat similar. These results indicate that the acceptability of forage-finished steaks is potentially healthier than grain-fed commercial steaks and have market potential toward Hispanic population.

Consumer interest in health benefits of forage-finished beef has led to increased product demand. To date, little information on the sensory characteristics of cooked forage-finished beef is available. We evaluated sensory acceptability and chemical characteristics of rib-eye steaks from forage-finished steers. Rib-eye steaks from 3 forage-finished steers (S1 [bermudagrass+ryegrass], S2 [bermudagrass+berseem], etc.) and one C (commercial) steak, cooked by grilling and/or 2-sided grilling, were evaluated for chemical composition and microbial safety. Sensory analysis was used to evaluate the sensory acceptability, chemical characteristics and microbial safety of rib-eye steaks from forage-finished steers and one commercial steak cooked by grilling and/or 2-sided grilling using Hispanic consumers. In addition to this, acceptability of the health-related components was also assessed.

For the freshly harvested beef consumer study (first study) and left eyes steaks obtained from steers that were fed with: Paddock A - Bermudagrass +Berseem, etc.; S1 - Bermudagrass+ryegrass (C, USDA Choice grade, Winn School of Animal Sciences and Department of Food Science, Louisiana State University Agricultural Center, Baton Rouge, Louisiana, USA); Paddock C - Bermudagrass+berseem+forage soybean+brown midrib sorghum; etc.); S2 (bermudagrass+ryegrass+berseem, etc.); S3 (bermudagrass+berseem+forage soybean+brown midrib sorghum, etc.) and one C (commercial steak), cooked by grilling and/or 2-sided grilling, were evaluated by 113 Hispanic consumers. Data were analyzed using PRINC MIxed, 0.05>. C (freezing) had higher fat (50.2%, 23.0-24.9%) and lower protein (49.4%, 73.5-74.4%), dry weight basis) contents compared with S1 and S2. S1 and S3 had higher omega-3 (49.05 vs. 0.09), lower omega-6/omega-3 ratio (25.18±1 vs. 10.07), and lower PUFA (4.31±4.77 vs. 8.4% ) contents than C, thus exhibiting a healthier fatty acid profile. Concerning sensory analysis, the visual appeal was statistically different (S3 (69.2%) concerning cooked steaks), the two cooking methods a Friedman’s test was used to determine significant differences in liking scores. Juiciness and OL scores of C steaks (both cooking methods) and S3(Grilling) were not significantly different. Purchase intent (after health benefits of forage-finished steaks was informed) increased from 62.0-73.8 to 69.8-85.7%. The mean drop of liking scores was -1.00 to -2.50 to -2.90 on the 5-point scale, respectively. Cooked rib-eye steaks were free of E. coli. This study demonstrated that forage-finished steaks are potentially healthier than grain-fed commercial steaks and have market potential toward Hispanic population.
Sensory acceptability and chemical characteristics of healthy rib-eye steaks from forage-finished steers

Torrico, D

2012-06-26