

CONSUMER PANEL RATINGS OF CHUCK AND ROUND GROUND BEEF PATTIES PRODUCED FROM CATTLE FED AN OMEGA-3 ENRICHED DIET

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I. INTRODUCTION

Beef products are often criticized in various sectors of the scientific community and media for containing elevated saturated fatty acids. Beef is practically devoid of omega-3 fatty acids because polyunsaturated fattyacid (PUFA) ruminal biohydrogenation [1]. Increasing dietary omega-3 in relation to omega-6 PUFA determines dietary healthfulness [2]; therefore, red meat producers are interested in increasing their products' omega-3 PUFA content. Unfortunately, literature documents increasing meat omega-3 content caused detrimental effects on meat color stability and palatability [3], but when diets were managed correctly, these negative effects were eliminated [4]. The objective of this study is to determine the effects of a microalgae-flaxseed finishing diet on consumer palatability ratings.

II. MATERIALS AND METHODS

Black-hided yearling steers ($N = 700$) were weighed, stratified into 12 weight blocks, and allocated to 28 pens ($N = 25$ head/pen) by weight block. Pens were randomly assigned to one of two treatments consisting of pens fed a conventional feedlot finishing diet (CON; $n = 14$) and pens fed a conventional feedlot diet containing a 10% extruded proprietary flaxseed, wheat middlings, and Nannochloropsis algae blend (OMG; $n = 14$; greatOplus; NBO3 Technologies, Manhattan, KS). After 173 days on feed, one head per pen was randomly selected, transported, and harvested and fabricated at a commercial abattoir (Hertzog Meat Company, Butler, MO). Chuck and Round subprimals were vacuum packaged, boxed, stored at a cold-storage facility, and shipped to the University of Georgia Meat Science and Technology Center (Athens, GA). On days 21 and 24 postmortem, Chuck and Round meat were coarse ground through a 13 mm plate and reground through a 6 mm plate. One-hundred-thirty (113 ± 2 g, 13-mm thick) patties were produced per carcass and primal with 40 randomly selected for consumer sensory analysis. Patties were frozen on trays at -40°C for 20 minutes, removed, vacuum packaged, and frozen at -20°C until analysis. Round and Chuck patties were randomly assigned to be evaluated by consumers ($N = 112$) over 14 panel sessions across two days. Each panel session consisted of eight panelists consuming eight samples, with treatments equally represented. Two patties per carcass and primal were thawed for 20 hours at 4°C , cooked at 204°C to an internal temperature of 71°C , and cut into four wedges for evaluation. Panelists evaluated patties for juiciness, texture, beef-flavor intensity, off-flavor intensity, and overall palatability on three-anchor 100-point line scales collected by Qualtrics software running on iPads. Chuck and Round data were analyzed separately and as a completely randomized design with carcass as the experimental unit. Treatment served as the fixed effect and data were analyzed with PROC Mixed of SAS. Statistical significance was determined at $\alpha \leq 0.05$ while tendencies were determined at $0.05 > P \leq 0.10$.

III. RESULTS AND DISCUSSION

There was no Treatment effect ($P = 0.15$) for off-flavor intensity rating, but Chuck OMG patties tended to have greater ($P = 0.06$) juiciness rating (Table 1). Chuck OMG patties had greater texture and beef-flavor intensity ratings, which resulted in them having greater overall palatability rating ($P < 0.05$). There were no treatment effects for Round patty juiciness, texture, beef-flavor intensity, and overall palatability ratings ($P > 0.39$); however, Round OMG patties tended to have less ($P = 0.07$) off-flavor intensity rating than CON patties.

Table 1. Effects of feedlot dietary omega-3 regimen on consumer panel ($N = 112$) Chuck and Round ground beef patty palatability ratings

Item ¹	Conventional	Omega-3	SEM	<i>P</i> -value
Chuck				
Juiciness	56.92	63.55	2.395	0.06
Texture	59.25	65.85	1.855	0.02
Beef-flavor intensity	58.02	62.30	1.500	0.05
Off-flavor intensity	17.39	14.36	1.438	0.15
Overall palatability	58.22	64.96	1.775	0.01
Round				
Juiciness	38.66	35.91	2.781	0.49
Texture	49.00	45.98	2.417	0.39
Beef-flavor intensity	48.97	49.50	1.686	0.83
Off-flavor intensity	23.02	18.87	1.567	0.07
Overall palatability	46.61	44.86	2.492	0.63

¹Sensory ratings: 0, extremely dry, extremely dislike texture/flavor/overall, none off flavor; 50 = neither dry or juicy, neither dislike or like dislike texture/flavor/overall, moderate off flavor; 100 = extremely juicy, extremely like dislike texture/flavor/overall, extreme off flavor.

IV. CONCLUSION

Data indicated Chuck ground beef patties produced from cattle fed an omega-3 enriched diet had a better overall palatability rating due to having better juiciness, texture, and beef-flavor intensity ratings. While omega-3 enhancement commonly results in increased off-flavor development, consumers indicated this feeding regimen did not affect Chuck off-flavor intensity and tended to reduce Round off-flavor intensity.

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REFERENCES

1. Harfoot, C. G. (1978). Lipid metabolism in the rumen. *Progress in Lipid Research* 17:21–54.
2. Ma, X., Jiang, Z., & Lai, C. (2016). Significance of increasing n-3 PUFA content in pork on human health. *Critical Reviews in Food Science and Nutrition* 56:858–870.
3. Phelps, K. J., Drouillard, J. S., O'Quinn, T. G., Burnett, D. D., Blackmon, T. L., Axtman, J., Van Bibber-Krueger, C. L., and Gonzalez, J. M.. (2016). Feeding microalgae meal (All-G Rich™, Schizochytrium limacinum CCAP 4087/2) to beef heifers II: effects on ground beef palatability and color. *Journal of Animal Science* 94:4030-4039.
4. Phelps, K. J., Drouillard, J. S., O'Quinn, T. G., Houser, T. A., & Gonzalez, J. M. (2020). Effects of supplementing DHA-rich microalgae and antioxidants on meat color stability and sensory characteristics. *Translational Animal Science* 4:1-13.