

CONSUMER SENSORY EVALUATION OF PLANT-BASED GROUND BEEF ALTERNATIVES IN COMPARISON TO GROUND BEEF OF VARIOUS FAT PERCENTAGES

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I. OBJECTIVES

The objective of this study was to determine whether current plant-based protein ground beef alternatives (GBA) offer similar palatability characteristics to ground beef (GB) patties of varying fat percentages.

II. MATERIALS AND METHODS

Fifteen different production lots ($n = 15/\text{fat level}$) of 1.36 kg GB chubs of 3 different fat levels (10%, 20%, and 30%) were collected from retail markets in the Manhattan, Kansas, area. Additionally, GBA products including a soy-protein-based Foodservice GBA (FGBA), a pea-protein-based Retail GBA (RGBA), and a traditional soy-protein-based GBA (TGBA) ($n = 15$ production lots/product) currently available through commercial channels were collected from retail markets and a commercial foodservice chain. All GB and GBA treatments were formed into 151-g patties (approximately 13-cm diameter; 1-cm thick) and frozen at -40°C until consumer sensory analysis. Patties were cooked to 71°C on a clamshell-style grill, cut into 6 equally sized wedges, and served within 5 min of cooking to consumers. Consumers ($n = 120$) were fed 6 samples (1 wedge/sample) in a random order and evaluated sample appearance, juiciness, tenderness, overall flavor liking, beef flavor liking, texture liking, and overall liking on continuous line scales verbally anchored at the ends and midpoints. Additionally, consumers rated each trait as either acceptable or unacceptable. All data were analyzed as a completely randomized design.

III. RESULTS

All 3 GB samples rated higher ($P < 0.05$) than the 3 GBA samples for appearance, overall flavor, beef flavor, and overall liking. Retail GBA rated lowest ($P < 0.05$) for appearance, overall flavor, texture, and overall liking. Of the GBA samples, FGBA rated highest ($P < 0.05$) for juiciness, beef flavor, and texture liking, and TGBA rated lowest ($P < 0.05$) for juiciness. However, FGBA rated higher ($P < 0.05$) for tenderness than the 20% fat GB samples. Moreover, of the GBA samples, FGBA and TGBA rated similar ($P > 0.05$) for appearance, tenderness, overall flavor liking, and overall liking. Among the GB samples, no differences ($P > 0.05$) were found for appearance, juiciness, overall flavor liking, beef flavor liking, or overall liking. For the percentage of samples rated acceptable for each palatability trait, all 3 GB treatments had a higher ($P < 0.05$) percentage of samples rated acceptable for appearance, overall flavor, beef flavor, texture, and overall liking than the 3 GBA. Retail GBA had the lowest ($P < 0.05$) percentage of samples rated acceptable for appearance, overall

flavor, texture, and overall liking. Traditional GBA had the lowest ($P < 0.05$) percentage of samples rated acceptable for juiciness. Among the GBA samples, FGBA had the highest ($P < 0.05$) percentage of samples rated acceptable for juiciness and beef flavor liking. Furthermore, among the GBA treatments, FGBA and TGBA had a similar ($P > 0.05$) percentage of samples rated acceptable for appearance, flavor, texture, and overall liking.

IV. CONCLUSION

These results indicate GB samples had higher ratings than GBA samples for most palatability traits evaluated. Moreover, a higher percentage of samples were rated as acceptable for GB than for GBA. This clearly indicates that the eating experience provided by GBA is different than that provided by traditional GB. Thus, consumers who purchase GBA should not expect the same eating quality as they would receive with GB.

Keywords: alternative proteins, consumer, ground beef, ground beef alternative, palatability