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The Effect of Lean Point and Subprimal Blend on Texture Profile Analysis of Ground Beef Patties

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Objectives

The objective of this study was to determine the effect of fat content and subprimal sourced blends on the textural properties of ground beef patties.

Materials and Methods

Six treatments (six 4.5 kg-chubs/treatment) were chosen to represent a variety of specific subprimal sourced blends, fat levels, and brands and included: 90/10 Certified Angus Beef (CAB) ground sirloin, 90/10 ground beef, 80/20 CAB ground chuck, 80/20 ground chuck, 80/20 ground beef, and 73/27 CAB ground beef. Ground beef chubs were fabricated into 151.2 g patties using a patty former. Formed patties were identified, frozen, and stored at -20°C until analysis. For shear force analysis, two 2.5 cm wide strips were removed and sheared 3 times across the width of the sample with a bunt edge blade. Three 2.54 cm cores were removed from each patty for texture analysis and compressed to 70% of their original height, twice. Calculations for hardness, cohesiveness, springiness, gumminess, and chewiness were conducted. Additionally, paired samples were evaluated for tenderness, texture liking, and overall liking by consumers. Data was analyzed as a completely randomized design.

Results

Hardness values showed a general increase as fat level decreased. Patties from 90/10 CAB ground sirloin and 90/10 ground beef had greater ($P < 0.05$) hardness values than all treatments except 80/20 CAB ground chuck. Cohesiveness was lower ($P < 0.05$) for 73/27 CAB ground beef and 80/20 CAB ground chuck than all other treatments except 80/20 ground chuck. Generally, cohesiveness decreased as fat level decreased; however, there was only a 3% difference between the highest (32.62) and lowest (29.97) values. Additionally, gumminess and chewiness were greater ($P < 0.05$) for 90/10 ground beef and 90/10 CAB ground sirloin compared to all other treatments. Springiness was greater ($P < 0.05$) for 80/20 ground chuck and 90/10 CAB ground sirloin than 90/10 ground beef, 80/20 ground beef, and 73/27 CAB ground beef. Springiness values differed only by 5% between the greatest and lowest values among all treatments (70.19 to 64.76). Shear force values generally increased with decreased fat level, with 90/10 ground beef having the highest ($P < 0.05$) shear force (4.44 kg). All 80/20 ground beef treatments were similar ($P > 0.05$) for shear force value and greater ($P < 0.05$) than 73/27 CAB ground beef. Additionally, 90/10 CAB ground sirloin had a lower ($P < 0.05$) shear force value (3.04 kg) than all treatments other than 73/27 CAB ground beef (3.17 kg).

Ground beef shear force was correlated ($P < 0.05$) with consumer tenderness ratings ($r = -0.20$). Consumer tenderness ratings were also correlated ($P < 0.01$) to hardness ($r = -0.31$), cohesiveness ($r = -0.35$), gumminess ($r = -0.33$) and chewiness ($r = -0.29$). Gumminess was the only trait correlated ($P < 0.05$) with consumer overall liking ($r = -0.24$). Consumer texture liking scores were not correlated ($P > 0.05$) to any of the instrumental texture measurements.

Conclusion

These results indicate that decreased fat level can increase hardness, cohesiveness, gumminess, chewiness, and shear force values for ground beef patties. However, instrumental texture measurements had no correlation to consumer texture liking scores, indicating texture profile analysis may not be representative of consumer texture liking of ground beef patties.

