Evaluation of ground beef quality from commodity and premium quality trimmings

University of Florida

Study Completed
May 2012

Funded by The Beef Checkoff
Evaluation of ground beef quality from commodity and premium quality trimmings: Project Summary

Background
Over 42% of per capita U.S. beef consumption has been ground product over the past thirty years, making it clearly the most consumed beef product in the United States (NCBA, 2006). The recent economic recession has led to an additional shift in demand from steaks and roasts toward ground beef, partially driven by the lower cost of ground products and the ability of ground beef to produce low cost meals. Thus, the objective of the current study was to evaluate the differences between ground beef quality manufactured with premium or commodity trimmings.

Methodology

Patty Manufacturing
Untrimmed inside rounds (IMPS #168) and outside round flats (IMPS #171B) were collected from cow (COW) carcasses to be used as a lean source. These round subprimals, as well as boneless plates (IMPS #121) were collected from top choice (TC) and commodity (COM) carcasses to be used as the fat source. Lean sources and fat sources were combined to produce 80 and 90% lean hamburger patties representing all 12 combinations: lean source (3) × fat source (2) × lean percentage (2).

Patties were used for subjective and objective color evaluation, consumer and trained sensory panels, oxidation analysis, cooking loss, and Lee-Kramer shear force.

Retail Color Evaluation
Panelists evaluated lean patties daily for lean color and discoloration for subjective lean color. Objective lean color analysis \((L^*, a^*, b^*)\) was conducted on the surface of each ground beef patty daily for 5 days in duplicate and averaged.

Fat oxidation
A 10 g sample was taken from the patty surface and oxidation was measured.

Trained Sensory Evaluation
Panelists evaluated patties for beef flavor, juiciness, firmness, off-flavor and greasiness.

Consumer Sensory Evaluation
Consumers evaluated all samples for flavor, juiciness, texture, overall acceptability, and firmness.

Cooking Loss and Lee-Kramer Shear Force
Frozen weights of ground beef patties were taken prior to being cooked and after being cooked to measure cooking loss. A portion of the patty was placed into an Instron machine to measure how much force it takes to penetrate through the patty section.
**Findings**
Fat source had a marginal effect on the objective color of beef patties during retail display. Patties manufactured with COW as a lean source had greater subjective values for lean color and were objectively a more optimal red at the beginning of retail display, however, these patties also discolored more quickly. Trained sensory panelists found marginal or no differences in patties manufactured with different lean or fat sources. Additionally, trained sensory panelists found 80% lean patties to be juicier, softer, greasier and to contain more off-flavor than 90% lean patties. Consumer panelists found no differences in likeability for overall acceptability or flavor between patties manufactured with different lean or fat sources. Additionally, consumers preferred the flavor of 80% lean patties and tended to give 80% lean patties higher ratings for overall acceptability in comparison to 90% lean patties. Moreover, a higher percentage of consumers reported that 80% patties were “just about right” for juiciness and firmness when compared to 90% patties. It took less force to shear through patties formulated at 80% lean than 90% lean patties. Lean source had a greater influence than fat source on retail color. Lean and fat source had marginal impact on consumer or trained sensory palatability.

**Implications**
No one lean source performed better than another, indicating that higher quality lean inputs are not necessarily different. Top Choice (TC) fat source showed slightly better performance overall compared to commodity (COM) fat source. A greater amount of fat in the product improved consumer sensory attributes.
Effect of lean source, fat source and lean percentage on trained sensory traits of beef patties.

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<th>Lean source</th>
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<td>COM</td>
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<td>Greasiness</td>
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