

FOOD MICROBIOLOGY AND FOOD CHEMISTRY SINCE 1967



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(Originally American Bacteriological & Chemical Research Corporation)

August 2, 2011

Rich Jochum
BPI Technology, Inc.
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891 Two Rivers Drive
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Dear Rich:

The following pages contain a final report for the project entitled
"Evaluation of Consumer Acceptability of Ground Beef Patties at Specified Incorporation Levels
Using Consumer Panels."

We at ABC Research would like to take this opportunity to thank you and your company for your
business. If you have any questions or comments, please do not hesitate to contact me.

Sincerely,

Gillian Folkes Dagan, Ph.D.
Program Director, Product Performance Services
ABC Research



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Title

Evaluation of Consumer Acceptability of Ground Beef Patties at Specified Incorporation Levels Using Consumer Panels

Objective

The objective of this study was to determine consumer preferences on 3 product classes: frozen 80/20 ground beef patties, 80/20 fresh ground beef patties, and 90/10 fresh ground beef patties.

Materials and Methods

Experimental Approach:

A. Product:

Samples of frozen 80/20 ground beef patties, 80/20 fresh ground beef patties, and 90/10 fresh ground beef patties were provided by the client. For each of the above products, 4 levels of incorporation of BPI Boneless Lean Beef were provided. The levels for each product class were 0% BPI Boneless Lean Beef, 10% BPI Boneless Lean Beef, 15% BPI Boneless Lean Beef, and 20% BPI Boneless Lean Beef. Frozen ground beef patties were stored at -10F and refrigerated patties were stored at 36F until they were used.

B. Sample Preparation

Ground beef patties were removed from cold storage and placed in Styrofoam coolers to maintain product temperature while they were staged for use. Staging and cooking took place in the pilot plant of the Food Science and Human Nutrition Building on the University of Florida Campus. Ground beef patties were cooked on a flat top grill for the sensory panels. Ground beef patties were then quartered before being served to panelists.

C. Sensory Evaluation

Consumer panels of 100-120 panelists in a randomized complete block design were used to compare incorporation levels on each of the product classes. Each of the three panels focused on one product class and were held on separate days. Panelists were screened using a question on consumption of ground beef. Panelists that regularly consume ground beef at least 2 times per month were allowed to participate in the panel.

After screening, panelists were seated in private booths and samples were presented under red lighting to hide any differences in sample appearance. Panelists were asked a series of questions on each of the 4 samples. Samples were evaluated one at a time and the order in which each panelist receives the samples was randomized. A 15 cm line scale was used for panelists to rate:

1. Aroma of Each Sample
2. Flavor of Each Sample
3. Texture of Each Sample
4. Juiciness of Each Sample
5. Overall Acceptability of Each Sample

Panelists were also allowed to make an open-ended comment on each of the samples at the conclusion of the test. Panelists were compensated upon concluding the test on all 4 samples.

E. Statistical Analysis of Data

Panelists' ratings were averaged to create sample means for each attribute tested on each sample. The 4 incorporation levels for each product class were compared using an Analysis of Variance at the $\alpha=.05$ level. When significant differences occur between incorporation levels a Tukey's mean separation test at $\alpha=.05$ was performed, unless otherwise stated.

Summary of Results

Table 1 contains all samples' average attribute ratings. For each set of samples an Analysis of Variance was performed at the $\alpha=.05$ level and when appropriate a Tukey's mean separation was performed at $\alpha=.05$.

Table 1. Average Attribute Ratings

80/20 Frozen Ground Beef Patties					
% Incorporation of BLBT	Aroma	Flavor	Texture	Juiciness	Overall Acceptability
0%	8.72	7.82	8.14	7.90	8.27
10%	9.24	8.67	8.96	8.40	9.07
15%	8.67	8.17	9.08	9.03	9.17
20%	8.82	8.26	8.93	8.99	8.99
80/20 Fresh Ground Beef Patties					
% Incorporation of BLBT	Aroma	Flavor	Texture	Juiciness	Overall Acceptability
0%	8.56	8.04	7.94	7.47	8.24
10%	9.08	8.50	8.09	7.50	8.43
15%	8.77	8.34	8.38	8.21	8.62
20%	8.50	8.37	8.85	8.52	8.81
90/10 Fresh Ground Beef Patties					
% Incorporation of BLBT	Aroma	Flavor	Texture	Juiciness	Overall Acceptability
0%	9.06	8.09	7.90	7.28	8.06
10%	9.24	8.84	8.99	8.06	8.93
15%	8.97	8.58	8.75	8.37	8.69
20%	9.02	8.42	9.23	8.66	8.84

80/20 Frozen Ground Beef Patties

Aroma: no significant difference at $\alpha=.05$

Flavor: no significant different at $\alpha=.05$ however there is a difference seen at $\alpha=.10$ (Tukey's performed at $\alpha=.1$)

% Incorporation of BLBT	Mean	Mean Separation
10%	8.67	a
20%	8.26	ab
15%	8.17	ab
0%	7.82	b

Texture: significant difference at $\alpha=.05$

% Incorporation of BLBT	Mean	Mean Separation
15%	9.08	a
10%	8.96	a
20%	8.93	ab
0%	8.14	b

Juiciness: significant difference at $\alpha=.05$

% Incorporation of BLBT	Mean	Mean Separation
15%	9.17	a
10%	9.07	a
20%	8.99	ab
0%	8.27	b

Overall Acceptability: significant difference at $\alpha=.05$

% Incorporation of BLBT	Mean	Mean Separation
20%	8.85	a
15%	8.38	ab
10%	8.09	ab
0%	7.94	b

80/20 Fresh Ground Beef Patties

Aroma: no significant difference at $\alpha=.05$

Flavor: no significant different at $\alpha=.05$

Texture: significant difference at $\alpha=.05$

% Incorporation of BLBT	Mean	Mean Separation
20%	8.52	a
15%	8.21	ab
10%	7.5	b
0%	7.47	b

Juiciness: significant difference at $\alpha=.05$

% Incorporation of BLBT	Mean	Mean Separation
10%	8.84	a
15%	8.58	ab
20%	8.42	ab
0%	8.09	b

Overall Acceptability: no significant difference at $\alpha=.05$

90/10 Fresh Ground Beef Patties

Aroma: no significant difference at alpha=.05

Flavor: no significant different at alpha=.05 however there is a difference seen at alpha=.10 (Tukey's performed at alpha=.1)

% Incorporation of BLBT	Mean	Mean Separation
20%	9.23	a
10%	8.99	a
15%	8.75	a
0%	7.9	b

Texture: significant difference at alpha=.05

% Incorporation of BLBT	Mean	Mean Separation
20%	8.66	a
15%	8.37	a
10%	8.06	ab
0%	7.28	b

Juiciness: significant difference at alpha=.05

% Incorporation of BLBT	Mean	Mean Separation
10%	8.93	a
20%	8.84	a
15%	8.69	ab
0%	8.06	b

Overall Acceptability: significant difference at alpha=.05

% Incorporation of BLBT	Mean	Mean Separation
10%	8.93	a
20%	8.84	a
15%	8.69	ab
0%	8.06	b

Panelists' comments have also been included in a separate file sent with this final report.

If you have any questions, please do not hesitate to contact me at your convenience.

Prepared by:



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