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Abstract

The objective of this study was to determine the effect of perceived palatability on ground beef patties by providing consumers with differing price per pound labels. Ground beef chubs ($n = 15$) of 80% lean/20% fat composition were used for all samples. The consumers ($n = 105$) were asked to evaluate each sample independently with the following information provided prior to sampling: Ultra-High \$6.25/lb; High \$5.00/lb; Medium \$3.75/lb; Low \$2.5/lb; Ultra-Low \$1.25/lb; or no information provided (NONE). The consumers were asked to evaluate each sample for tenderness, juiciness, texture liking, flavor liking, and overall liking. Also, the consumers reported their likelihood to purchase each sample. Consumers were equally as likely ($P > 0.05$) to purchase all samples regardless of the price label. However, the consumers listed price as one of the top purchasing motivators ($P > 0.05$). Moreover, consumers found the ultra-high, medium, and ultra-low price label to be more juicy ($P < 0.05$) than the low price or NONE label. Also, consumers gave a higher ($P < 0.05$) flavor liking score to the ultra-high, high, medium, and ultra-low price labels in comparison to the NONE label. The ultra-high and medium price labels had a greater ($P < 0.05$) change in ratings for overall liking than the ultra-low and low price labels when compared to the NONE label. Furthermore, almost every price label for every trait resulted in increased ($P < 0.05$) palatability ratings, aside from the low price label for juiciness, tenderness, and overall liking. Even though all samples were the same, consumer perceptions of palatability traits were influenced by price labels. While the higher price was perceived to have advantages in some quality aspects, consumers were still not more likely to purchase the higher priced sample.

Introduction

Understanding the influence price labels have on consumers can allow for more targeted marketing of ground beef and other commodities. Consumers can be influenced by certain labeling differences, leading to changes in the perceived quality (Roger et al., 1992; Lunardo et al., 2016). Consumers use a combination of visual quality differences and extrinsic factors such as labeling claims to make inferences about the eating experience (McIlveen et al., 2001). There have been few studies to explicitly look at the quality perception of beef with different prices, making it a gap in the current research. Therefore, the objective of this study was to determine the effect of perceived palat-

ability on ground beef patties by providing consumers with differing price per pound labels.

Experimental Procedures

Ground beef chubs ($n = 15$) of 80% lean/20% fat composition were procured from a beef processor from the same processing lot. The ground beef chubs were held at 30°F before further processing. Patties were formed 11 days after processing into 0.25 lb patties using a commercial patty former. Every two patties were packaged together with a four-digit identification code with one of the following price labels: Ultra-High, High, Medium, Low, Ultra-Low, and no information (NONE). The patties were packaged in a commercial Rollstock machine and stored frozen at -4°F until further analysis.

For all panels, samples were thawed 24 hours in advance and cooked on a clamshell grill (Griddler Deluxe, Cuisinart, East Windsor, NJ) to an internal temperature of 160°F measured using a ThermoWorks (Salt Lake City, UT) Thermopens Mk4. The consumers ($n = 105$) were asked to evaluate each sample independently with the following information provided prior to sampling: Ultra-High \$6.25/lb; High \$5.00/lb; Medium \$3.75/lb; Low \$2.5/lb; Ultra-Low \$1.25/lb; or no information provided. For each round, all consumers were given the same information about the price per pound for each sample. The consumers were asked to evaluate each sample for tenderness, juiciness, texture liking, flavor liking, and overall liking. Each attribute was measured on a 0-100 line scale using an electronic ballot made in Qualtrics (Version 2417833; Provo, UT) using an electronic tablet. Additionally, the consumers were asked to list if the sample was acceptable for all traits and the importance of purchasing motivators. Lastly, the consumers reported their likelihood to purchase each sample.

Data were analyzed using SAS Proc GLIMMIX (v. 9.4; SAS Institute, Inc., Cary, NC) as a completely randomized design. A Kenward-Rogers adjustment was made to all data. A P -value of $P < 0.05$ was considered significant.

Results and Discussion

There were no differences ($P > 0.05$) among any of the various price labels for tenderness, texture liking, and overall liking (Table 1). Consumers were equally as likely ($P > 0.05$) to purchase all samples regardless of the price label. However, the consumers listed price as one of the top purchasing motivators, similar ($P > 0.05$) to fat content, and appearance (Table 2). Moreover, consumers found the ultra-high, medium, and ultra-low price label to be more juicy ($P < 0.05$) than the low price or NONE label. Also, consumers gave a higher ($P < 0.05$) flavor liking score to the ultra-high and medium price labels in comparison to the NONE label. The ultra-high and medium price labels had a greater ($P < 0.05$) change in ratings for overall liking than the ultra-low and low price labels when compared to the NONE label (Table 3). Furthermore, almost every price label for every trait resulted in increased ($P < 0.05$) palatability ratings, aside from the low price label for juiciness, tenderness, and overall liking. A greater ($P < 0.05$) percentage of samples with the ultra-high and medium price level were rated as acceptable for juiciness in comparison to the low price and NONE label. Moreover, a greater ($P < 0.05$) percentage of samples labeled with the ultra-high and medium price labels were considered acceptable for flavor in comparison to all other price labels. Lastly, a greater ($P < 0.05$) percentage of samples labeled with the ultra-high, high, and medium price labels were considered acceptable overall when compared

to the NONE label. Even though all samples were the same, consumer perceptions of palatability traits were influenced by price labels. While the higher price was perceived to have advantages in some quality aspects, consumers were still not more likely to purchase the higher priced sample. This indicates that even though consumers perceived the quality to be higher with a higher price label, the added quality did not justify their willingness to purchase over the lower perceived quality and priced samples.

Implications

Understanding the role of labeling claims and price can allow for more targeted marketing. This research can be used as a marketing resource to help retailers and the industry have a better understanding of consumers' purchasing habits as it relates to price differences. Based on this research, consumers' quality perception is affected by price variations, but not the willingness to purchase, indicating consumers are not willing to pay more for ground beef even with an improved eating experience.

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Table 1. Consumer (n = 105) palatability ratings¹ for 80/20² ground beef patties when additional information was given about the price

Prices ³	Tenderness	Juiciness	Flavor liking	Texture liking	Overall liking	Purchasing
Ultra-high	72.8	73.9 ^a	68.6 ^a	66.2	69.6	62.4
High	67.3	70.9 ^{ab}	61.5 ^{abc}	62.6	63.8	59.6
Medium	69.4	73.3 ^a	66.3 ^{ab}	64.7	68.8	66.8
Low	66.5	65.3 ^{bc}	59.9 ^{bc}	62.6	61.4	57.9
Ultra-low	70.7	74.0 ^a	63.9 ^{abc}	64.7	65.0	61.1
NONE	66.7	62.6 ^c	56.5 ^c	60.4	58.8	55.3
SE ⁴	2.5	2.6	2.7	2.7	3.0	3.0
P-value	0.29	< 0.01	0.02	0.62	0.06	0.07

^{a-c} Least square means within the same panel type of the same column lacking a common superscript differ ($P < 0.05$).

¹ Sensory scores: 0 = not tender/juicy, dislike flavor/overall extremely, or extremely unlikely; 50 = neither tender nor tough, juicy nor dry, neither like nor dislike flavor/overall, or neither likely or unlikely; 100 = very tender/juicy, like flavor/overall extremely, or very likely.

² 80% lean/20% fat ground beef.

³ Prices: Ultra-High - \$6.25/lb; High - \$5.00/lb; Medium - \$3.75/lb; Low - \$2.50/lb; Ultra-Low - \$1.25/lb; NONE - no price given/lb.

⁴ SE (largest) of the least square means.

Table 2. Ground beef purchasing motivators¹ of consumers (n = 105) who participated in 80/20² ground beef consumer sensory panels when given additional labeling information

Trait	Importance
Animal fed a grass-based diet	40.9 ^{fg}
Animal fed a grain-based diet	39.0 ^{fg}
Animal not administered antibiotics	45.6 ^{ef}
Animal welfare	64.0 ^{bc}
Appearance – lean to fat ratio	73.5 ^a
Brand of product	33.3 ^{gh}
Color	65.8 ^{abc}
Fat content	70.4 ^{ab}
Growth promotant use in the animal	42.9 ^f
Fresh never frozen	46.5 ^{ef}
Locally raised	45.2 ^{ef}
Natural or organic claims	40.0 ^{fg}
Nutrient content	57.8 ^{cd}
Packaging type	38.5 ^{fg}
Preformed patty	28.8 ^h
Price	73.5 ^a
Primal source	52.8 ^{de}
Size, weight, and thickness	58.0 ^{dc}
SE ³	2.9
<i>P</i> -value	< 0.01

^{a-h} Least square means within the same panel lacking a common superscript differ ($P < 0.05$).

¹Purchasing motivators: 0 = extremely unimportant, 100 = extremely important.

²80% lean/20% fat ground beef.

³SE (largest) of the least square means.

Table 3. Percentage change in consumer (n = 105) ratings of palatability traits¹ for 80/20² ground beef patties when information about price is given versus no information² given

Prices ³	Tenderness	Juiciness	Flavor liking	Texture liking	Overall liking	Purchasing
Ultra-high	23.9*	46.1*	44.6*	42.6*	53.2 ^a *	56.9*
High	17.4*	44.4*	42.2*	35.3*	46.4 ^{ab} *	59.8*
Medium	19.4*	47.6*	47.1*	39.6*	57.0 ^a *	76.3*
Low	12.0	28.7	40.2*	28.6*	27.9 ^b	45.8*
Ultra-low	20.3*	46.3*	34.2*	32.5*	30.6 ^b *	49.3*
SE ⁴	8.4	17.2	13.2	11.7	14.0	22.1
P-value	0.43	0.12	0.80	0.64	< 0.01	0.38

^{ab} Least square means within the same panel type of the same column lacking a common superscript differ ($P < 0.05$).

*Indicates a significant difference from 0% change.

¹ Sensory scores: 0 = not tender/juicy, dislike flavor/overall extremely, or extremely unlikely; 50 = neither tender nor tough, juicy nor dry, neither like nor dislike flavor/overall, or neither likely or unlikely; 100 = very tender/juicy, like flavor/overall extremely, or very likely.

² 80% lean/20% fat ground beef.

³ Prices: Ultra-High - \$6.25/pound; High - \$5.00/pound; Medium - \$3.75/pound; Low - \$2.50/pound; Ultra-Low - \$1.25/pound.

⁴ SE (largest) of the least square means.