

Influence of Packaging on Acceptability of Frankfurters

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Four brands of frankfurters were evaluated for packaging and appearance of product in the package.

In both categories, consumers found significant differences ($P < .01$) between brands. When these same four brands of frankfurters were coded, cooked and evaluated, only minor differences could be detected and acceptance differences were non-significant ($P > .05$). This suggested that package appearance, product appearance in the package and/or prior reputation of product or manufacturer may have a major influence on sale of frankfurters which are very similar in organoleptic or cooked color properties. Sex of consumer and frequency of consumption of frankfurters also influenced evaluation of the cooked frankfurters.

Einfluß der Verpackung auf die Aufnahme von Frankfurtern

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Vier Marken von Frankfurtern wurden hinsichtlich ihrer Verpackung und Erscheinung des Produkts in der Verpackung bewertet. In beiden Bereichen fanden die Verbraucher beträchtliche Unterschiede zwischen den Marken (Wahrscheinlichkeit $< .01$). Als dieselben vier Marken der Ware verschlüsselt, gekocht und bewertet wurden, konnten nur geringfügige Unterschiede ermittelt werden und die Aufnahmeunterschiede waren unerheblich (Wahrscheinlichkeit $> .05$). Das führte zu der Vermutung, daß Packungsaufmachung, Erscheinung des Produkts in der Verpackung und/oder früherer Ruf des Produkts oder Herstellers einen sehr entscheidenden Einfluß auf den Verkauf von Frankfurtern haben könnten, die einander in organischen oder gekochten Farbeigenschaften sehr ähnlich sind. Weiter beeinflusste auch das Geschlecht der Verbraucher und die Häufigkeit des Konsums von Frankfurtern die Bewertung der gekochten Ware.

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Quatre marques de saucisses de francforts ont été jugées d'après pour l'apparence du produit dans l'emballage et leur apparence. Dans les deux catégories, les consommateurs ont trouvé des différences significatives ($P < 0.01$) entre les marques. Quand ces mêmes quatre marques de saucisses de francfort ont été codées, cuites et jugées seules, des différences mineures ont été détectées et les différences d'accueil étaient non significatives ($P > 0.05$). Ces résultats suggèrent que l'apparence de l'emballage l'apparence du produit en paquet et/ou la réputation antérieure du produit ou du fabricant pourraient avoir une influence sur la vente des saucisses de francfort qui sont similaires en qualités organoleptiques et en couleur. Le sexe des consommateurs et les fréquences de consommation des saucisses de francforts aussi influencent l'évaluation des saucisses de francforts cuites.

Влияние упаковки на приемливість сосисок

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Четыре вида сосисок, изготовленных различными фирмами, были оценены потребителями в отношении внешнего вида упаковки и внешнего вида продукта в упаковке. В обоих отношениях потребители нашли значительную разницу (вероятность $< 0,01$) между этими сосисками. Когда эти самые четыре вида сосисок были кодированы, сварены и затем оценены, потребители нашли только незначительные отличия и разница в приемливости была незначительна (вероятность $> 0,05$). Это дает основания предполагать, что внешний вид упаковки, внешний вид продукта в упаковке и/или репутация продукта или изготовителя могут иметь большое влияние на продажу сосисок, очень схожих по своим вкусовым качествам и по цвету в сваренном виде. Мужской или женский пол потребителя и частота употребления тоже оказывали влияние на оценку сосисок.

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INTRODUCTION

Frankfurters are a very popular meat item and were found to be consumed by 95% of the households sampled in a recent survey (Union Carbide, 1974). This same survey showed that adults eat frankfurters more frequently than children, young children eat more than older children and that women eat more than men.

Initially food packaging was for product protection but today packaging is also an integral part of merchandising and every packaging decision has an important effect on sales (Sacharow and Griffin, 1970). Forrest *et al.* (1975) stated that the purpose of a package is to attractively display the product to the consumer. Manufacturer identification is also accomplished by package labeling. Sacharow and Griffin (1970) also stated that packaging is now considered a top management marketing tool.

The purpose of this research was to evaluate the influence of visual appearance on consumer acceptance of sausage items and to investigate if preferences noted were substantiated by sensory evaluation of the cooked product. This project was designed to compare consumer acceptance of four commercially packaged brands of frankfurters at the point of sale and also compare by means of a laboratory panel, these same four brands in a coded fashion at the point of consumption.

EXPERIMENTAL

Four brands (A, B, C, D) of skinless frankfurters were selected for testing. In each case the label indicated that the product contained beef and pork and did not contain variety meats.

Consumer Evaluation Of Brand Identifiable Packaged Frankfurters

Two self-service retail grocery stores (one in a high income area and one in a medium income area) owned by the same organization were selected which offered for sale all four of the brand-name frankfurters tested. Consumer evaluations were conducted in each store on five different days and a total of 861 evaluations were made. Four sixteen-ounce (453.6 g) packages, one of each brand, were displayed on a green tray for consumer evaluation. Relative positions of the brands on the tray were rotated periodically. Shoppers were invited to participate in the evaluation as they approached the meat department of the store. Each consumer was asked to rate each brand for two factors: (1) appearance of package, including color combinations and package design; and, (2) appearance of frankfurter as viewed through the packaging material. The consumers were asked to rate both factors on a 1 (dislike) to 10 (like) hedonic scale. Four consumer forms were utilized to provide rotation of brands on the form.

Panel Evaluation Of Coded Cooked Frankfurters

Two liters of tap water were heated to boiling in a 2.8 liter aluminum saucepan. Four frankfurters were placed in the water and the pan was removed from the heating element. The frankfurters were allowed to heat for five minutes and then cut into four sections, coded and placed on a paper plate. This procedure was repeated for all brands and presented to a laboratory sensory panel for evaluation. Lawrie (1974) stated that the evaluation of a meat product for odor and taste is best accomplished by a taste panel. The panel evaluation procedure was repeated until 425 evaluations were obtained. Panel members were asked to list age, sex, frequency of eating frankfurters per month, (0-3, 4-5, 6-7, 8 or more) and if frankfurters were one of their favorite foods (yes, no). Panel members were then asked to rate the cooked frankfurters on the following factors: Saltiness (10 - very salty, 1 - not salty); spice flavors (10 - very spicy, 1 - no spice); smoke flavor (10 - strong smoke flavor, 1 - no smoke flavor); frankfurter flavor (10 - characteristic frankfurter flavor, 1 - off flavor); texture or bite (10 - firm, 1 - mushy); color (10 - dark, 1 - light); and, total acceptability (10 - very acceptable, 1 - unacceptable).

Analysis

All data were evaluated by least squares analysis (Harvey, 1968) and Duncan's multiple range (Harter, 1960).

RESULTS AND DISCUSSION

Evaluation Of Package Appearance

The least squares analysis of variance indicated no significant difference ($P>.05$) for package appearance between stores and a non-significant difference ($P>.05$) for the product brand X store interaction suggesting that the store in which the consumer shopped or income level (high, medium) had no major influence on the consumer's acceptance of package appearance for these four brands. There was a highly significant difference in package appearance for product brands ($P<.01$) as shown in Table 1. Acceptance of package appearance of Brand A, was significantly lower than for Brands B, C, or D. This would suggest that Brand A had a less consumer acceptable package than the other brands or that advertising, prior experience with the product or product manufacturer's reputation was causing a bias in the consumer panel. The panelists were instructed to ignore prior commitments to a particular brand and to evaluate only the package but this is extremely difficult to insure.

Table 1

Retail Consumers Evaluation (least square means) Of Appearance

	BRANDS			
	A	B	C	D
Package appearance ^{1/}	5.26 ^{a/}	7.52 ^{b/}	6.82 ^{b/}	7.33 ^{b/}
Product appearance in package ^{1/}	6.56 ^{c/}	7.50 ^{e/}	6.96 ^{d/}	7.83 ^{e/}

^{1/} Analysis of variance indicated a highly significant difference ($P<.01$) for product brands.

^{a-e} Mean values in the same row which have unlike superscripts differ significantly ($P<.01$).

Evaluation Of Product Appearance In Package

Product appearance in the package also showed no significant ($P>.05$) difference between stores and a non-significant ($P>.05$) product brand X store interaction. The differences between brands were less pronounced for product appearance in the package than they were for package appearance but there was still a highly significant ($P<.01$) difference in product appearance for product brands. Color is very important in product acceptability and Forrest *et al.* (1975) stated that its importance is equal to flavor and texture. Price and Schweigert (1960) reported that color is the prime factor in influencing consumer selection of packaged meat. Brand A again was evaluated significantly ($P<.01$) lower than Brands B, C, or D and Brand C was evaluated significantly ($P<.01$) lower than Brands B and D. This would suggest that product appearance was less desirable for Brands A and C. However, prior knowledge of the product may have influenced the consumer. Another factor that might have been important is that product appearance was evaluated after package appearance and this could have also influenced the evaluation. There was highly significant ($P<.01$) correlation of $r=0.44$ between package appearance and product appearance in the package.

Regardless of the causes, the consumer ranked Brand A as the least desirable followed by Brand C in both package appearance and product appearance in the package.

Evaluation Of Coded Cooked Frankfurters

Consumer age (Table 2) proved to be non-significant ($P>.05$) for all attributes evaluated on the coded cooked product. Males evaluated all attributes of the cooked frankfurters higher than females and this difference was significant for saltiness, texture, color, acceptance and approached significance for frankfurter flavor. Analysis of variance for frequency of consumption of frankfurter was highly significant ($P<.01$) for all attributes evaluated. Evaluators who consumed frankfurters eight or more times per month consistently ($P<.05$) scored all attributes lower than panelists who consumed fewer frankfurters. The next higher scores were recorded by people who consumed 0-3 and then 4-5 frankfurters per month. Differences between these last two groups were not significantly ($P>.05$). The highest scores were recorded by panelists who consumer frankfurters 6-7 times per month and they were usually (Table 2) significantly higher than the panelists who consumed fewer products. Whether or not panelists considered frankfurters one of their favorite foods had no significant difference ($P>.05$) on the rating received by any attributes.

Table 2

Evaluation (least square means) of Coded, Cooked Frankfurters, Separated According to Evaluator's Age, Sex, Frequency of Consumption and Preference for Frankfurters

Attribute evaluated	Age ^{1/}	Sex		Frequency of consumption per month*				Favorite food	
		Male	Female	0-3	4-5	6-7	8-more	Yes	No
Saltiness	NS	6.33 ^{**}	5.48	5.81 ^b	6.18 ^{bc}	6.85 ^c	4.76 ^a	5.78	6.02
Spiciness	NS	6.06 ^{NS}	5.63	5.77 ^b	6.07 ^{bc}	6.77 ^c	4.79 ^a	5.77	5.93
Smoke flavor	NS	6.32 ^{NS}	6.09	6.17 ^b	6.30 ^{bc}	7.03 ^c	5.33 ^a	6.15	6.26
Frankfurter flavor	NS	6.13 ^{AS}	5.60	5.73 ^b	6.01 ^b	6.89 ^c	4.82 ^a	5.79	5.95
Texture	NS	6.38 ^{**}	5.59	6.36 ^b	6.15 ^b	6.81 ^b	4.61 ^a	6.07	5.90
Color (cooked)	NS	6.79 ^{**}	5.73	6.49 ^b	6.74 ^b	7.10 ^b	4.71 ^a	6.35	6.17
Acceptance	NS	6.15 [*]	5.59	6.00 ^b	6.12 ^b	6.95 ^c	4.42 ^a	5.97	5.77

^{1/} Analysis of variance linear regression of age

NS Not significant ($P > .05$)

AS Approaching significance ($P < .10$)

* Significant ($P < .05$)

** Highly significant ($P < .01$)

a-c Mean values in the same row under "Frequency of Consumption" which have unlike superscripts differ significantly ($P < .05$)

A comparison of brands (A, B, C, D) (Table 3) for acceptance, cooked color, saltiness, spiciness, smoked flavor, and frankfurter flavor resulted in a non-significant ($P > .05$) difference between brands. The lack of difference in color between brands agrees with Puolanne (1975) who found little color differences in sausages that contained the same ingredients even though quantity relations were different. Texture was significantly different ($P < .05$) with Brands A and B being significantly ($P < .05$) firmer in texture than C and D. Smoke flavor differences approached significance ($P < .10$) with Brand C having less smoke flavor than the other brands. Both texture and smoke flavor differences were probably due to processing procedure used in manufacturing the frankfurters. Correlation values between acceptance and the other attributes (Table 4) would suggest that factors that contributed to flavor are slightly more important than color and texture in the acceptance of frankfurters. This agrees with the report of Gould (1977) that flavor of processed foods is probably the most important single quality factor of concern to the food technologist.

Table 3

Evaluation (least square means \pm standard errors) of Coded, Cooked Frankfurters by Brands

Attributes evaluated	BRANDS			
	A	B	C	D
Saltiness ^{NS}	5.77 \pm .23	5.99 \pm .24	5.66 \pm .23	5.59 \pm .22
Spiciness ^{NS}	6.09 \pm .24	6.17 \pm .25	5.53 \pm .24	5.90 \pm .23
Smoke flavor ^{AS}	6.27 \pm .23	6.44 \pm .24	5.70 \pm .24	6.38 \pm .23
Frankfurter flavor ^{NS}	6.06 \pm .24	6.10 \pm .25	5.67 \pm .24	5.73 \pm .23
Texture [*]	6.28 \pm .24 ^b	6.21 \pm .25 ^b	5.55 \pm .24 ^a	5.69 \pm .23 ^a
Color (cooked) ^{NS}	5.95 \pm .23	6.17 \pm .24	5.78 \pm .23	5.99 \pm .22
Acceptance ^{NS}	6.05 \pm .23	6.21 \pm .24	5.64 \pm .23	5.67 \pm .22

NS Non-significant ($P > .05$)

AS Approaching significance ($P < .10$)

* Significant ($P < .05$)

a-b Mean values in one row which have unlike superscripts differ significantly ($P < .05$)

Table 4

Correlations Between Acceptance and Other Attributes Evaluated on Coded, Cooked Frankfurters

Attribute evaluated	Acceptance
Saltiness	0.71**
Spiciness	0.78**
Smoke flavor	0.74**
Frankfurter flavor	0.86**
Texture	0.66**
Color	0.60**

** Highly significant ($P < .01$)

SUMMARY

This research would suggest that frankfurters that are very similar (except for minor processing differences) when evaluated by a laboratory sensory panel at the point of consumption may receive a significantly different rating when packaged and offered to the consumer at the point of sale. This emphasizes the importance of package appearance, product appearance and/or prior reputation of the product or manufacturer on the sale of meat items. Sex of the consumer and frequency of consumption of frankfurters also influenced the evaluation of cooked frankfurters.

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