

Influence of Cooking Methods on Consumers' Juiciness Acceptability and Palatability of Broiler Chicken Meat

E. F. Fabiyi

Agricultural Economics and Extension programme
Abubakar Tafawa Balewa University
P.M.B. 0248, Bauchi
Nigeria

Abstract

Consumers' juiciness acceptability and overall palatability of 8 - 10 week old broiler chicken meat cooked by boiling and by roasting were evaluated. A 6-person trained and experienced consumer sensory panel was used in the evaluation. Panelists scored samples from each cooking method according to a 5 - point descriptive scale. The results of the evaluation show that both cooking methods produce acceptable juiciness. Boiled broiler chicken however has a higher score for overall juiciness acceptability. Boiled broiler chicken meat also scored higher juiciness desirability than the over all desirability of roasted broiler chicken meat.

Although meat from both cooking methods produced acceptable juiciness the boiled one is preferred to roasted one and could be explored to get more consumer satisfaction.

1.0 Introduction

Most often, juiciness constitutes a very essential attribute in muscle foods. For turkey patties, consumer's scores for juiciness more closely matched those for acceptability than scores for meaty or firmness, even when warmed-over flavours were present in some samples (Chambers et al 1992). Chambers and Bowers (1993) stated that juicy and moist were terms often mentioned by consumers in focus groups to describe an ideal piece of meat.

Normally present juiciness and moistness can be objectionable if they are excessive. Thus, Chambers and Bowers (1993) reported in a study of cooking effect on frankfurters that consumers rated the roasted frankfurters lower than the boiled sample, primarily because it had a much greasier surface. According to Chambers and Bowers (1993) companies generally provide foods that will look moist and juicy among others. When foods are cooked, several participants in focus groups often indicate their dislikeness for meat that looked dry and tough.

Many consumers define quality in terms of tenderness and juiciness with more tender and juicy meat considered to have higher quality. Conversely, consumers actually find many levels of tenderness and juiciness unacceptable, depending on their expectations. Randall and Larmond (1977) found that for hamburgers patties, consumers liked one type of patty more than another patty because of general texture characteristics. Consumers commented that less acceptable patties were tough and dry among others.

The objective of the present study was to evaluate the influence of cooking methods on juiciness desirability and overall acceptance of broiler chicken meat. Such studies have not been reported in Nigeria. This was an effort to meet consumers' desire as this can be explored to provide satisfaction to consumers.

2.0 Methodology

Six broiler chickens, aged 8 - 10 weeks, were used in this study. The chickens had been raised on broiler starter, broiler mash and finisher. For the study, the breast meat of the chickens, pectoralis major, was used. After trimming extraneous material, the breast meat was cut into 2.5cm cubes. Six slices were used from each chicken, for boiling or for roasting. The uniform sized slices were randomly assigned to each trained consumer panelist for evaluation. Each piece was placed in a plate with identification tag and instructions for evaluation. Instructions explained cooking method (i.e. boiling or roasting), evaluation procedures and juiciness rating scales. The consumer panel was made up of 4 young women and 2 young men aged between 25 and 40 years, who represent core users of the product and had participated in sensory evaluation before and even then had an orientation appropriate to the present exercise. The validity of panel using small numbers of training panelists has been established (Chambers et al., 1982) and numbers as low as five and even three have been used (Chambers et al., 1992). People with allergies or dental devices were excluded in this study.

Each consumer panel member was requested to score each assigned piece of chicken meat on a 5-point scale of desirability, where 5 = very desirable; 4 = moderately desirable; 3 = slightly desirable; 2 = slightly undesirable; 1 = very undesirable. Also the panelists score each piece of chicken on a 5-point scale of overall acceptability, where 5 = very acceptable; 4 = moderately acceptable; 3 = slightly acceptable; 2 = slightly unacceptable; 1 = very unacceptable. They were also asked to rate the degree of overall acceptability. Panelists first evaluated the degree of overall acceptability. After completing the overall acceptability evaluation, the second form was distributed for the evaluation of degree of juiciness desirability.

Boiled pieces were paired with roasted ones. Boiling had been done in a pot in a conventional way using an electric cooker at 85 - 90°C for about 30 minutes while roasting was also done in a conventional oven at 160 - 180°C for about 2 hours. Condiments including 6 medium sized onions, 6 large pepper, 12 desert spoonfuls of vegetable oil, salt to taste, and 12 maggi cubes were used for the chickens. Spices were also used (curry and thyme).

Panelists conducted their evaluation far away from one another to prevent communication between panelists. The temperature of each piece of meat was brought down in a cooler to the room temperature (20 - 25°C) before the commencement of the evaluation. It was ensured that the samples were served in a random order so that the consumer panelists will not be biased by the presentation sequence. Samples were scored as quickly as possible after preparation to prevent changes that occur during holding (samples can dry out or develop off flavours). It was also ensured that samples were prepared as uniformly as possible so that sample-to-variation was due to experimental treatment - that is preparation methods.

One evaluation session first of boiled meat immediately followed by roasted meat was held each day at 10:00a.m for three consecutive days respectively. Room temperature water was provided to rinse the palate between samples to remove what was recently consumed which could influence judgement of following sample.

Data were analyzed in a split - plot design described by Cochran and Cox (1986). Standard errors and analysis of variance were determined. Least significant differences (LSD) were calculated and used to separate means. An alpha level ($P \leq 0.05$) was used to determine significance.

3.0 Results and Discussion

Table 1

Demographic Characteristics of Consumer Panelists Evaluating Broiler Chicken Meat for Juiciness Desirability and Overall Acceptability

Consumer characteristics	Number
Gender	
Female	4
Male	2
Age in years	
25 - 40	6
Ethnicity (nationality)	
Nigerians	6

The demographic characteristics of the consumers who participated in the evaluation are shown in Table 1. Four of the consumer panelists are young women and the remaining 2 are young men aged 25 to 40 years. They are all Nigerians.

Table 2

Mean of Consumer Panelists Ratings of Juiciness Desirability and Overall Acceptability of Meat of Broiler Chickens Cooked by Boiling and Roasting

Juiciness desirability	Cooking method	
	Boiling	Roasting
Juiciness desirability	4.17 ^a	2.83 ^b
Overall acceptability	4.83 ^a	4.34 ^b

The method of cooking influenced juiciness in the study. Boiled meat has higher juiciness desirability ($P < 0.05$) than the oven-roasted meat. The overall palatability also is significantly higher for boiled meat ($P < 0.05$) than roasted meat. Overall acceptability is higher than juiciness desirability in each of boiled and roasted chicken meat. This indicates that juiciness is not the only factor. Such results suggest other attributes, such as tenderness and flavour, may affect overall acceptability of broiler chicken in this study. Working on beef cattle, Miller et al (1995) reported tenderness and flavour of both as important in consumer acceptability. Presumably, boiling might have produced better tenderness flavour than roasting thus increasing overall acceptability of both boiled meat and roasted meat.

The results of this study are similar to those reported by Chambers and Bowers (1993) who found boiled frankfurters to have higher juiciness desirability than roasted frankfurters. As in their studies also, that may be due to excessive juiciness of roasted meat, which resulted in greasiness of the roasted meat.

It is clear therefore that broiler chicken meat cooked by boiling produce better juiciness desirability as well as overall palatability than oven-roasted meat although both forms of cooking methods produce acceptable meat. Presumably, roasted meat showing only slightly desirable juiciness is made moderately acceptable overall as a result of the effect of tenderness and/or flavour.

The influence of cooking methods on juiciness desirability should be used to the advantage of consumers. The preference for boiled meat can be explored to optimize more consumer satisfaction and increased consumption market of broiler meat.

Acknowledgement

The author acknowledges with appreciation the guidance of Mrs. Ludmila Wojick in the execution of the work. The author also wishes to extend her gratitude to the sensory panelists for the time and commitment given to this project.

References

- Chambers E. IV and Bowers, J. R. (1993), Consumer perception of sensory quantities in muscle food, *Food Technology*, 47 (11), 116 - 120.
- Chambers L., Chambers E. IV and Bowers, J. R. (1992), Consumer acceptability of cooked stored ground turkey patties with differing levels of phosphate, *Journal of Food Science*, 57, 1026 - 1028.
- Chambers, E. IV., Bowers, J. A. and Dayton, A. D. (1981), Satiation designs and Panel training/experience for sensory analysis, *Journal of Food Science*, 57, 521 - 523.
- Chambers, E. V., Bowers, J. R. and Smith, E. A. (1992), Flavour of cooked, ground turkey patties with added sodium tripolyphosphate as perceived by sensory panel with differing phosphate sensitivity. *Journal of Food Science*, 57, 521-523.
- Cochran, W. G. and Cox, G. M. (1968), *Experimental Design*, Second Edition, John Wiley and Sons Inc., New York, 239pp.
- Miller, M. F., Hoover, L. V., Cok, K. D., Guerra, a. L., Kuffman, K. L. Tinney, K. S., Ransey, C. B. Brittin, H. C. and Juffman, L. M. (1995), Consumer acceptability of beefsteak tenderness in the home and restaurant, *Journal of Food Science*, 60(5), 963-965.
- Randall, C. J. and Larmond, E. (1977), Effect of method of communication (flake-cutting and grinding) on the acceptability and quality of hamburger patties, *Journal of Food Science*, 42, 728 - 730.

Use of Visuals in Agricultural Advertisements in Nigerian Newspapers

J. O. Oladeji and T. A. Olowu

Department of Agricultural Extension and Rural Development
University of Ibadan, Ibadan

Abstract

The study focused on the use of visuals in agricultural advertisements in Nigerian newspapers. A total of 219 newspapers editions were randomly selected for the period January, 1985 to December, 1994. The selected newspapers were content analysed for frequency and type of visuals used in the agricultural advertisements.

Findings reveal that more than half of the agricultural advertisements do not have visuals while those with visuals are mostly machinery/tools advertisements. Furthermore, the findings indicate that photographs are the common visual type used in the agricultural advertisements.

1.0 Introduction

The need to diversify the means of information dissemination in a developing nation has become increasingly important. This importance has not been belittled in anyway given that disseminating appropriate and relevant technical information is only the beginning of our journey towards attaining the nation's objective of sustained and substantial increase in food production (Olowu, 1990). However, it has been observed that extension agents who have the major mandate of information dissemination most often direct their efforts at non-literate rural dwellers while new entrant farmers who are educated, knowledgeable and literate are left to sought for information on their own.

This set of literate individuals who now farm on a large scale have the production capacity to improve food scarcity in Nigeria. Therefore, their information needs should be adequately addressed if Nigeria's agricultural economy must attain the desired expectation. Towards this end, the necessity to consider other literate forms of information dissemination becomes paramount. This is especially so as these forms, such as newspapers, can be read and re-read at convenience for fuller and better understanding of their contents. Newspapers apart from containing agricultural news and stories also have agricultural advertisements (Oladeji, 1994). These agricultural contents are potent sources of information for the identified literate farmers. However, the potency of these contents may be dependent on visuals that accompany them. Indeed, Moriarty (1987) had noted that visuals are used in advertisements to gain the attention of an indifferent audience. In other words, visuals play a significant role in getting meaningful attention and improving understanding. But in order that the potency and roles of these visuals are attained not only must the target literate audience be exposed to them but the newspapers themselves should of necessity contain them. But do the agricultural advertisements have visuals? If so, what type of visuals and with what frequency? Only answers to these questions will provide an empirical basis for the exploitation of their potency for agricultural development. Herein lies the basis of this study.

2.0 Methodology

The study was a content analysis of visuals in agricultural advertisements in Nigerian daily newspapers published from January, 1985 to December, 1994. This period marked the emergence of many agricultural development programmes in Nigeria. These programmes included Better Life

for Rural Women, National Agricultural and Land Development Authority (NALDA) and Directorate for Food and Rural Infrastructure (DFFRI). It was an era of economic reform in Nigeria during which the Nigerian government introduced the Structural Adjustment Programme (SAP). It also marked the era numerous agricultural investors who are learned but have little or no technical knowledge of agricultural production came into large scale farming activities (Spore, 1990).

2.1 Creation of content categories of agricultural advertisements and Visuals

2.1.1 Categorisation of agricultural advertisements

To facilitate content analysis of visuals in agricultural advertisements, first agricultural advertisements in newspapers had to be identified and classified. To this end therefore, five agricultural advertisements categories that are mutually exhaustive and exclusive as developed by Oladeji (1994) were used. The categories are (1) Services (2) Machinery/ tools (3) Agrochemicals (4) Processed produce and products and (5) Stocks.

Services

Services are advisory or regulatory activities rendered by the agricultural commodity boards, auctioneers and estate valuers, agricultural experts, individuals, agricultural research centers and extension agents to agricultural practitioners to help improve farm production. Examples are seminars, workshops, agricultural shows, agricultural exhibition and agricultural consultancy services.

Machinery/Tools

Machinery/tools are hand instruments or objects used to do agricultural work or man-made instruments or equipment that use power to perform agricultural work. Examples are ploughs, tractors, fishing boats, harrows, hoes, fishing hooks, cutlasses and axes.

Agrochemicals

Agrochemicals are chemical substances that are used in crop, animal and fish production. Examples are pesticides, herbicides, fertilizers and drugs-Cymbus and Perenox.

Processed Produce and Products

Processed produce and products are treated and refined agricultural produce and products as well as unprocessed agricultural products. Example are crop produce-palm kernel products, animal products-chicken, turkey, roasted meal (suya), livestock feeds, fish products-shrimps, frozen fish and food and snacks-meat pie, cornflakes, beverages, tea, bread, sweet and biscuits.

Stocks

Stocks are genetic materials that are used for propagation. Examples are animal breeds, seeds, seedlings and fingerlings.

2.1.2 Categorisation of Visuals

Visuals in agricultural advertisements also were categorized as follows:

Graphics drawings

Graphic drawings are drawn sketches, charts, written signs or any diagram drawn to instruct without using an actual photograph in an advertisement.

Pictures

Pictures are photographs obtained by using a camera and film sensitive to light to produce the likeness of the product in an advertisement.

2.2 Sampling of Newspapers

Nine daily newspapers of a population of 18 published continuously in Nigeria throughout the 10-year study period were randomly selected. The editions of the nine selected newspapers were obtained for the randomly selected 200 days of the study period. The 200 days were, however, obtained as follows:

Five months of each year of the 10-year period were randomly selected. From each selected month, one week was randomly selected. Then, from each selected week, two week-days (Monday through Friday) and one weekend-day (Saturday and Sunday) were selected. The editions of each of the nine newspapers of the resultant 200 days were finally obtained.

2.3 Recording of Visuals

All agricultural advertisements in the selected editions of the nine newspapers were counted and recorded. These agricultural advertisements were further content analysed for:

Type of visuals—graphics, photographs or photographs and graphics

Frequency--- number of times each particular type of visual occurred in an agricultural advertisement.

3.0 Results and Discussion

Two hundred and nineteen editions of the daily newspapers have 534 agricultural advertisements. Table 1 shows that majority of the agricultural advertisements (59.9%) do not have visuals while 43.1% have visuals.

Table 1
Use of Visuals in Newspapers' Agricultural Advertisements

	Frequency	Percentage
No visuals	304	59.9%
Visuals	230	43.1%
Total	534	100.0%

This finding may not augur well for agricultural production, as the vital roles of visuals in enlightening the audience as well as sensitizing them on product quality and creating necessary demand will not be promoted.

Table 2
Use of Visuals in Categories of Agricultural Advertisements of Nigerian Daily Newspapers

Categories of advertisement	No visuals	Visuals	Total	Percentage
Services	84(87.5)*	12(12.5)	96	18.0%
Machinery/Tools	35(29.9)	82(71.1)	117	21.9%
Agrochemicals	60(66.7)	30(33.3)	90	16.9%
Processed produced/products	111(51.9)	103(48.1)	214	40.1%
Stocks	14(82.4)	03(17.6)	17	3.2%
Total	304	230	534	

*Figures in parentheses are row percentages

Table 2 shows that machinery/tools advertisements are the most "visually aided" (71.1%) while the least "visually aided" are services advertisements (12.5%). Others are processed produce/products (48.1%), agrochemicals (33.3%) and stocks (12.5%). While Arens and Bovee (1989) had postulated that visuals are chosen on the basis of their need, cost, technical limitations of producing them, time required to obtain them, effect desired, printing process to be used, paper on which they are to be printed and availability of the artist who can produce what is needed in the medium desired, it appears that the type of product may be responsible for the variation in the use of visuals in agricultural advertisements in this study. The results indicate that the more tangible advertisement categories used more visuals than the intangible products. However more empirical based explanations should be explored.

Table 3
Types of Visuals Used In Agricultural Advertisements

Visual	Frequency	Percentage
Graphic drawings	58	25.2
Photographs	165	71.74
Both	07	3.04
Total	230	100.0%

Table 1 has shown that less than half of agricultural advertisements in Nigerian daily newspapers have visuals. However, what types of visuals are these? Table 3 indicates that 71.7% of the visuals are photographs, 25.2% are graphic drawings and a small fraction (3%) are photographs and graphic drawings combined. This finding is in line with Moriarty (1987) who reported that photographs were the most frequently used type of visuals in advertisements.

Photographs may have been mostly used because they add humour to advertisements. Bolling (1964) reported that humour is a great asset in advertising when properly used, for it adds a human touch to the advertiser's announcement and helps to break down the barrier of indifference that so often greets an offer of service. Otto Kleppner (1979) also stated that humour is often appropriate for low priced package products, products people buy for fun, products whose primary appeal is taste, or products or services in need of a change of pace in advertising because of strong competition. Of course agricultural products have strong competition both within the sector and between it and other sectors. The predominant use of photographs may therefore be appropriate. Indeed, Jenkins (1984) had put it succinctly that photographs are one of the advertising manager's greatest aids.

Table 4
Use of Visuals in Categories of Agricultural Advertisements of Nigerian Daily Newspapers

Categories of advertisement	Graphic drawings	Photographs	Both	Total	Percentage
Services	9(75)*	3(25)	0	12	5.2
Machinery/Tools	14(17)	66(83)	2	82	35.7
Agrochemicals	8(26.7)	22(73.3)	0	30	13.0
Processed products/produce	25(24.3)	73(75.7)	5	103	44.8
Stocks	2(66.7)	01(33.3)	0	03	1.3
Total	58	165	7	230	
Percentages	25.2%	71.7%	3.0%		100%

*Figures in parentheses are row percentages

Table 4 reveals that graphic drawings are mostly used in the advertisements of agricultural services (75%) and agricultural stocks (66.7%) while photographs are predominant in the advertisements of agricultural machinery/tools (83%), agricultural processed produce and products (75.7%) and agrochemicals (73.3%). In other words, tangible products are advertised with photographs while intangible products are advertised with graphic drawings. Factors identified by Arens and Bovee (1989) may explain this trend.

4.0 Conclusions

The study has established that less than half of agricultural advertisements have visuals. These visuals are predominantly photographs. However, photographs are mostly used for advertising tangible products while graphic drawings are used for intangible products.

References

- Arens, W.F and Bovee, C.L. (1989), *Contemporary Advertising*, Richard, D.Irvin Inc. Homewood, Illinois, 252p
- Bolling, C.L. (1964) (4th Ed), *Sales Management: A Practical Guide to Sales Organisation, Policy and Routine Marketing, Publicity and Salesmanship*, Sir Isaac Pitman and Sons Ltd, London, 198p.
- Jefkins, F (1984). *Advertising Today*, Wciv6BX, London, 254p.
- Moriarty, S.E. (1987), A content analysis of visuals used in print media advertising., *Journalism Quarterly*, Vol. 64,550h-554
- Oladeji, J.O. (1994), *A Content Analysis of Agricultural Advertisements in Four Nigerian Newspapers*, Unpublished M.Sc. Thesis, Department of Agricultural Extension Services, University of Ibadan, Ibadan, 162p.
- Oladeji, J.O (1999), *Content Analysis of Visuals and Information Cues of Agricultural Advertisement in Nigerian Daily Newspapers*, Unpublished Ph.D Thesis Department of Agricultural Extension and Rural Development, University of Ibadan, Ibadan, 213p
- Olowu, T.A. (1990), Reportage of agricultural news in Nigerian newspapers, *Journalism Quarterly*, Vol.6, No.1, 195-200.
- Otto, Kleppner (1979), *Advertising Procedure*, Practice Hall, Inc., Englewood Cliffs, New Jersey, 313p.
- Spore (1990), *Back-to-the-land: New hope for civil servants and graduates*, CTA, Wageningen, No. 28, 1-4.