

# BEEF COOKING PRACTICES IN A SEGMENT OF AN URBAN NIGERIAN POPULACE

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## ABSTRACT

A survey was carried out among a segment of a Nigerian urban population in an attempt to determine the range of cooking methods and time commonly used in the preparation of beef for the table. Responses were obtained from 492 respondents who cut across several defined age groups and economic status. The findings indicate that almost all the respondents cook their meat from the fresh state. Boiling was the most frequently used cooking method followed by boiling/frying and boiling/frying/stewing which are the traditional systems of preparing stew in Nigeria.

Boiling/stewing was used more frequently by the 41-50yr age group but was least used by the 25-20yr age group. Most respondents cook their beef for between 20 and 40 min. and utilized the broth from the boiled meat in preparing the stew rather than discarding it. The level of tenderness of the cooked meat was singularly the most important factor while marbling was the least factor contributing to its acceptability.

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Key Words: Beef, cooking, Nigeria.

## INTRODUCTION

It is the general practice that meat is cooked before being eaten. Cooking renders the meat more attractive and palatable, brings out the supreme flavour attributes, improves the tenderness and most often renders the product nearly sterile and easily digestible (Levie, 1967). It has been shown that the cookery method and anatomical location of muscle exert considerable influence on the ultimate palatability of meat (Berry, Wheeling and Carpenter, 1977). Furthermore, eating satisfaction is ensured only when meat is cooked by the appropriate

method for a sufficient time to reach the appropriate internal temperature (Seltzer, 1955).

Consumers use quite a wide range of cooking methods for their meat preparations (Lasley, Keihl and Brady, 1955). While certain meat cuts are best cooked following specific cookery methods (Riordin, 1974), the type of cooking method used by consumers is greatly influenced by income educational status, age of consumer and family size (Stevens *et al.*, 1956). Over nine cookery methods have been identified (Levie, 1967; Jeremiah, 1982). Of these, broiling, roasting and pan frying appear to

be regularly used by consumers and in research experiments.

There is presently very few published information on the various methods of cookery that are regularly used by an average Nigerian consumer. The present survey was therefore designed to study and document the cooking practices often used in preparing beef among respondents of various age groups resident within the University of Ibadan campus as a means of understanding what obtains among the general populace.

### EXPERIMENTAL METHOD

#### The sampling units

The survey exercise was carried out among household members within the residential areas of the University of Ibadan between January and April 1984. The respondents (husband and wife make up a survey unit) cut across various age groups and economic status. Of the 492 respondents evaluated, 306 had both the husband and wife in the same age groups; while 186 had the husband and wife in different age groups and were therefore classified as a mixed group. Based on economic stratification, 228 respondents lived in residential units reserved for senior staff cadre earning ₦5136.00 and above while 189 respondents were clearly in the junior staff category earning below ₦5016.00. A further 75 respondents comprising of students, househelps and other people live independently in the so called "boys quarters" attached to the main residential units in the senior staff areas.

To ensure completeness of coverage, respondents were drawn from every alternate housing unit, flat or "boys quarters". In most cases, the questionnaires were completed by the female member of each survey unit since most of the cookery for the family is usually carried out by ladies.

#### The Survey questionnaire

A total of 492 returns were obtained from the survey after one or two follow-up calls. The survey questionnaire is as outlined in Figure 1. Where necessary, the questionnaire was supplemented with verbal explanations by the interviewers. The responses of the respondents were analysed by computing the sample percentage distribution of respondents across the different age groups of each parameter evaluated.

### RESULTS AND DISCUSSION

#### Choice of meat eaten

The percentage of respondents in the various age groups in relation to the type of meat consumed are shown in table 1. An overwhelming proportion of respondents in all age groups prefer their meat cooked from the fresh state. Such beef is usually from a freshly slaughtered cattle but may be in the chilled or frozen state in line with the general belief by the average Nigerian that the freshness of meat is greatly associated with meat quality and wholesomeness.

Some meat primarily in the form of balan-gu (suya roasted around smoky burning wood) and asun (a product of normally associated with smoked goat-meat) is preferred to the remaining kinds of meat by the 31-40yr as well as the 51-60yr and mixed aged groups. The cured and canned meat items were favoured by the 18-30yr age groups. The observed trend may be attributed to the fact that the younger respondents, who were mostly students, devoted less time to elaborate cooking. Rather they consume more sausages, canned corned beef and sliced ham, which are convenient meat items and fast foods or are easily used in preparing sandwiches. Dried and other forms of meat are hardly consumed, since they are at present hardly found in the market or are unnecessarily expensive rela-

**Fig.1**  
**Consumer survey on meat cooking practices**

Survey zone ..... Questionnaire No..... Date .....

Please answer the following questions:

1. Age of husband..... Wife .....

2. Choice of meat of eaten:

.....Fresh.....Driede.g. Kundi..... Smoked  
.....cured/salted.....Canned.....Other (Specify)

3. Method preferred in cooking meat (list three in order of preference).

.....Boiling.....Boiling/Pan Frying/Stewing  
.....Pan Frying.....Broiling  
.....Stewing.....Roasting  
.....Boiling/Pan Frying.....Roasting  
.....Boiling/Stewing

4. Estimated normal cooking time

..... Less than 10 min..... 40-50 min.  
..... 10-20 min..... 50-60 min.  
..... 20-30 min..... over 60 min.  
..... 30-40 min.

5. If meat is boiled, what is the fate of the broth?

..... Discarded  
..... Used in cooking the stew  
..... Used in seasoning other foods

6. Most important factors used in determining cooked meat acceptability (check three)

..... Colour..... Tenderness  
..... Marbling..... Juiciness  
..... Lean/fat ratio..... other (specify)  
..... Flavour

tive to their worth. A few respondents expressed disapproval of dried meat because such meat are often rancid, infested with insects and mold or otherwise degraded by fecal contamination. Mann (1960) attributed such spoilage of otherwise wholesome meat to poor handling and exposure to air, light and moisture in unprotected packages.

### Choice of cooking method

Table 2 presents data on the various cooking methods with the percentage of respondents who regularly used these methods. It is apparent that in all age groups, the most often used cooking methods are boiling, boiling/frying (i.e. boiling followed by frying), and boiling/frying/stewing (i.e. boiling followed by frying and stewing). On the overall, boiling/stewing (i.e. boiling followed by stewing) appeared to be more frequently used than the remaining five methods. Respondents in the 41-50yr age group used boiling/stewing more frequently than the 25-30yr age group. A higher percentage of respondents in the 51-60yr age group utilized boiling and braising than any of the other age groups although these are the least methods preferred on the overall by respondents in all age groups.

With respect to the first choice of cooking methods, boiling was the most preferred choice among the 18-24yr age groups followed equally by boiling/stewing and roasting. Except for the mixed aged group, the sequence of first preference by all the other age groups was boiling, boiling/stewing and boiling/frying/stewing. In the mixed aged group, boiling/frying/stewing superceded boiling/stewing. A comparison of both sections of the table shows that a majority of those who regularly used boiling/stewing also used it as their first choice compared with any other cooking method.

Respondents in the 18-24yr age groups only used five cooking options in their first

choice whereas those in the 25-30yr and 41-50yr age groups used six cooking options. It is instructive that there is a fairly even distribution throughout the cooking methods in the 51-60yr age group. The distribution may be related to the low number of respondents but may also be attributed to the general awareness of the cooking methods. In contrast, the younger age groups especially the 18-24yr age group; availed themselves only of the five traditional methods of cookery in vogue in Nigeria.

As pointed out by Forrest *et al* (1975), water is a good conductor of heat, aids the penetration of heat into the deepest parts of cuts and enhances the complete hydrolysis of collagen into gelatin. Beef cattle available on the Nigerian market have mostly lost their youthfulness (Okubanjo, 1982) and therefore contain a relatively large amount of connective tissue which requires moist heat for conversion of its collagen to gelatin. Boiling as the most popular form of meat cookery was therefore most appropriate. In comparison, the beef available in the Western world and elsewhere is obtained from youthful animals and the preferred methods of cookery are boiling, frying and roasting, which are adaptable for meat low in collagen (Seltzer, 1955, Stevens *et al*, 1956, Daner, 1959, Jeremiah, 1982).

The survey was carried out during the period of extreme scarcity of vegetable cooking oil in the Nigerian market. This probably explains the variation in the reaction of respondents in the various groups as regards boiling/pan frying, boiling/stewing and boiling/frying stewing. Traditionally, the sequence of cooking stewing meat is by boiling/pan frying/stewing and should therefore have been the first choice after boiling. Across all age groups, boiling/pan frying was least used as the first cookery method by the respondents. Respondents within the 18-24yr age groups, who were mostly students and low income earners, used boiling/stewing

**Table 1**  
**Percentage of respondents in the various age groups regularly consuming the different kinds of meat**

	A g e G r o u p s (yr)						
	Kind of meat						Overall n = 492
	18-24 n = 39	25-30 n = 44	31-40 n = 120	41-50 n = 87	51-60 n = 16	Mixed n = 186	
Fresh	97.4	97.7	90.8	94.3	93.8	94.1	93.9
Smoked	2.6	0.0	10.8	0.1	18.8	12.9	9.8
Cured/salted	12.8	13.6	4.2	2.3	6.3	3.2	5.1
Dried	2.6	9.1	0.8	3.5	0.0	2.2	2.6
Canned	7.7	11.4	1.7	2.3	6.3	2.7	3.7
Other <sup>a</sup>	0.0	0.0	0.0	0.0	0.0	1.6	0.6

<sup>a</sup> = Rabbit, Snail and Fish

**Table 2**  
**Percentage of respondents in specific age groups preferring the various methods of cooking meat with the first preferred choice of method**

	A g e G r o u p s (yr)						
	Kind of meat						Overall n = 492
	18-24 n = 39	25-30 n = 44	31-40 n = 120	41-50 n = 87	51-60 n = 16	Mixed n = 186	
<b>COOKING METHODS REGULARLY USED</b>							
Boiling	97.4	63.6	51.7	52.9	93.8	67.2	63.8
Pan Frying	0.0	2.3	10.0	4.6	12.5	11.8	8.3
Stewing	2.6	6.8	25.8	20.7	6.3	25.8	20.7
Boiling/Frying	64.1	79.6	38.3	56.3	37.5	46.8	50.4
Boiling/Stewing	20.5	14.6	43.3	51.7	33.8	44.1	41.5
Boiling/Frying/Stewing	71.8	88.2	41.7	50.6	75.0	48.9	51.8
Broiling	0.0	0.0	6.7	2.3	18.8	2.7	3.7
Roasting	56.4	43.1	22.5	27.6	31.3	19.4	25.8
Braising	0.0	0.0	2.5	5.6	6.3	1.6	2.2
<b>COOKING METHODS OF FIRST CHOICE</b>							
Boiling	64.1	65.9	50.0	48.2	25.0	57.5	54.0
Pan frying	0.0	4.5	2.5	0.0	0.0	1.6	1.4
Stewing	0.0	0.0	5.0	5.7	6.3	4.8	3.9
Boiling/Frying	5.1	2.3	5.0	9.2	6.3	5.9	5.8
Boiling/Stewing	12.8	11.4	22.5	24.1	18.6	12.4	17.9
Boiling/Frying/Stewing	5.1	11.4	12.5	6.9	18.6	14.5	12.6
Broiling	0.0	0.0	0.8	2.3	6.3	1.1	1.0
Roasting	12.8	2.3	0.8	3.3	6.3	1.1	2.6
Braising	0.0	0.0	0.0	0.0	6.3	1.1	0.4

where the requirements for cooking oil was greatly less than for boiling/frying or boiling/frying/stewing. Respondents in age groups 24-30yr were mostly bachelors and spinsters earning slightly improved salaries but without much financial responsibilities and therefore could reasonably purchase some cooking oil. Hence, the equal distribution between boiling/stewing and boiling/pan frying/stewing. In the 31-50yr age groups respondents are pre-occupied mainly with raising families, educating their children, building houses, providing some measure of comfort for the home and therefore saddled with major financial responsibilities. This may partly explain why the cooking oil required for frying was sacrificed in favour of boiling/stewing.

#### Duration of cooking

Data presented in table 3 shows the partitioning of respondents in the different age groups according to the total time used for cooking meat. It is apparent that the most popular cooking duration are either between 20 and 30min. or between 30 and 40min. with the relative percentage dropping off above or below these time scales. Very few of the respondents cook for less than 10 minutes or more than 60 minutes. In contrast, a recent study in Central Alberta (Jeremiah, 1982) shows that 10-20min. appeared to be the optimum cooking time among all age groups irrespective of the cookery method. This may be logical regarding the usually high connective tissue content of meat available on the Nigerian market vis-a-vis the Canadian counterpart. The ethnicity of respondents in the two geographical areas may also be another factor in that most Nigerians prefer their meat well done at which point myofibrillar protein hardening and toughening occurs and the meat is less juicy (Porrest *et al.*, 1975). In contrast, meat is usually cooked rare to

medium in the Western World to ensure supreme tenderness and juiciness.

#### Fate of cooked meat broth

The data presented in table 4 shows clearly that across all age groups, the broth resulting from boiling meat was never discarded but was rather usually incorporated into the stew. Part of the broth also finds its way into seasoning other foods. The foregoing is very important in relation to the changes which accompany the cooking of meat for extended time as most of the respondents preferred. Bouton *et al.*, (1972) observed increases in cooking loss and decreases in expressible juice with increase in final degree of doneness. Schmidt *et al.*, (1968) also reported significant influence on cooked meat colour, water holding capacity, pH and the micro-structure of the meat. Furthermore, vitamins present in meat are substantially stable to cooking, a fair amount are lost in the broth especially riboflavin and niacin among others. Similarly meat fat may be melted and lost with the broth. Incorporation of the meat broth in the stew therefore helps greatly in retaining the nutritive value of the meat.

#### Criteria for cooked meat acceptability

Tenderness was singularly the most important factor determining the acceptability of cooked meat followed in importance by the flavour, juiciness colour and lean/fat ratio (Table 5). However, tenderness as a factor increased in importance with the age of respondents at the expense of all the other attributes. Previous work (Forbes *et al.*, 1974) among Canadian consumers similarly indicated that tenderness was the most important criteria followed by flavour and juiciness. Marbling appeared to contribute very little to cooked meat acceptability probably because most meat that are available to Nigerian consumers are poorly

**Table 3**  
**Percentage of respondents in the different age groups using various cooking times**

	A g e G r o u p s (yr)						Overall n = 492
	Kind of meat						
	18-24 n = 39	25-30 n = 44	31-40 n = 120	41-50 n = 87	51-60 n = 16	Mixed n = 186	
Less than 10	5.1	0.0	5.8	2.3	0.0	1.1	2.6
10-20	12.8	20.5	14.2	3.4	12.5	12.4	12.2
20-30	41.0	25.0	31.7	27.6	56.3	30.7	31.5
30-40	28.2	29.6	28.3	41.2	62.5	31.1	12.0
40-50	7.7	19.2	7.5	11.5	18.8	10.8	10.8
50-60	5.1	6.8	10.0	9.2	0.0	9.7	8.7
Over 60	0.0	0.0	2.5	4.6	0.0	4.3	2.2

**Table 4**  
**Effect of age groups on the fate of broth from boiled meat**

	A g e G r o u p s (yr)						Overall n = 492
	Kind of meat						
	18-24 n = 39	25-30 n = 44	31-40 n = 120	41-50 n = 87	51-60 n = 16	Mixed n = 186	
Discarded	0.0	2.3	0.0	0.0	0.0	1.6	0.8
Incorporated in stew	92.3	97.7	99.2	94.3	87.5	92.5	94.7
Used in seasoning other food	12.8	11.4	25.0	17.2	18.8	21.0	19.7

**Table 5**  
**Percentage of respondents in the various age groups considering specific criteria for cooked meat acceptability**

	A g e G r o u p s (yr)						Overall n = 492
	Kind of meat						
	18-24 n = 39	25-30 n = 44	31-40 n = 120	41-50 n = 87	51-60 n = 16	Mixed n = 186	
Colour	82.1	70.5	55.0	55.2	62.5	55.9	59.2
Marbling	38.5	22.7	14.2	23.0	20.0	18.3	19.5
Lean/fat ratio	79.5	73.6	65.8	57.5	56.3	46.2	57.5
Flavour	79.5	95.5	75.0	70.1	56.3	56.5	68.7
Tenderness	84.6	93.2	95.0	95.4	93.8	89.8	92.1
Juiciness	71.8	75.0	60.0	52.9	68.8	63.4	62.6
Other <sup>a</sup>	0.0	0.0	1.7	0.0	0.0	0.5	0.6

<sup>a</sup> = Grittiness

marbled (Okubanjo, 1982). A few respondents in the 31-40yr and mixed age group cited grittiness, a meat textural characteristic, as another criteria for meat acceptability.

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