

## CONSUMPTION PATTERN OF MAIZE BASED DISHES IN FOUR AGRO-ECOLOGICAL ZONES OF NIGERIA

<sup>1</sup>OLAYIWOLA, I. O., <sup>2</sup>OGANAH, B. C., <sup>1</sup>ONABANJO O. O., <sup>1</sup>OGUNTONA, C. R. B., <sup>3</sup>POPOOLA, A. R., <sup>1</sup>SANNI, S. A., <sup>1</sup>AFOLABI WAO, <sup>4</sup>SAM-WOBO, S.O.

<sup>1</sup>Department of Nutrition and Dietetics, <sup>3</sup>Department of Crop Science,

<sup>4</sup>Department of Biological Sciences, Federal University of Agriculture, Abeokuta

<sup>2</sup>Department of Home Economics, Adeniran Ogunsanya College of Education, Otto-Ijanikin, Lagos.

**Corresponding Author:** onabanjo169@yahoo.com

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### ABSTRACT

The global picture had dramatically changed the lifestyles of Nigerian citizens pushing them into various fast-eating cultures with more instant and tasty meals, and the attendant gradual relegation of our traditional rich eating cultures. Studies were carried in eight Local Government Areas of Nigeria from the four Agro-Ecological Zones (AEZs) namely: moist savanna (Oyo State), humid forest (Lagos State), mid-altitude (Abuja) and dry Savanna (Kaduna State). Stratified multistage sampling technique with structured questionnaires from 1641 respondents and focus group discussions (FGDs) were employed to identify the maize-based dishes consumed and determined the frequency of consumption. The demographic characteristics revealed that 54.8% of the respondents were male. Residents in the rural area were more (56.8%) and majority of the respondents were between the ages of 26-45 years (67.6%), while more Christians (57.88%) participated in the study than any other religion. Results showed that thirty-two maize-based dishes were identified, of which ten were frequently consumed. *Ogi* was the most popular maize-based dish (73.5%) consumed in the AEZs while corn pudding was the least consumed (28.5%). There were significant differences ( $p < 0.05$ ) in all the sensory attributes measured. The low consumption of majority of the maize-based dishes raises concern for the current campaign on mobilizing local biodiversity which has been reported to be one of the food based intervention strategies for solving nutrition problems among population groups.

**Keywords:** Maize-Based Dishes, Consumption Pattern, Agro-ecological zones, Nigeria.

### INTRODUCTION

Maize (*Zea mays* L., Poaceae) is the second most important cereal staple in Nigeria, ranking behind sorghum in the number of people it feeds (Okoh, 1998). It is one of the world's three primary cereal crops (Vassal, 2000). It has been identified as one of the major staple foods eaten across the country in different forms. It is used in Ni-

gerian households for the preparation of various sumptuous dishes (Abdulrahman and Kolawole, 2006). Maize of different varieties is utilized both fresh and dry in a wide range of methods.

Maize provides nutrients for both humans and animals (Enwere, 1998). It is also a basic raw material for the production of starch, oil,

alcoholic beverages, food sweeteners, drug carriers and more recently in developed countries as fuel. Maize is not only a good source of energy, but it provides significant source of protein as well. It is an important source of carbohydrate, protein, some vitamins and minerals (Okorowa 1995).

One of the issues in ensuring food security is to promote optimum utilization of available food supply and recipe standardization is one method of achieving this objective. Oguntona and Adekoya (1999) opined that recipe standardization is an area of limited research study and that the few recipe books available do not even contain proximate, micronutrient and anti nutrient composition. The food composition tables have been known to be the only avenue to obtain the nutrient contents of foods. One of the limitations of the food composition table is that it gives the values of raw foods. Another issue is that most maize dishes have been found to have a remarkable variation (Isoun and Anthonio, 2002). Studies have shown that these variations are a function of socio-economic status, educational background, prevailing food taboos, cultural and religious affiliations, level of nutritional knowledge, and food habits of the person preparing the food together with seasonal variations (Bender and Bender, 1982; Oguntona and Adekoya, 1999). Presently, the distaste and suspicion attached by indigenes from the various ethnic groups to dishes from other parts of the country had provided the global phenomenon where nutrition transition had made many people to rather eat processed imported foods other than try something different from within Nigeria (Enweonwu, 2008; Oganah and Nwabah, 2009).

Nutritional scientists in Nigeria are yet to make referral diets basically on maize. The

importance of standardized recipes lies in the fact that it will reduce errors arising from arbitrary use of ingredients in meal preparation and hence improve utilization in terms of diet therapy, dietetic use, political and health use and act as a viable tool in assisting vulnerable groups as it is done in developed countries. Standardizing maize-based dishes will increase its utilization as foods in more households and as rations in emergency situations when the need arises. Without standardization, a recipe will be underutilized and will not be able to fulfill its scientific functions. Making it difficult for self evaluation, moderation of nutrient intake and monitoring in terms of disease pattern. Also in cases of nutrition intervention, standardized recipes maybe used as rations. There is the need therefore to identify the different maize – based dishes consumed, determine the consumption pattern of maize in Nigerian households, standardized the recipes and evaluate the nutritive value of these diets.

## MATERIALS AND METHODS

### *Survey Design*

The study was a national survey from which data on maize-based meals consumed in the country were collected and standardized. There is obvious and documented relationship between the agro ecological zone (AEZ), type of farming systems and crops grown and consumed in Nigeria (Maziya-Dixon et al., 2004). For the purpose of this study, the country was stratified according to major agro ecological zones as described by Maziya-Dixon et al. (2004). The consumption pattern of maize was ascertained and the maize – based dishes eaten in these zones were identified and collected.

### *Sampling Technique*

Stratified sampling techniques was used to

select the respondents for identifying the maize-based dishes consumed and collection of recipes for standardization.

The AEZs are as follows;

- i. Moist savanna – made up of Oyo, Ogun, Osun, Ekiti, Kogi, Kwara, Ebonyi, Enugu, Benue States.
- ii. Humid forest – Lagos, Delta, Edo, Imo, Abia, Cross river, Akwa-Ibom, Bayelsa, Anambra, Kwara, Rivers and Nasarawa states.
- iii. Mid-altitude – Plateau and parts of Taraba and Bauchi states.

Dry Savanna – comprising Sokoto, Kano, Katsina, Jigawa, Yobe, Borno, Gombe, Zamfara, Kebbi, Kaduna, and Niger states (Maziya-Dixon et al., 2004). In a multi-stage sampling, one state each from each AEZs was randomly selected (Lagos, Oyo, Kaduna states and the Federal Capital Territory (FCT), after which two local government area was surveyed from each state. Township status was applied in terms of rural and urban communities. In order to have a balance study, one rural and one urban community was used. A total of eight local government areas were selected for the study. The sample size was selected from the total population in each LGA and calculated using the formula of Araoye, (2003).

This was calculated for the two local government areas that were selected in each State using the 2006 population census figures. The following are the sample size for respondents from each State:

Kaduna State:

Urban:	Kaduna north LGA	- 360
Rural:	Birin-Gwari LGA	- 255,
		Total = 615

Lagos State:

Urban:	Alimosho LGA	- 248
Rural:	Badagry LGA	- 168
		Total = 416

Oyo State

Urban:	Ibadan North West	- 185
Rural:	Iwajowa LGA	- 175.
		Total = 360

FCT:

Bwari LGA.

Total = 250

Total no of respondents = 1641

**Determination of Consumption Pattern**

The maize-based dishes consumed were identified and the frequency of consumption determined using structured questionnaires from the method described by MacIntyre *et al.* (2000) and Olayiwola (2003).

**Statistical Analysis**

Data collected from the different stages of the study was subjected to statistical analysis using the SPSS Statistical package version 17.0.

**RESULTS**

**Demographic characteristics of respondents in the four Agro ecological Zones (AEZs).**

The demographic characteristics of respondents from the 4 agro-ecological zones are presented in Table 1. Results reveal that 56.8% of the respondents across the agro-ecological zones reside in the rural area while 43.5% reside in urban communities. Thirty five percent of the respondents live within a household size of between 3–5 members, and 43.2% of the respondents living within a household size of 6–8 persons. The least number of respondents (21.5%) live within a household size of 9 persons and above. Most

(67.6%) of the respondents were within the age range of 26- 45 years with more male respondents (54.8%) than females (45.2%). Assessing respondents' religious leaning, results showed there were more Christians (57.8%) to Moslems (40.1%) and African traditional worshippers (2.15). Majority (79.3%) of the respondents were engaged in one form of occupation with only 20.7% as students.

**Table 1: Demographic Information of the Respondents.**

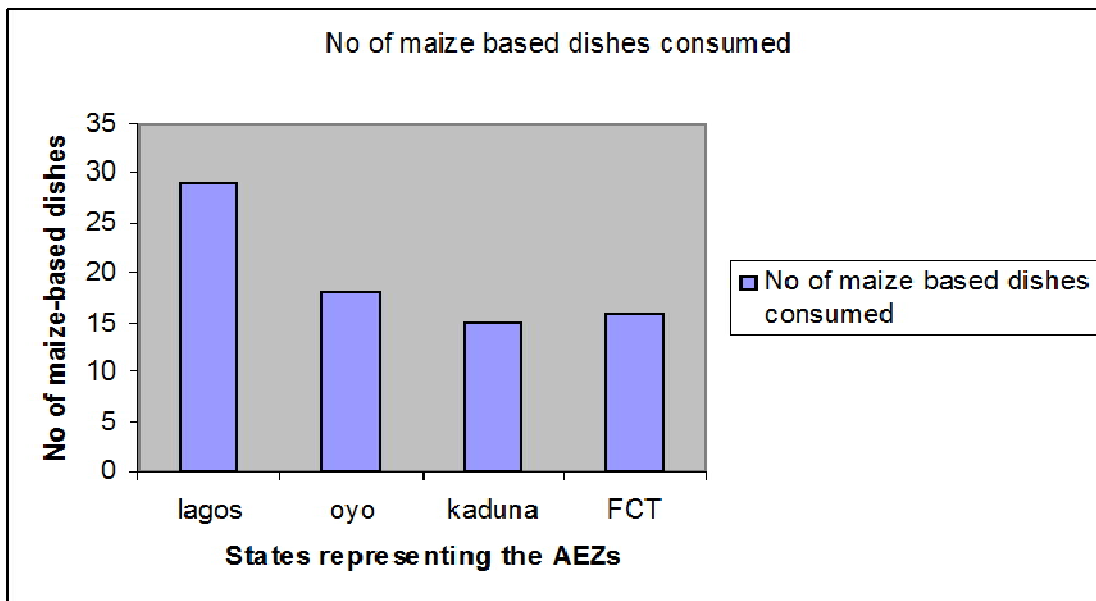
Designation	Frequency	Percentage
Rural	886	56.8
Urban	669	43.2
Household Size		
3 – 5	544	35
6 – 8	676	43.5
9 and above	335	21.5
Age		
5 – 15	89	5.7
16 – 25	270	17.4
26 – 35	577	37.1
36 – 45	475	30.5
50 and above	144	9.3
Sex		
Male	856	54.8
Female	699	45.2
Religion		
Christian	900	57.8
Islam	623	40.1
African traditional religion	32	2.15
Occupation		
Artisan	113	7.3
Civil servant	399	25.7
Farming	368	23.7
Student	322	20.7
Trading/Business	220	14.7
Security operatives	133	8.6

**Source: Field survey (2012)**

**Comparative Assessment of the Consumption Pattern of Maize-Based Dishes**

In assessing comparatively the consumption pattern of maize-based dishes, analyses were carried out separately in the four agro-ecological zones. However, a summary of the number of maize-based dishes con-

sumed in the four AEZs is presented in Figure 1. A total of thirty two (32) maize-based dishes were identified. Lagos had the highest number of maize-based dishes (29) representing 90.6% of the maize-based dishes identified; Oyo had 18 (52.25%); FCT 16 (50%) while Kaduna had the least (15) representing 46.87%.



**Fig 1: Number of maize-based dishes identified in the four AEZs**  
Source: Field survey (2012)

**Lagos State**

Results of the analysis from Lagos State are presented in Table 2. A total of 29 maize-based dishes were identified to be consumed by the respondents. The consumption of *Aadun, Abokun, Adalu, Akansu, Egbo, Elekute, Kakara, Mosa, Owowo, Pito, Tanfiri, Ekuru* and *Wonkpa* were low. Chi-square analysis showed a significant difference ( $p < 0.01$ ) in the consumption pattern of all the foods. The moderately consumed dishes were *Apanglaise*, boiled and roast maize, cornmeal (*Tuwo*), corn pudding, *Donkunnu,*

*Donkwa, Kokoro,* and *Kenke*. Chi-square analysis showed a significant difference ( $p < 0.01$ ) in the consumption pattern of all the moderately consumed dishes except cornmeal where no significant difference in its consumption pattern was observed.

Dishes like cornflakes, custard, *Eko, Kunnu, Ogi (pap), popcorn* and *semovita* were highly consumed by the respondents. Chi-square analysis showed a significant difference ( $p < 0.01$ ) in the consumption pattern of the foods on a daily, weekly and occasional

basis. The mostly consumed dish was *Ogi* (67.6%) while the least consumed was *wonkpa* (6.7%). Six of the dishes were selected based on the highest consumption. These include corn flakes, Eko, Kokoro, Kunnu, Ogi and Popcorn. The effects of gender, location and occupation on the consumption of the six dishes were determined and the results are presented in Table 3.

### **Location**

Cornmeal and popcorn were consumed more in urban areas than the rural parts of Lagos State. Statistical analysis at  $p < 0.05$  revealed a significant difference in the consumption pattern based on location for cornmeal, Eko, Kokoro and Kunnu but no significant difference in the consumption of Ogi and popcorn.

### **Gender**

Consumption rate of the six dishes according to gender were analyzed and results revealed that males consumed *Eko*, *Kokoro*, *Kunnu* and *Ogi* more than females, while females consumed more cornmeal and popcorn than males.

### **Occupation**

The results on the effect of occupation on the consumption of the dishes revealed that students consumed Tuwo and popcorn more than other professionals that took part in the study. Civil servants consumed Eko, Ogi, Kokoro and Kunnu more than the other professionals. However, there was a significant difference in the consumption of all the dishes by all the professionals.

### **Oyo State**

The result of the consumption pattern of the maize-based dishes consumed in Oyo State was presented in Table 4. A total of 18

maize-based dishes were consumed by the respondents daily, weekly and occasionally. Results showed that the consumption of Aadun, Abari, Adalu, cornflakes, Kakara, Kokoro, Kunnu, Owowo and roast maize was low. Chi square analysis showed a significant difference in the consumption of these dishes ( $P < 0.01$ ). Moderately, consumed were boiled maize, Tuwo, Custard, Donkwa, Guguru (popcorn) and Mosa. There was also a significant difference in their consumption. The dishes Egbo, Eko and Ogi were highly consumed by the respondents. Also there was a significant difference to the consumption. The highest most consumed maize-based dish was Ogi (65.1%) while the least consumed was Abari (5.3%). Six dishes of the most consumed were also selected and the effects of location, gender and occupation on the dishes was determined. Results are showed in Table 5.

### **Location**

Egbo, Tuwo, Eko, boiled maize, Ogi and Guguru were consumed more in the rural than in the urban area. Their consumption pattern was significantly different ( $P < 0.01$ ) except for egbo and boiled maize which had no significant difference in consumption in the rural and urban locations.

### **Gender**

There was no significant difference in the consumption of egbo and tuwo by both sexes, though males consumed the foods more than the female respondents. However, more females consumed eko, boiled corn and guguru more than the males, but the males consumed ogi more than the females. There was a significant difference ( $P < 0.01$ ) in the consumption of the dishes between males and females.

**Table 2: Consumption Pattern of Maize-based Dishes in Lagos State**

Maize-based dish	Eaten daily Freq (%)	Eaten weekly Freq (%)	Eaten occasionally Freq (%)	Chi-square value (X <sup>2</sup> )	Remarks
Aadun	69 (16.3)	80 (18.9)	263 (62.2)	172.9**	Low
Abokun	57 (13.5)	73 (17.3)	283 (66.9)	231.1**	Low
Adalu/ Sapala	75 (17.7)	106 (25.1)	232 (54.8)	100.5**	Low
Akansu	66 (15.6)	103 (24.3)	226 (53.4)	106.6**	Low
Aponglaise	138 (32.6)	83 (19.6)	184 (43.5)	378.8**	Moderate
Boiled maize	145 (34.3)	159 (37.6)	112 (26.5)	8.39*	Moderate
Corn flakes	203 (48.0)	86 (20.3)	128 (30.3)	50.54**	High
Corn meal	159 (27.6)	127 (30.0)	130 (30.7)	4.5 ns	Moderate
Abari	104 (24.6)	130 (30.7)	178 (42.1)	20.52**	Moderate
Custard	201 (47.5)	93 (22.0)	120 (28.4)	45.78**	High
Donkunnu	133 (31.4)	110 (26.0)	167 (39.5)	12.03**	Moderate
Donkwa	125 (29.6)	123 (29.1)	159 (37.6)	6.03**	Moderate
Egbo	93 (22.0)	99 (23.4)	220 (52.0)	74.77**	Low
Eko	202 (47.8)	120 (28.4)	92 (21.7)	47.36**	High
Ekuru	82 (19.4)	113 (26.7)	214 (50.6)	69.89**	Low
Elekute	48 (11.3)	106 (25.1)	244 (57.7)	152.8**	Low
Kakara	108 (25.5)	95 (22.5)	201 (47.5)	198.36**	Low
Kokoro	151 (35.7)	87 (20.6)	170 (40.2)	27.80**	Moderate
Kunnu	180 (42.6)	138 (32.6)	95 (22.5)	26.24**	High
Kenke	126 (29.8)	113 (26.7)	165 (39.0)	10.87**	Moderate
Mosa	105 (24.8)	130 (30.7)	177 (41.8)	19.46**	Low
Owowo	66 (15.6)	128 (30.3)	213 (50.4)	80.29**	Low
Ogi (pap)	286 (67.6)	76 (18.0)	65 (13.0)	234.77**	High
Pito	126 (29.8)	100 (23.6)	177 (41.8)	22.84**	Low
Popcorn	178 (42.1)	128 (30.3)	106 (25.1)	19.82**	High
Roast corn	104 (24.6)	183 (43.3)	126 (29.8)	21.15**	Moderate
Semovita	170 (40.8)	151 (35.7)	94 (22.2)	22.61**	High
Tanfiri	91 (21.5)	99 (23.4)	215 (50.8)	71.34**	Low
Wonkpa	29 (6.9)	62 (14.7)	307 (72.6)	347.72**	Low

\* = significant @ P<0.05

\*\* = significant @ P<0.01

ns = Not significant

Source: Field survey (2012)

**Table 3: Effect of Location, gender and occupation on the most frequently**

	Food type					
	Cornmeal	Eko	Kokoro	Kunnu	Ogi	Pop corn
<b>Location</b>						
Rural	36	120	110	108	131	58
Urban	84	56	27	57	109	79
<b>Gender</b>						
Male	70	111	76	92	153	83
Female	84	87	74	87	128	91
<b>Occupation</b>						
Artisan	7	20	11	6	12	12
Civil servants	45	59	47	54	94	45
Farmers	4	24	29	10	27	9
Student	67	45	25	38	76	76
Security men	17	14	11	13	25	13
Traders	19	40	28	24	52	23

**Source: Field survey (2012)**

**Table 4: Consumption Pattern of Maize-based Dishes in Oyo State**

Maize-based dish	Eaten daily Freq (%)	Eaten weekly Freq (%)	Eaten occasionally Freq (%)	Chi square value	Remarks
Aadun	25 (7.0)	19 (5.3)	314 (87.7)	476.5**	Low
Abari/pudding	19 (5.3)	68 (19.0)	271 (75.7)	299.2**	Low
Adalu	48 (13.4)	101 (28.2)	209 (58.4)	112.8**	Low
Boiled maize	123 (34.4)	83 (23.2)	152 (42.5)	20.2**	Moderate
Corn flakes	45 (12.6)	63 (17.6)	250 (69.8)	215.9**	Low
Cornmeal/Tuwo	101 (28.2)	95 (26.0)	162 (45.3)	23.03**	Moderate
Custard	56 (15.6)	93 (26.0)	209 (58.4)	106.8**	Moderate
Donkwa	52 (14.5)	154 (43.0)	153 (42.5)	57.01**	Moderate
Egbo	145 (40.5)	100 (27.9)	113 (31.6)	8.99**	High
Eko	214 (59.8)	65 (18.2)	79 (22.1)	113.5**	High
Guguru	129 (36.0)	90 (25.1)	139 (38.8)	11.24**	Moderate
Kango/Kakara	43 (12.0)	188 (24.6)	227 (63.4)	154.2**	Low
Kokoro	37 (10.3)	48 (13.4)	273 (76.3)	297.3**	Low
Kunnu	62 (17.3)	75 (20.9)	221 (61.7)	130.6**	Low
Mosa	96 (26.8)	101 (28.2)	161 (45.0)	21.93**	Moderate
Owowo	42 (11.7)	37 (10.3)	279 (77.9)	320.6**	Low
Ogi	233 (65.1)	62 (17.3)	62 (17.3)	163.8**	High
Roast maize	97 (27.1)	72 (20.1)	189 (52.8)	63.6**	Low

\* = significant @ P<0.05

\*\* = significant @ P<0.01

ns = Not significant

Source: Field survey (2012)



**Occupation**  
 There was a significant difference ( $P < 0.01$ ) in the consumption of all the six dishes by the professionals that took part in the study. Civil servants consumed Egbo. Farmers consumed Eko, Ogi, Guguru more. Both farmers and civil servants equally consumed Tuwo while traders and people in business consumed boiled maize more.

**Table 5: Effect of location, gender, occupation on the most consumed dishes in Oyo state.**

Food	Egbo	Tuwo	Eko	Boiled maize	Ogi	Guguru
<b>Location</b>						
Rural	81	74	148	67	151	90
Urban	64	27	66	56	82	39
Chi-square	1.99ns	21.87**	31.42**	0.98ns	20.43**	20.16**
<b>Gender</b>						
Male	73	52	104	52	120	59
Female	72	49	109	71	112	69
Chi-square	0.01ns	0.89ns	104.2**	2.4**	113.2**	62.69**
<b>Occupation</b>						
Artisan	7	10	14	10	16	8
Civil servants	42	28	57	23	60	30
Farmers	37	28	63	31	70	41
Students	27	8	26	19	30	23
Trading/business	32	27	54	40	57	27
Chi-square	49.52**	39.02*	77.42**	48.07**	82.63**	42.86**

\* = significant @  $P < 0.05$

\*\* = significant @  $P < 0.01$

ns = Not significant

Source: Field survey (2012)

**Kaduna State**

The consumption pattern of the maize-based dishes from Kaduna state is presented in Table 6. A total of 15 maize dishes were consumed by the respondents in the area under study. The consumption of Alele masara, corn flakes, custard, guguru, kaafa, madidi, semovita and roast corn (gasheshe masara) was low. There was also a significant difference in the consumption pattern of all the dishes ( $P < 0.01$ ). The

consumption of dafefe masara (boiled corn) was high. On the other hand, the consumption of donkwa, koko (pap), kunu, maassa, pete and tuwo was high. There was however no significant difference in the consumption of the dishes ( $P < 0.01$ ) except for donkwa which was significantly different ( $P < 0.05$ ). The highest number of the respondents consumed tuwo (74.6%) while the least consumed dish was custard (1.5%). The effect of location, gender and occupation on the most

consumed dishes on a daily basis was determined. Seven dishes were selected and the result of the analysis is shown in Table 7. The dishes are boiled corn, donkwa, koko, kunu, pete maasa and tuwo.

**Location**

All seven dishes were consumed more in the rural area than in the urban. There was also no significant difference in the consumption pattern of koko, pete, maasa and tuwo. There was however a significant difference in the consumption of donkwa and kunu (P<0.05).

**Gender**

The male respondents consumed more of

all the dishes than the female respondents. The consumption of the dishes based on gender was significantly different (P>0.01) except for boiled maize and kunu which was significantly different at P<0.05.

**Occupation**

The effect of occupation on the consumption of the dishes was comparable. Civil servants consumed koko, donkwa, kunu, pete, maasa and tuwo more than the other professional that took part in the study. The effect of occupation on the consumption of the dishes was significantly different.

**Table 6: Consumption pattern of maize – based dishes in Kaduna state**

Maize-based dishes	Eaten daily Freq (%)	Eaten weekly Freq (%)	Eaten occasionally Freq (%)	Chi-square value	Remarks	
Alele masara	26 (4.2)	110 (17.9)	479	77.9	566.55**	Low
Corn flakes	50 (8.1)	121 (19.7)	444	72.2	430.25**	Low
Custard	9 (1.5)	50 (8.1)	55	90.4	905.6**	Low
Dafefe masara	234 (38.4)	141 (22.9)	240	39.0	30.06**	High
Donkwa	283 (46.00)	136 (22.1)	196	31.9	53.29*	High
Guguru	107 (17.4)	85 (13.8)	425	69.1	355.1**	Low
Kafaa	48 (7.8)	62 (10.1)	505	82.1	659.0**	Low
Koko	396 (64.4)	56 (9.1)	163	26.5	294.1**	High
Kunu	410 (66.7)	115 (18.7)	90	14.6	309.0**	High
Maasa	380 (61.8)	91 (14.8)	144	23.4	230.9**	High
Madidi	13 (2.1)	50 (8.1)	552	89.8	888.4**	Low
Pete	389 (63.3)	101(16.4)	125	20.3	249.1**	High
Semovita	84 (13.7)	130(21.1)	401	65.2	286.3**	Low
Gasheshe masara	107 (17.4)	51(8.3)	457	74.3	472.3**	Low
Tuwo masara	457 (74.6)	92(15.0)	64	10.4	474.0**	High

\* = significant @ P<0.05

\*\* = significant @P<0.01

ns = Not significant

Source: Field survey (2012)

**Table 7: Effect of location, gender and occupation on the most consumed dishes in Kaduna state.**

	Food Type						
	Dafefe masara	Donkwa	Koko	Kunu	Pete	Maasa	Tuwo
<b>Location</b>							
Rural	149	159	205	224	198	199	241
Urban	85	124	191	186	191	181	218
Chi-square	17.50**	4.32*	0.49ns	3.52*	0.12ns	0.85ns	1.15ns
<b>Gender</b>							
Male	132	173	248	223	235	227	275
Female	102	110	148	187	154	153	184
Chi-square	3.84*	14.02**	25.25**	3.16*	16.86**	14.41**	18.04**
<b>Occupation</b>							
Artisan	37	42	46	39	42	45	47
Civil servants	37	45	67	89	64	61	92
Farmers	25	20	34	47	31	32	44
Students	25	33	44	39	44	40	49
Trader/ business	22	24	30	27	31	36	39
Chi-square	11.02*	14.43**	19.17**	48.10*	18.97**	16.43**	34.02**

\* = significant @ P<0.05

\*\* = significant @P<0.01

ns = Not significant

Source: Field survey (2012)

### Federal Capital Territory (FCT)

Table 8 presents the result of the consumption pattern of the maize-based dishes consumed in the FCT. Sixteen (16) dishes were consumed at varying degree in the area under study. The consumption of boiled and roast corn, koko, maasa, semovita, tuwo and dame was high. The consumption of custard, madidi and kunu was moderate. While the least consumed foods were alele masara, cornflakes, donkwa, popcorn, kaafa, and pete. There was a significant difference in the consumption pattern (P. <0.05) of all the foods.

The determination of the effects of gender and occupation on the consumption of the seven most consumed dishes is shown in Table 9.

### Gender

The male respondents consumed all the dishes (boiled and roast corn, koko, maasa, semovita, tuwo and dame) more than the female respondents. There was a significant difference (P< 0.01) in the consumption of the foods based on gender except for boiled corn which was significantly different at P <0.05.

**Occupation**

Results showed that students consumed more boiled corn while the respondents in business consumed more maasa, koko, se-

movita and roast corn. Farmers consumed more tuwo and dame than the other maize-based dishes analyzed. There was a significant difference in all the dishes consumed by the respondents based on occupation.

**Table 8: Consumption Pattern of Maize- dishes in the Federal Capital Territory (FCT)**

Maize-based dishes	Eaten daily Freq (%)	Eaten weekly Freq (%)	Eaten Occasionally Freq (%)	Chi-square value	Remarks
Alele masara	10 (4.0)	99 (39.6)	140 (56.0)	106.43**	Low
Corn flakes	66 (26.4)	34 (13.6)	150 (60.0)	86.14**	Low
Custard	110 (44.0)	34 (13.6)	105 (42.0)	43.54**	Moderate
Dafefe masara/ Boiled corn	158 (63.2)	57 (22.8)	33 (13.2)	1.06**	High
Donkwa	27 (10.8)	60 (24.0)	162 (64.8)	1.19**	Low
Guguru/ Popcorn	37 (14.8)	64 (25.6)	145 (58.0)	1.82**	Low
Kaafa/Eko	38 (15.2)	40 (16.0)	170 (68.0)	1.38**	Low
Koko/Ogi	221 (88.4)	24 (9.6)	4 (1.6)	3.47**	High
Kunu	206 (41.6)	138 (27.9)	151 (30.5)	49.08ns	Moderate
Maasa	153 (61.2)	40 (16.0)	55 (22.0)	91.12**	High
Madidi	66 (26.4)	90 (36.0)	92 (36.8)	5.06**	Moderate
Pete/Fate-fate	53 (21.2)	87 (34.8)	105 (42.0)	17.08**	Low
Semovita	134(53.6)	61 (24.4)	54 (21.6)	47.3**	High
Gasheshe masara/ Roast corn	128 (51.2)	63 (25.2)	58 (23.2)	36.74**	High
Tuwo masara	195 (78.0)	48 (19.2)	6 (2.4)	2.37**	High
Dame	115 (46.0)	40(16.0)	95 (38.0)	36.2	High

\* = significant @ P<0.05

\*\* = significant @P<0.01

ns = Not significant

Source: Field survey (2012)

**Comparative Assessment of Ogi/koko consumers in the 4 agro ecological zones**

Further comparative analysis of ogi showed that it is the most consumed maize-based dish across the four AEZs (Figure 2). Analysis showed that 73.5% (1136) of the

respondents consumed ogi daily, 14.01% (218) consumed it weekly and 18.26% (284) had the food occasionally. Figure 3 shows the result of the analysis of the gender of the consumers of ogi/koko across the AEZs. 50 % of the respondents were male while 41% were females.

**Table 9: Effect of Gender and Occupation on the most consumed dishes in FCT**

	Food Type						
	Dafefe masara	Koko	Masa	Semovita	Soyeye	Tuwo	Dame
<b>Gender</b>							
Male	98	142	100	80	82	123	80
Female	60	79	53	54	46	72	72
Chi-square	9.13*	17.95**	14.44**	5.05**	10.13**	13.34**	17.61**
<b>Occupation</b>							
Artisans	11	11	7	9	8	11	5
Civil servants	22	30	27	21	16	31	13
Farmers	39	59	36	19	27	55	50
Students	44	55	38	37	34	50	25
Trading/business	42	66	48	48	43	45	22
Chi-square	26.37*	47.85**	30.11**	36.0**	30.36**	33.49**	50.35**

\* = significant @ P<0.05

\*\* = significant @P<0.01

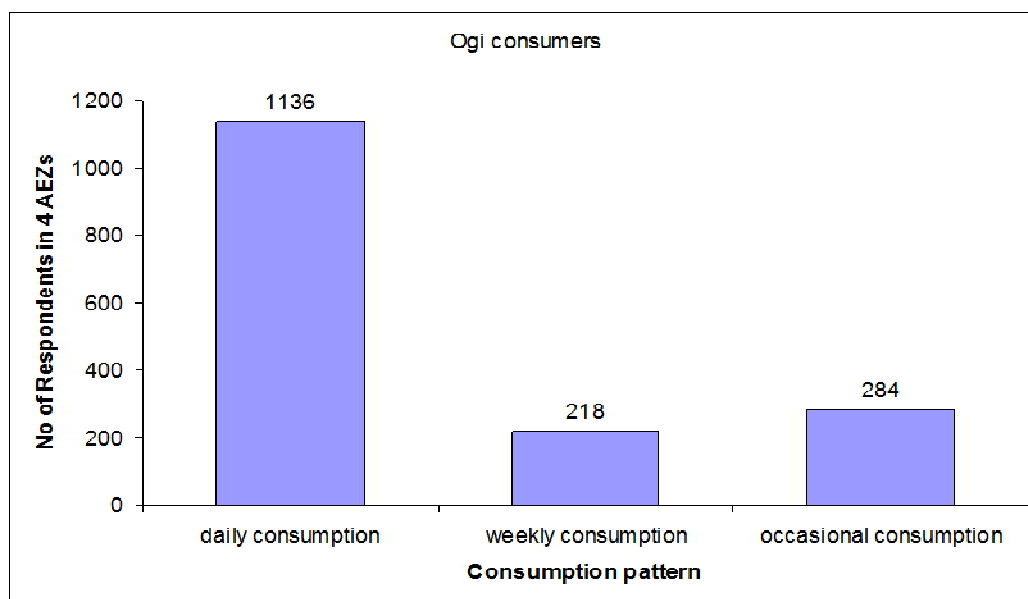
ns = Not significant

Source: Field survey (2012)

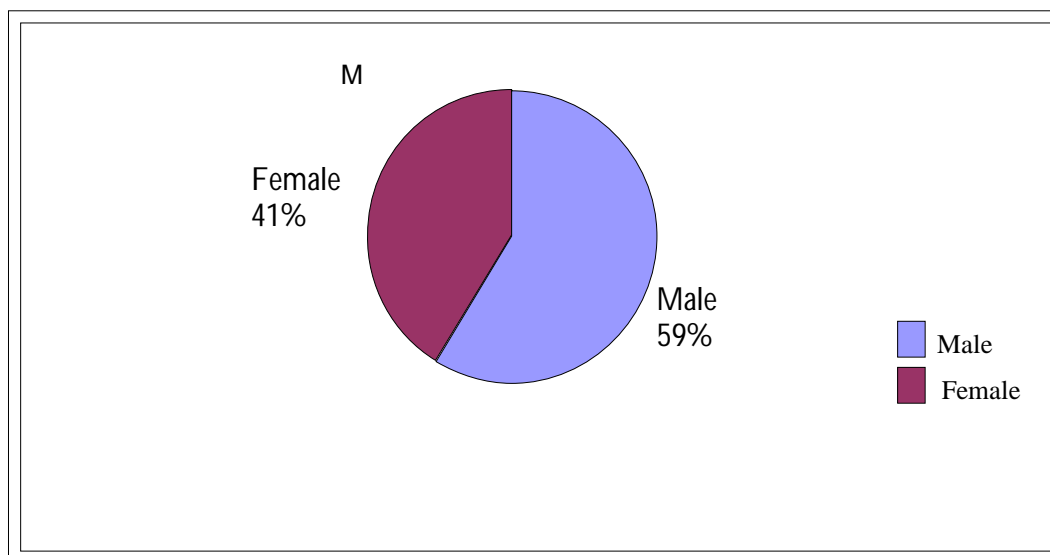
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dents consumed ogi daily, 14.01% (218) consumed it weekly and 18.26% (284) had the food occasionally. Figure 3 showed the result of the analysis of the gender of the consumers of ogi/koko across the AEZs. Fifty nine percent of the respondents were male while 41% were females.



**Fig 2: Consumption pattern of Ogi/Koko in the 4AEZs**  
*Source: Field survey (2012)*



**Fig 3: Ogi consumption in the 4AEZs according to gender**  
*Source: Field survey (2012)*

## DISCUSSION

The relatively high number of maize-based dishes identified and consumed in the AEZs reaffirms the fact that maize is a popular staple food for human consumption in Nigeria. Maziya-Dixon *et al.* (2000), reported in a national food consumption survey that overall, maize was the most frequently consumed staple which was consumed at various numbers of times in a week either as whole grain that has been processed into flour or as green maize. The large number of maize-based dishes consumed may be attributed to the high distribution and lower prices of the grain when compared to other cereals (Okoruwa 1995). The wide range of processing which maize may be subjected to, might also have contributed to the high number of the maize-based dishes identified and consumed. Okoruwa (1995) further observed that in developing countries, maize is a major staple food which per capita human consumption reaches high levels.

However, the number of maize-based dishes identified did not translate to high consumption of the dishes as the study revealed a significantly low consumption pattern of majority of the dishes. This finding corroborates that of Okoh, (1998) who reported a continual decline worldwide in the consumption of maize as nations now turn to relatively cheaper imported rice and wheat product. Some of the reasons could be the emergence of technology, peoples quest for quick and easy to prepare foods and modernization of cultural practices. Abdulrahman and Kolawole (2006) had also observed the decline in consumption of some maize-based dishes such as *Aadun*, *Abari*, *Owowo* etc, which were favourite meals on special occasions like naming ceremonies, *Oro* or *Ogun* festivals and commu-

nity meetings. These could be attributed to the fact that the pattern of these ceremonies have changed in line with modernization. Due to the low consumption of majority of the dishes, Smith *et al.* (2006) had raised concern that the current campaign on mobilizing local biodiversity as one of the food based intervention strategies for solving nutrition problems among population groups may be hampered.

The observed consumption of *Ogi*, as the sole maize-based dish with the highest percentage consumption in all the AEZs and the moderate to high consumption of *Tuwo* (corn meal) agrees with the view of Abdulrahman and Kolawole (2006) who observed that African countries have one or more maize-based dishes that is unique to its cultures. Examples include Nigeria's "Ogi", or pap, Ghanaian "Kenkey", "koga" in Cameroon, 'to' eaten in Mali, 'Injera' an Ethiopian meal and 'Ugali' commonly eaten in Kenya.

The slight variation in the preparation of some of the maize-based dishes, even when they have the same name that was observed in the course of the standardization process agrees with the works of Anthonio and Isoun (2002); Oguntona and Adekoya (1999) who reported remarkable variations in some traditional recipes. These variations in the preparation of the dishes are as a function of socio-economic status, knowledge of nutrition, culture and religious practices.

Finding from the sensory evaluation of the standardized dishes was instructive although all dishes were acceptable statistically there was a significant difference in the varying sensory attributes measured. Donkwa recorded the highest overall rating among all the dishes evaluated organoleptically. Donkwa is a snack prepared from roasted

groundnut, maize, sugar and pepper. Its high score may be as a result of the sweet and peculiar flavour of groundnut and sugar which imparted positively on the taste of the snack.

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