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Proximate Composition of Composite Dishes Commonly Consumed in Imo State, Nigeria

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Abstract

The study determined the proximate composition of composite dishes commonly consumed in the urban areas of Imo State, Nigeria. The study adopted both cross sectional survey and quasi experimental design. The study was conducted in Imo State, Nigeria. The population for the study was households (HH) (urban) in Imo State. There are 848,236 households in Imo State, Nigeria. Multi-stage sampling technique and Taro Yamane's formula for sample size determination was used to derive a sample size of four hundred households studied. A sub-sample (10% of sample size) was randomly selected for weighed recipes measurement/data of the ten most commonly consumed composite dishes in Imo State. Data for the study were collected by the use of focus group discussion (FGD), questionnaire and dietary study (24-hour food recall and weighed food recipe data). The proximate analysis of each of the dishes was determined using standard methods described by AOAC. Descriptive statistics were used to present the variables. The results showed that jollof rice, tomato stew, okro soup, beans pottage, egusi (melon) soup, vegetable soup (edi-kai kong), uha soup (Pterocarpus mildraedii), moimoi, yam pottage and Owerri soup were the commonly consumed composite dishes in Imo State, Nigeria. Proximate composition of the dishes Owerri showed that tomato stew (81.42g), uha soup (82.13g) and okro soup (79.42g) had high moisture contents. Egusi soup (18.94g), moimoi (8.94g) and beans pottage (8.25) had high protein contents respectively. Owerri (20.14g), Vegetable (16.33g) and uha (12.23g) soups had higher crude fibre contents than the other dishes yam pottage (29.73g) and jollof rice (29.12g) had higher carbohydrate contents than the other dishes respectively. Fat content (38.26g) was very high in egusi soup. This study shows that jollof rice, tomato stew, okro soup, beans pottage, egusi (melon) soup, vegetable soup (edi-kai kong), uha soup (Pterocarpus mildraedii), moimoi, yam pottage and Owerri soup were the most commonly consumed composite dishes in Imo State, Nigeria and these dishes had appreciable proximate values which can maintain life and sustain growth. The study recommends that results from this study should be added to the food composition data base of the nation to aid food consumption studies in the area studied.

Keywords: *Composite dishes, Food composition, Nutrients*

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Background to the Study

Nigeria is a nation with ethnical and culturally diverse food consumption patterns in the different ecological zones. Many people consume different types of foods with different accompaniments. Urbanization has created changes in food consumption patterns with more processed foods being available in the cities. Rapid changes in, and expansion of the food supply has made it imperative to know what people eat as a basis for understanding the relationship between diet and disease thus developing realistic nutrition education programmes and appropriate dietary counseling. Various dishes based on different plant foods are consumed and enjoyed by the people of Imo State. These dishes are prepared from such foods as cowpea (*Vigna unguiculata*), maize (*Zea mays*), yam (*Discorea spp*), African oil bean seed (*Pentaclethra macrophylia*) (*ugba),* cassava (*Manihot spp*), cocoyams (*Colocasia spp* and *Xanthosoma maffafa*), plantain (*Musa paradisiaca*), rice (*Oryza sativa*) among others. Most of the dishes have local variations and include ingredients available in the locality which may have different names according to the community. Each community in Imo State is known for her particular dish/dishes which are prepared from their locally available foodstuffs. These foodstuffs are not consumed as single foods; they are prepared and consumed in composite forms as composite dishes.

A composite dish is a dish made with more than one ingredient (Sharma, Mbanya, Cruickshank, Cade, Tanya, Cao, Hurbos & Wong, 2007). Composite dishes are dishes that comprise more than one distinct ingredient. They are dishes consumed as main meals (lunch or supper) whose preparation involves cu linary skills that contain ingredients from at least three of five main food groups. Composite dishes are made by combining different ingredients or constituents to form a whole. They can be in the form of soups, stews, pottage, salads among others, with their accompaniments.

Link between dietary patterns and lifestyle related chronic diseases such as hypertension, cardiovascular diseases and certain types of cancer have been well established. There is an increasing interest in studying the relationship between diets and diseases in Nigeria especially those referred to as diet-related non-communicable diseases such as obesity, diabetes mellitus, cardiovascular diseases, ischemic heart disease and chronic respiratory diseases among others (World Health Organization (WHO), 2014). Their prevalence is on the increase worldwide and in Nigeria due to rapid urbanization, globalization and life style (dietary) changes. WHO global status report on non-communicable diseases (NCDS) listed Nigeria and other developing countries as the most hit with deaths from NCDs. The burden of non - communicable diseases is rising in both urban and rural communities.

Consuming a nutrient dense diet was associated with a low risk of all causes of mortality (Streppel, Sluck, Van Ypercn, Geelen, Hoffman & Franco, 2004). Consumption of healthy diets and physical activity are keys to good nutrition and necessary for a long and healthy life. Eating nutrient dense foods and balancing energy intake with the necessary physical activity to maintain a healthy weight is essential at all life stages (WHO, 2017). The amount of food one eats is as important as the quality of the food, and to maintain the best nutritional status, an individual's diet must be adequate both in quantity and quality. Proper selection of foods

ensures good health. The foods that contain all the nutrients in the right proportions are adequate diets. Adequate, optimal and good nutrition are expressions used to indicate diets that are adequate in both quality and quantity of the nutrients. This implies that the utilization of such nutrients in the body precipitates the highest level of physical and mental health maintained throughout the life cycle (Mudambi & Rajagopal, 2007).

The knowledge of nutrient composition of foods is quite essential in dietary treatment of diseases or in quantitative study of human nutrition. There are different food composition tables that are used in nutritional studies in developing countries, although there are gaps in terms of composite dishes. Most food composition tables provide information on single foods rather than composite foods which is the most usual form in which foods are consumed in Nigeria. Knowledge of the chemical composition of foods is the most essential in the dietary treatment of diseases or in any quantitative study of human nutrition. However, due to increasing levels of sophistication and complexity in nutrition science, there is a greater demand for complete, current and reliable food composition data (FCD), together with information on a wider range of food components, including bioactive compounds. A culturally specific up to date food composition table is essential for the analysis of the energy and nutrient content of each composite dish consumed in Nigeria and Imo State. Unfortunately, there is dearth of information on nutrient composition of composite dishes. The study thus determined the nutrient composition of composite dishes commonly consumed in urban areas in Imo State, Nigeria.

Objectives of the Study

The broad objective of the study was to determine the proximate composition of composite dishes consumed in urban areas Imo State, Nigeria.

The Specific Objectives of the Study Were to:

i. Ascertain the background information of the respondents in the urban households in Imo State by use of questionnaire;
ii. Ascertain and compile composite dishes consumed in urban areas in Imo State using focus group discussion (FGD) and 24-hour dietary recall;
iii. Determine the proximate composition of the ten most commonly consumed composite dishes in urban areas in Imo State using chemical analysis;

Materials and Method

Study Area: The study was conducted in Imo State, Nigeria. Imo State is one of the 36 states of Nigeria and lies in the South Eastern part of the country with Owerri as its capital and largest city. Imo State came into existence in 1976.

Study Design: The study adopted both cross sectional survey and quasi experimental design.

Population for the Study: The population for the study was households (HH) in Imo State. There are 848,236 households in Imo State, Nigeria (National Population Commission (NPC), (2007).

Sample Size and Sample Size Calculation: Imo State is made up of 848,236 households. Due to the fact that this population is a finite one, Taro Yamane's (1967) formula for sample size determination was used to derive a sample size of four hundred households.

Thus $n = N/1+N(e)^2$
Where n = the sample size
N = the finite population
e = the level of significance
1 = a constant

Substitute numbers in formula:

$$n = \frac{848236}{1+848236(0.05)^2}$$

n=399.81 =400 households.
Five percent of the sample size was added to make room for attrition. 5% of 400 = 20. 400+20 = 420.

Sampling Techniques: Multi-stage sampling technique was used to select the households to be studied. The three senatorial zones in Imo State (stage one) were used for the study. Orlu senatorial zone has 12 LGAs, Owerri senatorial zone has 9 LGAs and Okigwe senatorial zone has 6 LGAs. Four LGAs were proportionally selected from Orlu zone, three LGAs from Owerri zone and two LGAs from Okigwe senatorial zone (stage two). One LGA headquarter were randomly selected from each LGA selected for this study, totaling nine LGA headquarters (stage three). Forty-four households were randomly selected in each sector (stage four) to get a total of 396 households for the study. Taro Yamane's formula for sample size determination was used to derive 420 households for the study but 396 households were used (those who gave their consent and who have an adult female in charge of food preparation) for the study.

Inclusion Criteria: The households with adult females in charge of food preparation who gave their consents were selected for the study.

Exclusion Criteria: Households without adult females in charge of food preparation were not selected for the study.

Table 1: List of selected Local Government areas and urban communities in Imo State

Senatorial zones	Local Government Areas	Urban communities
Orlu zone	Ohaji/Egbema	Mmahu-egbema
	Orlu	Orlu
	Nkwerre	Owere nkwoji
	Nwangele	Amaigbo
Owerri zone	Owerri municipal	Owerri city
	Ikeduru	Iho
	Owerri North	Urattta
Okigwe zone	Onuimo	Okwe
	Ihitte Uboma	Isinweke

Sub-Sample Determination: A sub-sample (10% of sample size) was randomly selected for weighed recipes measurement /data of the ten most commonly consumed composite dishes in urban areas in Imo State

Recruitment and Training of Research Assistants: The researcher recruited and trained two research assistants from each senatorial zone totaling six research assistants to help in data collection.

Methods of Data Collection: Data for the study was collected by the use of focus group discussion (FGD), questionnaire and dietary study (24-hour food recall and weighed food recipe data).

Questionnaire: A semi-structured validated questionnaire comprising different sections: general households' characteristics, food consumption frequency and 24-hour recall was developed to elicit information on the different sections. The questionnaire was pre-tested for reliability on the households in the communities that were not used for the study and the alpha reliability coefficient was 0.83. The questionnaire was administered to any adult female in the households selected for the study.

Focus Group Discussion: The focus group discussion (FGD) was used to compile the composite dishes consumed in each community selected for the study. The focus group discussion comprised small groups of about 6-10 adult women and each session lasted between 45-60 minutes. The researcher moderated the focus group discussion, a tape recorder was used to get a verbatim report.

24-hour Dietary Recall: Each female adult in the house hold selected for the study was required to recall the composite dishes consumed in the last 24 hours. The 24-hour recall was used to select the 10 most commonly consumed composite dishes in the selected areas.

Weighed Food Recipe Measurement: The dishes were prepared by members of the focus group discussion (sub sample) in their homes. Ingredients and the quantities used for the preparation of the composite dishes were weighed using electronic kitchen scale and their weights recorded by the researcher and her assistants in a proforma prepared for the study. The dishes were prepared after the measurements and the weight of prepared food recorded.

Homogenization of the Recipes: Five samples of each composite dish were homogenized using a Kenwood model BL440 blender. The homogenized sample of each dish was packaged with a sterile plastic container, labeled and sent to the laboratory.

Chemical Analysis: Samples of dishes weighed during the weighed food recipe data measurement were collected and frozen at zero degrees centigrade for chemical analysis. All nutrients were analysed in triplicates. Analysis was done for protein, fats, carbohydrates, energy, ash, moisture

Proximate Analysis: The proximate analysis of each sample produced was determined using methods described by AOAC (2005).

Determination of Energy: Energy was calculated using Atwater factors of 4, 9, 4 for protein, fat and carbohydrate, respectively (FAO, 1968).

Statistical Analysis: Descriptive statistics such as frequency, percentage, mean and standard deviation were used to present the variables.

Results

Commonly Consumed Composite Dishes from FGD Report in Imo State, Nigeria.

The focus group discussants reported that jollof rice, yam pottage, beans pottage, tomato stew, moimoi, different types of traditional soups which included vegetable soup (*edi-kai kong*), *egusi* (melon) soup, *okro* soup, *uha* soup (*Pterocarpus mildraedii)*, Owerri soup, *banga* soup, among others as the most consumed composite dishes in Imo State. Other dishes not commonly consumed included *ukwa* pottage (breadfruit), plantain pottage, yam pepper soup, yam with palm oil, tapioca salad, oil bean salad, cocoyam pottage, beans and rice, beans and corn pottage.

Background Information of the Urban and Rural Respondents

Table 2 presents the background information of the respondents. The respondents were within the age group of 42-59 years (31.31%) and 34-41 years (26.77%). Majority of the respondents were mothers (75.76%). Mothers were also mostly in charge of food preparation in the urban (72.73%)

Table 2: Background information of the respondents in the households

Variables	Number	Percentage %
Age (years)		
18-25	40	10.10
26-33	68	17.17
34-41	106	26.77
42-59	124	31.31
>60	58	14.65
Total	**396**	**100**
Position of respondents in the household		
Mother	300	75.76
Female house help	45	11.36
Adult relation	51	12.88
Total	**396**	**100**
Person in charge of food preparation		
Mother	288	72.73
Children	47	11.87
House help/other adults	61	15.40
Total	**396**	**100**

Socio-Economic Characteristics of the mothers

Table 3 presents the socio-economic characteristics of the mothers in the selected areas. Among the respondents, 41.6% and 24.8% were HND/BSc/B.Ed holders, respectively. The household's monthly income of 38.7% of the urban respondents was ≥₦66,000.0 while 55.0% of the rural respondents earned ₦10,000 - ₦25,000. Among the urban respondents, 36.5% were teachers and 45.4% of the rural respondents were traders. The household size of majority of the urban respondents (51.7%) and some of the rural respondents (47.7%) was 4-6.

Table 3: Socio-economic characteristics of the respondents

Variables	Number	Percentage %
Educational qualification of respondents		
FSLC	26	6.57
NCE/OND	132	33.33
HND/B.Sc./B.Ed	158	39.90
M.Sc/M.Ed	60	15.15
Ph.D	20	5.05
Total	**396**	**100.00**
Household monthly income of respondents		
N10,000-N25,000	102	25.76
N26,000-N45,000	64	16.16
N46,000-65,000	82	20.71
>66,000	148	37.37
Total	**396**	**100.00**
Occupation of respondents		
Teaching	140	35.35
Trading	88	22.22
Civil service	94	23.74
Unemployed	74	18.69
Total	**396**	**100.00**
Household size		
1-3	76	19.19
4-6	204	51.52
>6	116	29.29
Total	**396**	**100.00**

Consumption frequencies of composite dishes consumed in Imo State using 24-hour dietary recall

Fig.1 presents the composite dishes commonly consumed in communities in Imo State, Nigeria. The fig. shows that the ten most commonly consumed composite dishes in Imo State included jollof rice (75%), tomato stew (71%), okro soup (67%), bean pottage (65%), egusi soup (65%), vegetable soup (60%), uha soup (58%), moi moi (57%), yam pottage (53%) and Owerri soup (44%).

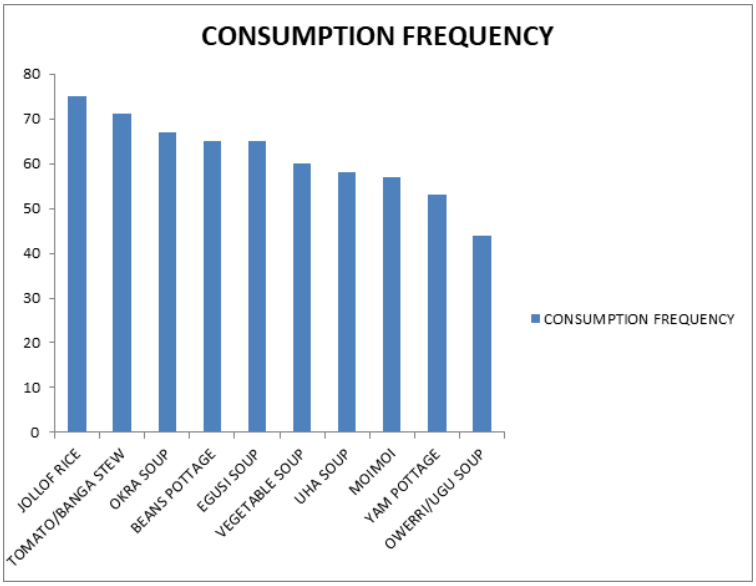

Fig.1: Ten most commonly consumed composite dishes in Imo State

Energy and proximate composition of the composite dishes

Table 4 shows the energy and proximate composition of the composite dishes consumed in the urban areas per 100g. Moisture contents of uha soup and tomato stew were 82.13g and 81.42g respectively. Egusi soup and moimoi had ash contents of 1.34g and 1.10g respectively. Protein contents of Egusi soup, moimoi and beans pottage were 18.94g, 8.94g and 8.25g respectively. Fat contents of egusi soup and tomato stew were 38.26g and 8.06 respectively. Vegetable soup and uha soup had crude fiber content of 16.33g and 12.23g respectively. Carbohydrate and energy values of jollof rice were 29.12g and 197.81kcals respectively

Table 4: Energy and proximate composition of the composite dishes consumed in urban and rural areas per 100g

Dishes	Jollof rice	Tomato stew	Okro soup	Beans pottage	Egusi soup	Vegetable soup	Uha soup	Moimoi	Yam pottage
Nutrients									
Moisture (g)	56.16±0.02	81.42±0.02	79.42±0.03	68.13±0.03	56.19±0.02	73.57±0.34	82.13±0.02	68.05±0.06	64.57±0.05
Ash (g)	0.27±0.02	0.33±0.03	0.90±0.03	1.04±0.05	1.34±0.02	1.00±0.10	0.49±0.02	1.10±0.04	0.80±0.06
Protein (g)	6.18±0.02	6.14±0.02	7.02±0.01	8.25±0.02	18.94±0.03	4.43±0.05	2.96±0.03	8.94±0.01	2.13±0.00
Fat (g)	6.29±0.02	8.06±0.01	2.17±0.03	4.53±0.02	38.26±0.01	2.67±0.02	2.04±0.01	2.92±0.02	2.10±0.01
Crude Fiber (g)	1.99±0.08	2.01±0.01	8.72±0.08	6.12±0.01	7.34±0.04	16.33±0.03	12.23±0.03	3.29±0.02	0.60±0.02
Carbohydrate (g)	29.12±0.15	2.04±0.03	1.78±0.07	6.12±0.01	7.93±0.05	2.00±0.39	0.14±0.05	15.69±0.05	29.73±0.06
Energy (Kcal)	197.81	105.26	54.73	135.92	451.82	49.75	30.76	124.8	146.34

Discussion of Findings

Background Information and socio-economic characteristics of respondents

The ages of the respondents were 34-59 years, indicating that the respondents were young and middle-aged women. The women were mothers and also were in charge of meal preparations

in their various homes. This result agrees with Mills, White, Wrieden, Brown, Stead and Adams (2017) who stated that part of the mother's duties in the family is to provide meals for her household particularly healthy and nutritious meals. Also, Adepoju, Ogunniyi and Adedeyi (2015) observed that one of the major roles of women in the households is purchasing, processing and meal preparation to ensure the well- being of the members of their households.

All the respondents were literate with first school leaving certificate as the lowest qualification. This shows that women in Imo state have moved from the level of illiteracy observed in earlier years to a level of literacy. This agrees with Onuoha, Ibeanu and Chiekwu (2011) and Acha (2014) who found a high educational attainment by South Eastern Nigerian women. Berker, et al (2013) stated that there is a remarkable boom in higher education particularly of women. The households earned above N66,000 per month. This is similar to the observation of Sanusi et al. (2015) who reported that urban households earned above N50,000 per month. Olodu et al. (2019) also observed that 93.7% of households in an urban setting in Southwestern Nigeria earned above N20,000 per month.

The respondents were mainly civil servants and traders. This result is in line with the findings of Onimawo, Ukegbu and Abaoja (2007) who reported that 38% of the women studied were civil servants/ teachers in the urban areas of Abia state. Ukegbu e t al. (2012) reported that 51.9% of the mothers in the urban setting were civil servants and 37.0% were traders/artisans. The household size of 4-6 seen in majority of the households was similar to the report of Sobo et al. (2016), they reported that 45% of their respondents had a household size of 4-6. Dada (2019) observed that 40.8% of his respondents had a household size 4-6. This household size is expected because Africans especially the Igbos love many children and enjoy good brotherliness seen in the practice of extended family system.

Frequency of Consumption of the Composite Dishes

The results in table 3 on the frequency of consumption of composite dishes agree with the works of Oguizu (2015) who observed that 98% of his respondents consumed rice most frequently than any other food. Maziya-Dixon et al. (2006) also observed rice as the most consumed food in southeast Nigeria. It has become a very popular food in recent times. It is fast replacing many traditional dishes like yam, beans and soups.

Nutrient content of the Composite dishes (non-soups dishes): Jollof rice, beans pottage, yam pottage, and moi-moi.

Moisture content of the non-soup dishes was high. This indicated that the dishes were perishable and susceptible to micro-organisms attacks. This result agrees with the works of Ngozi et al. (2017), Otitoju et al. (2015) and Sharma et al. (2007) who found moisture contents of non- soup dishes between 58g and 73g. Beans pottage and moimoi studied in the areas were rich in protein. Beans used in the preparation of beans pottage and moi-moi were legumes and were important source of protein (20-30%) (Lakshmi, Ramadas, Creetha & Begum, 2010). This result is similar to the findings of Otitoju, Otitoju, Nwamarah and Baiyeri (2015) who found protein content of 4.62g-8.47g in beans pottage dishes prepared with

different varieties of cowpea. Jollof rice also had high protein content as presented in table 4 Rice is predominantly a starchy food though it contributes useful quantities of protein, vitamins, minerals and fibre. The protein contents of the jollof rice may be attributed to the quality and quantity of protein rich ingredients used in their preparation such as meat, fish, crayfish, among others. This result is similar to the results of Ngozi et al. (2017) who found protein contents of 7.76g for jollof rice consumed by undergraduates in Oyo state. Yam pottage had low protein content (Table 4.). It should be noted that yam is a starchy tuber with relatively low protein content and has a poor amino acid source. Most people in Imo State prepare yam with mostly palm oil, salt and pepper with little or no animal protein. The low protein content of yam pottage was also observed by Sanni, Oguntona, & Sanni (1990) who observed a protein content of between 0.24g and 2.33g in different yam dishes. Carbohydrate and energy values of the non-soup dishes were high, between 11.96g and 29.73g in the areas studied. Yam, rice and beans are staples commonly consumed in Imo State and are energy giving foods. This result is in line with the findings of Ngozi et al. (2017) who observed high (yam pottage 16.42g; beans pottage 19.33g; moimoi 31.10g and jollof rice 29.21g) carbohydrate contents of yam, beans, and rice dishes studied. The non-soup dishes were able to meet the carbohydrate and daily energy requirements of healthy individuals.

Fibre contents of the dishes were between 1.60g and 4.53g. This result is higher than the results of Ngozi et al. (2017) who observed crude fibre contents of 0.75g for moi moi, 0.77g for jollof rice, 1.43g for beans pottage and 1.55g for yam potage. Fat content was between 2.10g and 6.29g. This result is similar to the fat content result of bean pottage (6.94g) and yam pottage (2.06g) by Ngozi et al. (2017) but higher than their findings in jollof rice (3.90g) and lower than their results in moi-moi (11.88g) respectively.

Nutrient content of the composite dishes (soups dishes): Tomatoes stew, Okoro soup, Egwusi soup, Vegetable soup and Oha soup. Soups consumed in Imo state just like every soup consumed in Nigeria vary in complexity. This is because they are made with multiple ingredients of varying proportions and types as well as varied methods of preparations. The observed variations in the nutrient contents of commonly consumed soups in this study confirm the observation made by Ene-Obong, Sanusi, Udenta, & Williams (2013) in their study of commonly consumed dishes in the six geo-political zones in Nigeria. They observed that variations in nutrient contents of dishes are attributable to the use, type, and quantity of animal protein and the use of vegetables and thickeners in their preparations. Based on the data presented in table 4, it was observed that the moisture content, protein source and quantity/type of ingredients and thickeners used appeared to cause the greatest variations in the energy and nutrient contents of the soups.

Moisture contents of the soups were high. This presupposes their easy spoilage and susceptibility to microbial attack. This is in line with observations of Kayode, Ozumba, Ojeniyi, Adetuyi and Erukainure (2010) who reported that Nigerian soups had high moisture content between 63g in egusi soup to 90g in ewedu soup. Egusi and okro soups had high protein contents the rest of the soup dishes were low in protein contents. Egusi soup is a

legume rich in protein and other nutrients. The protein contents of egusi and okro soups could be attributed to the quantity and quality of protein ingredients used in the preparation of these soups. This result is not similar to the observations of Mustapha (2013), who observed high protein content of all the soups consumed by postpartum mothers in Nigeria (23-30g) but similar to the observations of Ramdath, Hilaire, Brambilla and Sharma (2011) who observed a varied protein contents of the soups studied (2.5 g in corn soup, 1.6 g in pumkin talkari soup and 4.1g in fried ochro soup) in Trinidad. In general, soups need to be combined with other foods of high protein value in order to meet individuals' protein needs (Ejoh, Mbiapo, & Fokou, 1996).

Owerri, vegetable and uha soups had higher crude fibre and dietary fibre content than egusi and okro soups. This suggests that owerri, vegetable and uha soups are good sources of fibre compared to the other soups. The fibre content of the soups is very much higher than the observations of Mustapha (2013) who observed fibre content of dishes between 1.64g to 1.70g but similar to the observations of Obiakor-Okeke, Obioha and Onyeneke (2014) who observed fibre content of between 8.20g to 13.72g in traditional soups consumed in Igbere community in Bende L.G.A Abia State Nigeria.

Egusi soup had high fat content while the other soups had moderate fat contents. The high fat content of egusi soup is mostly attributed to the high fat content of melon seeds and the amount of palm oil used in the preparation of the soup. This result agrees with the study of Mustapha (2013) who reported that traditional soups have high fat content (43g-53g). Ani et al. (2011) observed that a typical Nigerian dish is generous in fat. Ash contents of the soups ranged between 0.27g to 1.34g. This result is lower than the findings of Kayode et al. (2010) who found ash content of soups between 1.36g in beans and vegetable soup to 6.05g in ogbono soup of south-south geopolitical zone, Nigeria. Ash content of a dish represents the inorganic or mineral constituent of that dish. All the soups were generally low in carbohydrate except egusi soup that had 7.34g and 7.13g. This will contribute to the energy value of the soup. The poor carbohydrate thus poor energy value of the other soups may be attributed to the fact that the soups were prepared with little or no quantities of carbohydrate-based ingredients like thickeners such as *ukpo* (*Mucana urens*) *ofor* (*Deuterium microcarpum*) *achi* (*Brachystegia eurycoma*) and cocoyam. Vegetable and okro soups were not prepared with any thickner. These soups cannot provide the energy needs of individuals when consumed. Fortunately, soups are not consumed in isolation particularly in Imo State and Nigeria in general; rather they are consumed with carbohydrate-based dishes like cassava fufu, *eba* (garri) and wheat fufu among others. The low carbohydrate content of the soups is similar to the observations of Ngozi, Sanni, Adeoye and Akinlade (2017) who reported a low carbohydrate content of soup (7.07g) in vegetarian meals consumed in Ogun state. It is also similar to the works of Sanni et al. (1999) who found the carbohydrate contents of vegetable soups in different locations in Abeokuta between 1.11g to 1.97g. Egusi soup was of very high energy value unlike the other soups. This may be as a result of high fat and carbohydrate content of melon seed. This result is similar to the findings Ngozi et al. (2017) who observed energy value of egusi soup as 215.15 kcal. Sharma et al. (2007) found high energy value of Cameronian soups (Keleng keleng 637 kcal, okra pod soup 153 kcal, groundnut soup 250 kcal and yellow soup 144 kcal).

Conclusion

This study shows that jollof rice, beans pottage, yam pottage, moi-moi, tomato/*banga* stew, okra soup, *egusi* soup, vegetable soup, *uha* soup and Owerri soups were the ten most commonly consumed composite dishes in Imo State, Nigeria. Most of the dishes had appreciable energy, proximate, vitamins and mineral values. This shows that nine composite dishes commonly consumed dishes were able to maintain growth reduce malnutrition especially the risk of non-communicable diseases in the State.

Recommendations

This study has presented the proximate composition of the ten most commonly consumed composite dishes in the urban areas of Imo State, Nigeria. Most of the dishes were of high nutritional quality.

Based on the findings, the following recommendations were made,

i. The results from this study should be added to the food composition data base of the nation to aid food consumption studies in the area of study.
ii. There should be similar studies on commonly consumed composite dishes in other states in Nigeria for comparison.
iii. There should be increased advocacy for food diversification in order to increase consumption of micronutrient rich foods by individuals in Imo State as well as in Nigeria.

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