

THE EVALUATION OF PROXIMATE COMPOSITION AND SENSORY PROPERTIES OF SELECTED LOCAL DISHES IN OSUN STATE

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Abstract

The study evaluated the proximate (moisture, ash, fiber, protein, fats and carbohydrate) composition of selected local dishes commonly consumed in Osun State, Nigeria. The dishes were prepared following their traditional methods of preparation. The proximate nutrient were determined according to AOAC (2005). The result revealed that moisture content ranged from 47.32 ± 0.02 to 56.41 ± 0.11 . The ash content was between 1.64 ± 0.25 to 5.32 ± 0.02 . The crude fiber content ranged from 0.57 ± 0.02 to 2.04 ± 0.02 . The protein content range from 5.06 ± 0.11 to 12.54 ± 0.02 . The fats content was between 4.93 ± 0.25 to 10.21 ± 0.01 . The carbohydrate content range from 21.79 ± 0.04 to 33.51 ± 0.02 . There were no significant difference ($P \leq 0.05$) the result of sensory evaluation showed that all the dishes had overall acceptability score of 7.20 to 7.80 on a nine point hedonic scale. This study has showed that local dishes consumed in Osun State are good sources of protein, carbohydrate, fats and moderate sources of crude ash, fiber and high moisture content. Awareness of the nutritional quality of these local dishes will enable a person to make wise choices when selecting food thereby reducing malnutrition.

Keywords: Evaluation, Proximate Composition, Sensory Evaluation and Local Dishes.

INTRODUCTION

Local food refers to food and dishes that are passed to generations and also refers to foods consumed over long term duration of civilization that have been passed through generations. According to the 2008 food, conservation and energy Act, Local dishes includes food produced within 400 miles of its origin (Hand and Martinez 2010). Generally, local dishes are foods sourced from nearby producers and farmers. Traditional foods are foods produce locally which form part of the food culture inherited in locality and are grown for food within the farming systems operating in any particular locality (Trichopoulou 2007). Traditional foods play an important role in local identity, consumer behavior, and transfer of cultural heritage with the rest of the world. In many countries, the promotion and protection of traditional food is directed through quality, agricultural and special policies. Local foods are protected by registering them in accordance with relevant laboratories. Due to the effects they have, traditional foods need to be examined from the producers, consumers and marketers perspectives. Traditional foods beyond being elements to be protected, have also become

important instrument in marketing. In fact, considering the cost of developing new products in marketing, traditional foods form a potential in terms of product diversification.

The value of traditional foods as an element of cultural heritage and their protection is important. Traditional food systems also refer to the human managed biophysical systems that are involved in the production, distribution and consumption of food in a particular environment, improvement in the food systems have been found to greatly reduce hunger, improve income and reduce malnutrition and the related disease conditions in so many countries (Enefiok, 2016).

WHAT ARE THESE LOCAL FOOD SYSTEMS

According to Onimawa, (2010) there are two groups of local foods

First, those consumed in the areas where they are grown as traditional dietary staples for example cassava, yam, cocoyam, sweet potato, (*Ipomoea Batatas*), plantains (*Musa Paradiaca*) and maize/

The second group is made up of those consumed as a component of accompanying relishes and sauces. These include oil seeds, fruits and vegetables

ROOTS AND TUBERS

Carbohydrate (Olawunmi et al., 2012) supplies quick source of metabolisable energy (Onimawa 2010) examples are cassava, yams, cocoyam- these are mainly produced and consumed in the humid savannah and rain forest agro-ecological zones. Products from roots and tubers include Amala, Garri, Porridge, Pounded yam, Tapioca, Ebiripo, Ikokore etc.

CEREALS AND LEGUMES

Cereals and Legumes (Galiant, 1999) are an essential items in Nigeria, examples includes sorghum, millet rice, cowpeas etc. Food product from cereals and legumes are boiled rice, boiled beans, marshed beans, moin moin, akara, gbegiri, corn food, pap, eko/agidi, ekuru etc.

FRUITS AND VEGETABLES

Fruits are described as the ripened seed of plants and the adjoining tissues which house them. They are commonly used as desserts. Vegetables are the leafy outgrowth of plant or part of plants that are used in making soups or eaten with principal part of meal. In southern Nigeria, leafy vegetables are grouped into cultivated leafy vegetables such as pumpkin, green (spinach), bitter leaf, ewedu, water leaf etc, and semi-wild vegetables which grow wild in the bush but are now protected and grow in the home garden e.g utazi, uziza, atama etc. (Adeniyi 2014, Onimawa 2010). Certain worked showed that traditional Nigerian foods fed to children 3-5 years supply adequate energy (101.24%) but deficient in some micro nutrients.

Over 80% of protein intake came from plant proteins. However, when meals were prepared from traditionally available foods for children 3-5 years, the result showed adequate intake of energy, protein and some micro nutrients. Traditional foods contributed over 90% of the energy, protein, thiamin, niacin ascorbic acid. Among the traditional foods, cereal made the most significant contribution to energy (31.1%) and niacin (39.9%). Legumes made the

highest contribution to protein (16%). Calcium intake came from vegetables (16.8%) and legumes (16.0). However, about 26.5% of the iron came from cereals this was followed by legumes (26.3).

Thiamin and riboflavin came mainly from nuts and seeds (33.9% and (29.9), the bulk of the ascorbic acid came from starchy roots and tubers.

The energy, protein, calcium, iron, riboflavin, and niacin intakes of school children 6-12 years were low.

Starchy roots and tubers contributed most of their energy intake (29.7%) this was followed by legumes (23.9%). The bulk of the protein, calcium and iron came from legumes (44.1%, 18.28% and 37.9%). Vegetables contributed only about 14.7% of the total vitamin A intake. Red palm oil has the major source of vitamin A (71.5%) vegetables were also a significant contributor of thiamin (34.8%) and riboflavin (31.9%). Nuts and seed were also contributors of riboflavin (30%), Niacin was derived mainly from legumes (28.4%), cereals (25.9).

Low consumption levels of traditional fresh fruits and vegetables contribute significantly to micro nutrient deficiency. Total Nigeria diet is plant based with little contribution made by meat and their products. Traditional foods are high in moisture, bulky and low in density. (Onimawa, 2010).

Proximate composition is the term usually used in the field of feed/food and means the six components of moisture, crude protein, ether extract, crude fiber, crude ash and nitrogen free extracts, which are expressed as the content percentage (%).

Sensory or organoleptic analysis of food is a scientific study used to evoke, measure, analyze and interpret reactions to those characteristics of foods and materials, as they are perceived by the sense of sight, smell, taste, touch and hearing. Sensory analysis of food is usually based on hedonic scale, which is a scale upon which degree of liking and disliking is recorded. The hedonic scale indicates likes or dislikes for a specific characteristics of food such as color, flavor and texture; it does not indicate change in Intensity of those characteristics. The organoleptic qualities - flavor, color and texture - are perhaps the most important characteristics of foods because they are the attributes the consumer can readily assess (Ihekoronye & Ngoddy, 1985).

STATEMENT OF PROBLEM

Nourishing foods are soul's complement. People ignore local dishes or traditional food because they lack knowledge of nutritive value of the food. Secondly, those that are knowledgeable on nutritive value of food in Osun State are unable to buy because of inadequate finance due to the fact that Osun State government owes her citizens salary for a very long time and lastly poverty and recession makes food items not readily available on the table thereby causing malnutrition.

PURPOSE OF THE STUDY

This study purpose is to determine the nutritional content and sensory properties of the local dishes prepared and consumed in Osun state. This nutritional information will enable a person to make a wise choices when selecting food thereby reducing malnutrition.

BROAD OBJECTIVE

The objective of this study is to evaluate the proximate composition and sensory properties of selected local dishes in Osun state.

SPECIFIC OBJECTIVES

1. To know the level of acceptability of the local dishes using organoleptic evaluation of the dishes.
2. To know the nutritional content of the dishes using proximate analysis.

NUTRITION

The Council on Food and Nutrition of the American Medical Association defines nutrition as the science of food, the nutrients and the substances therein, their action, interaction and the balance in relation to health and disease, and the process by which the organism ingests, digests absorbs, transports, utilizes and excretes food substances. Nutrients come from food. Which provides both the energy and materials needed to build and maintain all body cells. Nutrients are the nourishing substances we must obtain from food. (Gordon M. Wardlaw & Margaret Kessel, 2002).

CARBOHYDRATES

Carbohydrates are compounds which contain carbon, hydrogen, and oxygen. They are the main sources of energy for our body and the only source of energy for our nervous tissues on average 4kcal per gram (kcal/g).

Carbohydrates are mainly distributed among plant foods with few exceptions like glycogen, lactose, and ribose which are present in muscles or in liver, human milk and animal cells, respectively.

In various parts of the plants such as leaves, stems, fruits, seeds and roots, carbohydrate is stored as starch and sugar. And the plant sources supply about 40 to 80 per cent of the energy requirement of people throughout the world. Plants through the process of photosynthesis manufacture carbohydrate and after it use stores them as polysaccharides. (Raheema, 2012)

PROTEINS

According to David Fosket et al., (2015) Protein is the body building nutrient found in foods of both animal and plant origin. Meat poultry, fish, eggs, milk, cheese, legumes, nuts and some cereal foods are good sources of protein. Also protein serves as a basic necessity for body development, maintenance of fluid balance, formation of hormones and enzymes and contribution to immune function. (Sunday et al., 2012) Protein is necessary for growth, building body blocks and for repair of damaged tissues.

FATS

Fats are composed of carbon, hydrogen and oxygen, but in different proportions from those found in carbohydrates (Raheema 2012). True fats add flavour and variety to foods and make meals palatable and satisfying. They promote efficiency in the utilization of proteins and carbohydrates. They may aid in absorption of fat soluble vitamins and in some cases,

importance carriers of these vitamins and are also sources of fatty acids essential for certain body function. Fats are of both animals and plant origin. Fats of plant origin contain more polyunsaturated fatty acids or "poly-enes" than fats of animal origin. A characteristic of all fats is high caloric value compared to that of carbohydrates and proteins (Olusanya et al., 2009).

MINERALS

According to Gordom and Margaret (2004) Minerals are essential constituents of tissues and fluids of the body and assist in regulating body processes. They are widely distributed in all foods except the most highly refined although the kind and quality may vary. The mineral elements needed by the body include calcium chlorine, chromium, cobalt, copper, fluorine, iodine iron, magnesium, manganese, phosphorus, potassium and sodium.

VITAMINS

Vitamins are essential to optimum nutrition and health and for normal growth and development. (Raheema, 2012) Vitamins are indispensable in our diet because our body cannot synthesis them, they serves the body by promoting growth, protecting against diseases and by contributing to what is sometimes expressed as "the possession of the attributes of youth".

WATER (MOISTURE)

Water makes up approximately two-third of the body's composition. (Olusanya , Et al 2009) it is present in every cell and tissues and is important in regulating body processes. Digestion, assimilation, regulation of heat and elimination of waste are all dependent upon the water content of the body. Drinking water frequently contains some of the minerals needed by the body, such as calcium, iron, iodine, figurine, sodium. Water in the body comes from beverages, solid foods in the diet and from the metabolism of foods within the tissues.

According to Adegunwa, et.al (2015) the moisture content of any food is an index of its water activity {aw}. High water activity encourages the growth of fungi.

High moisture content encourages microbial proliferation that leads to food spoilage. (Ezeama, 2007, Akhtar et al., 2008 Elleunch et al., 2016).

MALNUTRITION

Malnutrition generally refers to both under nutrition and over nutrition, but in this study we use the term to refer solely to a deficiency of nutrition. Many factors can cause malnutrition, most which relate to poor diet or severe and repeated infections, particularly in underprivileged populations. Inadequate diet and disease, in turn are closely linked to the general standard of living, the environmental conditions, whether a population is able to meet its basic needs such as for food, housing and healthcare. Malnutrition is thus a health outcome as well as a risk factor for disease. Malnutrition can increase the risk both of morbidity and mortality. Although it is rarely the direct cause of death (except in extreme situations such as famine). Child malnutrition was associated with 54% of child deaths (10.8 Million children) in developing countries in 2001. Malnutrition that is the direct cause of

death is referred to as "protein-energy malnutrition". (Blakely, Hales & Woodward, 2004).

SELECTED LOCAL DISHES COMMONLY CONSUMED IN OSUN STATE

- SWEET POTATO (Potato porridge)
- COWPEA (Moin moin, Akara and Ekuru)
- MAIZE (Abari)
- YAM (Yam flour (Elubo) and Pounded yam)

HEALTH BENEFIT OF THE LOCAL DISHES CONSUMED IN OSUN STATE

COWPEA (EKURU, MOIMOI, GBEGIRI, AKARA)

- i. Some studies have shown that folate in the beans can lower heart disease risk
- ii. Beans are rich in complex carbohydrates (such as dietary fiber) which are digested more slowly. As a result, bean consumption has been shown to increase feelings of fullness and help regulate plasma glucose and insulin levels after meals
- iii. Eating beans may reduce the risk for developing certain types of cancers due to their contribution of bioactive compounds to the diet, including flavonoids, tannins, phenolic compounds and other antioxidants, these compounds act to decrease the risk of cancer, as well as other chronic disease. Bean intake has been associated with a decreased risk of breast, stomach, kidney and prostate cancers. (Julie & Krystle, 2013).

Maize (Ogi, Abari)

Maize contains vitamin B-complex such as Vitamin B1, Vitamin B2 and Vitamin B6 that makes it commendable for hair, skin, digestion, heart and brain. It also contains Vitamin K, Vitamin C and A with large amounts of beta-carotene and fair amounts of selenium that helps to improve the thyroid gland and play important role in proper functioning of immune system. Also from the ancient time corn has been used to pacify, anorexia, general debilities. It is potent antioxidants that guards body from harming by free radicals responsible for cellular damage or cancer. It has the potential to alleviate pain and process analgesic activities as well. It helps in the production of sex related hormones; it is believe to improve symptoms of rheumatism as B-complex is able to improve joint motility. Corn silk improves blood pressure and support liver functioning as well as producing bile, it also act as a good emollient for ulcer, wound and swelling. (Dilip & Aditya, 2013).

YAM (Pounded Yam, Elubo)

- Yam contains carotenoids B-carotene, zeaxanthin, phytoene and phytofluene. Yam also contains iron, zinc, and vitamin which combat micronutrient deficiency. Carotenoids serve as precursors of vitamin A. Carotenoid is required for the differentiation of epithelia cells, maintenance of epithelia barrier against attack by pathogenic organisms and play important role in vision. Some carotenoids are antioxidants which have been linked to enhancement of immune function and decreased risk of degenerative diseases like cancer, cardiovascular diseases and ageing, because of their richness in antioxidant, they prevent the development of cancerous cells.
- The complex carbohydrates will be release into the blood stream in gradual rate to be turned into energy whenever required. This condition will assist in regulating the blood sugar level.

(Anthony et al., 2014).

SWEET POTATO (Potato Porridge)

- Potatoes are rich in several micronutrients, especially vitamin C, eaten with its skin; a single medium sized potato of 150g provides nearly half the daily adult requirement (100mg). The potato is moderate source of iron, and its high vitamin C content promotes iron absorption. It is a good source of vitamin B1, B3 and B6 and minerals such as potassium, phosphorus and magnesium, and contains folate, pantothenic acid and riboflavin.
- Potatoes also contain dietary antioxidant, which may play a part in preventing diseases related to ageing, and dietary fibre, which benefit health.
- Potato also prevents over weight, obesity and diet related non-communicable diseases including heart diseases.
- It also provides heat, during its oxidation and used in maintaining the metabolic activities. (FAO, 2008).

CONDIMENT FOR LOCAL DISHES CONSUMED IN OSUN STATE

TOMATO (*Lycopersicum lycopersicon*)

Tomato is one of the most important vegetable crops grown all over Nigeria. It is the World's largest vegetable crop after sweet potato. In Nigeria, tomato is regarded as the most important condiments in most vegetables after onions and pepper (Fawusi, 1978). It is an important condiment in most diets and a very cheap source of vitamins. It contains a large quantity of water (%), calcium (%) and Niacin all of which are of great importance in the metabolic activities of man. Tomato is a good source of vitamin A, C and E and minerals that are very good for body and protect the body against diseases (Taylor, 1987). Tomato contain large amount of vitamin C, providing 40% of the daily value. They also contain 15% daily value of vitamin A, 8% daily value of potassium and 7% of the recommended dietary allowance (RDA). The red pigment contained in tomatoes is called Lycopene (Debjit et al., 2012).

PROXIMATE ANALYSIS OF TOMATO VARIETIES

Variety	Protein %	Fat %	Fibre %	% Vitamin C mg/100g	Calcium %	Magnesium %	Potassium %	Phosphorous %
Ibadan local	29.39	3.86	7.42	0.21	0.329	0.185	0.135	0.573
Ogbimosh o local	42.55	3.72	6.94	0.19	0.383	0.214	0.157	0.455
Tropical	32.18	4.22	6.93	0.29	0.302	0.183	0.138	0.404

(Olanivi et al., 2009)

PEPPER

Pepper come in a beautiful array of colours and shapes, they add flavor, colour to many low calorie dishes. All fresh pepper are excellent sources of vitamin C, K, carotenoides and flavonoides. Antioxidant vitamin A and C help to prevent cell damage. One average pepper fruit contains between 1-2g/kg vitamin C, which is equivalent to 200% to 300% of the recommended daily allowance for adult men and women. The level of pro-vitamin A carotenoids (Alpha and Beta-carotene) is cultivars specific. Some cultivars of hot pepper have as much as 12mg/kg total carotenoids, while others are below the detectable level. Major flavonoids in the pepper are quercetin and luteolin. They are present in conjugated form and their content values among cultivars ranging from hot detectable to 800mg/kg. When comparing the nutrient values of the different bell pepper, studies have shown that red bell pepper has significantly higher levels of nutrients than green. Chili hot peppers have amazingly high levels of vitamins and minerals. Chili hot pepper, red or green are rich source of vitamin C. Chilies are also good in vitamin B-complex group of vitamins, chili hot pepper contain good amount of minerals like potassium, manganese, iron and magnesium. Just 100g of pepper provides (the recommended daily allowance in percent (%)).

Vitamin C	Vitamin B6	Vitamin A	Iron	Copper	Potassium
24%	39%	32%	13%	14%	7%

(Joaos, 2012).

LOCUST BEANS

The African locust bean (*Parkia biglobosa*) has found very popular use especially in the fermented 'dawadawa' form, which is a product of the seeds. However, the yellow dry powdery fruit pulp called 'Dorowa' in Hausa has not attracted much attention. The carbohydrates being primarily reducing sugars (19.00%), non-reducing sugars (9.00%) and other complex carbohydrates (36.00%).

The fruit pulp of the African locust bean is sweet to the taste, which indicates the presence of natural sugars and thus a potential energy source. The attractive yellow colour indicates the presence of phyto-nutrients, possibly carotenoids, which are important precursors of retinol (vitamin A). It has a sour taste which indicates the presence of ascorbic acid (vitamin C). Literature reveals that the fruit pulp is used in rural Africa during emergencies, when the grain stores are empty, which is an indication of its edibility and non-toxicity. It may also be used as an ingredient in the preparation of various stews, soups and sauces for the consumption of cereals; pressed into cakes and preserved for later use or used in the preparation of some indigenous drinks, and is more than adequate to meet the recommended daily allowance of protein of 0.59g/kg body weight for an average healthy individual and 0.88g/kg body weight for children aged 1 to 10 years. Carbohydrate content was found to be 67.30%. This is much higher than the seeds (49.49%), and is in agreement with the findings

that the fruit pulp contains more carbohydrates than the seeds. It is also higher than most legume seeds with only lentils and bambara groundnuts coming close with a value of 65.0%. Though proteins and fats also provide energy, carbohydrates are much cheaper and more easily digested and absorbed. With this content of carbohydrate the African locust bean fruit pulp is a potential good source of energy given the recommended daily energy intake. The crude fiber was found to be 11.75%, which is on the high side. Though crude fiber does not contribute nutrients or energy, it is a source of dietary fiber which is essential for good bowel movement and helps in preventing obesity, diabetes and cancer of the colon and other ailments of the gastro-intestinal tract of man. Though the crude fiber obtained for the fruit pulp is less than that of the seeds (18.00%) as it is much higher than for most food legumes, which range from 2.10% in groundnuts to 7.60% in kidney beans. This makes the African locust beans fruit pulp a potential good source of dietary fiber. According to Lisa (1997) Crude fibre have the ability of cleansing the digestive tract by removing potential carcinogens from the body and preventing the absorption of excessive cholesterol.

PROXIMATE COMPOSITION OF LOCUST BEANS (%)

Protein	Fat	Crude fibre	Ash	Carbohydrate	Moisture
30.00%	15.00%	4.00%	2.00%	49.00%	50.00%

(Gernah D. et al 2007)

MELON

Citrullus lanatus belongs to the family cucurbitaceae (Common name: melon; Yoruba name: egusi), a tendril climber or crawling annual crops with fibrous and shallow root system. It is mostly grown as a subsidiary crop interplant with early maize and yam in some savannah belt of Nigeria. Melons are major food crops with several varieties which serves as major food sources. *Citrullus lanatus* are among the economically most important vegetable crops worldwide and are grown in both temperate and tropical regions. Melon seeds are major soup ingredients and they are used to thicken soups. The seeds are less expensive and widely distributed.

In Nigeria, the seeds are used to prepare food condiment with characteristic aroma. The condiment is used as a flavouring agent in stews, soups and sauces. According to previous study, the seeds contain 35 percent protein and 50 percent oil, therefore may be useful raw materials for the food and cosmetic industries. Melon contains vitamin C, and B2, minerals, riboflavin, fat, protein and carbohydrate. They can contribute substantially towards obtaining a balanced diet. Many plant proteins usually in the form of protein extracts are being investigated and tested for new products, such as low cost fabricated food which are nutritious, attractive and acceptable to consumers just like conventional foods from meat and fish.

PROXIMATE COMPOSITION OF MELON SEED (%)

Moisture	Crude fibre	Protein	Ash	Fat	Carbohydrate
7.10%	6.40%	30.63%	6.7%	49.05%	7.22%

(Jacob et al., 2015).

MATERIALS AND METHODS

Five sample dishes purposely selected from three senatorial districts in Osun state are Potato porridge, Iyan and Egusi soup, Amala, fish stew and Ewedu soup, Abari and Ekuru and Eko with okro soup. The ingredients for preparing these local dishes were purchased from Sayedero market in Ilaro Yewa south and were prepared in the Nutrition and Dietetics kitchen, Federal Polytechnic, Ilaro.

RECIPE AND PREPARATION PROCEDURE OF THE LOCAL DISHES

POTATO PORRIDGE

INGREDIENTS

Desirable tubers of potato, 1/4 litre of palm oil, Pepper (desirable amount), Tomato (5 medium size), Pinch of salt, Onions (1 medium size), Fish (optional) and Seasonings (two cubes)

PROCEDURE

- Peel and wash the potato and cut into desirable shapes
- Put the potato into a pot of water and cook
- Grate the pepper and, tomato and onions
- After the potato has become soft, use spatula to make it into a pudding
- Add the grated pepper, onions and boiled fish into the potato, cover and allow it to simmer
- Add salt and seasonings and turn with a spatula and allow it to simmer for some minutes
- It is ready to serve.

Raw Potato Tuber > Peeling > Washing/Dicing > Cooking > Addition of Vegetable, Oil and Seasoning > Steaming > Serving

Figure 1: Flow chart for the production of potato porridge

IYAN (POUNDED YAM) AND EGUSI SOUP

Iyan (Aiyeye F., & Eleyinmi A., (2007) one of the most important culinary traditional preparation of yam in Nigeria and indeed West Africa is pounded yam (Iyan). It is commonly served for lunch and dinner with vegetable in egusi soup (melon) soup as accompaniment. In spite the fact that the preparation is labour intensive, it still has a generally wide appeal.

TRADITIONAL PRODUCTION OF IYAN

White yam is peeled, cut into pieces and boiled until fully cooked without being soggy. The boiled yam is then pounded until a glutinous dough is obtained. It is often packaged leaves and stored in warmer until needed for serving.

Yam Tuber > Peeling > slicing> Washing> Sulphiting > Stem Cooking > Hot Air Drying > Milling > Sifting > Flour> Packaging

Figure 2: Flow chart for improved production of Iyan

EGUSI SOUP

INGREDIENTS

Melon seed (2 cups), 180ml of palm oil, Dried fish, Pepper (desirable amount), Tomato (desirable amount), Onion (1 big size), 2 teaspoon of salt, Seasoning (2 cubes) and Vegetables

PROCEDURE

- Grind the melon seed, pepper, tomatoes and onions
- Put desirable amount of palm oil in a pot and fry
- Add the grinded melon and pepper into the oil and stir
- Add salt and seasonings and stir
- After that add the vegetables and allow it to cook for some minutes
- It is ready to serve

AMALA, FISH STEW AND EWEDU

TRADITIONAL PRODUCTION OF AMALA (made from Elubo)

Elubo is a dehydrated milled product obtained from yam of discorea species. It is a smooth brown powder and being a wholly yam based product, it is a rich source of carbohydrate. It is prepared by pouring in hot (boiling) water with continuous stirring until a stiff gel called Amala is obtained. It is commonly serve for lunch or dinner with stew and any of mucilaginous vegetable (especially Ewedu).

Raw yam > Peeling (under running water) > Washing> Chemical Pre-treatment > Draining > Drying > Milling > Packaging

Figure 3: Flow Chart for Elubo Production

PROCEDURE FOR EWEDU SOUP

INGREDIENTS

Bunch of ewedu leafs, Pinch of salt and Potash

PROCEDURE

- Sort the leaves from the stick and rinse in clean water
- Put water into a pot and allow it to boil and add potash
- After the water get boiled, add the ewedu into the boiling water and allow it to cook until tender
- Add a pinch of salt
- After cooking, use a blender to blend it or use a broomstick to blend also
- Serve with the fish stew

FISH STEW

INGREDIENTS

Pepper (desirable amounts), Tomato (8 medium size), Onions (2 medium size), Salt (2 teaspoon), Seasoning (2 cubes), 187ml of palm oil and 2kg of fish

PROCEDURE

- Wash the pepper, tomato, onions and blend
- Put a pot on fire and add the of palm oil
- After the oil has spent some minutes on fire, add the blended paste into the oil and allow it to steam up for some minutes.
- Add the seasonings and salts to it and add the washed fish.
- Cover it and allow it to cook for about 20 minutes
- It is ready to serve

ABARI (CORN PUDDING)

INGREDIENTS

6 big size corn, 180ml of palm oil, Pepper, Seasoning (optional), Pinch of salt and 1 medium size onion

PROCEDURE

- Remove the corn from the cob
- Blend the corn and the pepper
- Mix together with a spatula and pinch of salt and seasoning (optional)
- Pour into leaves
- Steam in a pot of boiling water
- After it has steamed up for some minutes
- It is ready to serve

Raw maize cob > Shelling > Wet milling > Addition of Vegetables, Oil and Seasonings > Wrapping in Leaves > Steaming > Serving

Figure 4: Flow Chart for the Production of Abari

EKURU WITH EKO IN OKRA SOUP WITH STEW

EKURU

The traditional name of beans meal is Ekuru, a wholly cowpea based food item, rich in essential amino acids. Locally, it is consumed as a lunch or dinner meal with "eko" (fermented maize gruel) as accompaniment. It is one of the popular form in which beans is processed among the Yorubas of Nigeria.

TRADITIONAL PRODUCTION OF EKURU

Beans is soaked in water for 2-3 hours. It is then dehulled and milled using small quantities of water to obtain a slurry of right consistency. The resulting slurry is stirred, carefully wrapped in leaves, and steamed for about 45 minutes. The resulting product is ready to be eaten.

Raw Beans > Soaking > Decoating > Wet-Milling > Stirring > Addition of Vegetable oil > Filling into cans/leaves > Exhaustion > Steaming > Pasteurization > Cooling

Figure 5: Flow Chart for the Production of Ekuru

INGREDIENTS

4 cups of beans and leaves

PROCEDURE

- Peel the beans and soak it
- Soak it until it becomes soft
- After soaking for some minutes, grind it or blend it
- [continued page 349] Stir with a spatula and pour desirable amount into leaves
- Allow it to steam up for some minutes
- It is ready to serve with the soup

MILLED MAIZE (EKO)

PROCEDURE

- Put water in a pot and allow to boil
- Mix the pap slurry with cold water and avoid lumps
- After mixing, start pouring the pap inside the hot water and start stirring
- Stir to avoid lumps, after it has spent some time on fire, put it off the fire
- Wrap in leaves and allow it to solidify

OKRA SOUP

INGREDIENTS

Okra (desirable amounts) and Pinch of salt

PROCEDURE

- Grate the okra
- Put water on the fire and allow it to boil
- Put the okra into the pot with boiling water and allow it to cook
- Add the desirable quantity of salt and fun
- It is ready to serve[fish]

FRIED STEW

INGREDIENTS

Pepper (desirable amount), Tomato (6 medium size), 90ml of palm oil, 1 big onion, Dry fish, 1 teaspoon of salt and Seasonings (1 cube)

PROCEDURE

- Wash the pepper, tomato and onions
- Blend the pepper, tomato and onions
- Add the desirable quantity of palm oil into a pot and allow the oil to fry
- Add the blended paste into the oil and allow it to cook
- After some minute, add the required seasonings to it and allow it to cook for few minutes
- It is ready to be serve

INSTRUMENT FOR DATA COLLECTION

The proximate composition of the local dishes (Potato porridge, Iyan and Egusi soup, Amala, fish stew and Ewedu soup, Abari and Ekuru and Eko with okro soup) were determined using the analytical procedure as described by AOAC Association of Official Analytical Chemist (2005).

SENSORY ASSESSMENT

Samples of the dishes (Potato porridge, Iyan and Egusi soup, Amala, fish stew and Ewedu soup, Abari and Ekuru and Eko in okra soup) were subjected to organoleptic assessment. The parameter overall acceptability using a 9 point hedonic scale.

STATISTICAL ANALYSIS

All data collected were subjected to Analysis of Variance, Ranged Test, Steel and Torrie, 1980).

RESULTS

TABLE 1: SENSORY EVALUATION OF SELECTED LOCAL DISHES CONSUMED IN OSUN STATE

PARAMETER	SAMPLES				
	001	002	003	004	005
APPEARANCE	7.50 ^a	7.10 ^a	7.60 ^a	7.25 ^a	7.55 ^a
TEXTURE	7.60 ^a	7.15 ^a	7.75 ^b	7.20 ^c	7.25 ^c
TASTE	7.65 ^a	7.15 ^a	7.40 ^b	7.17 ^c	7.30 ^d
FLAVOUR	7.10 ^a	7.25 ^a	7.60 ^b	6.95 ^c	7.20 ^d
OVERALL ACCEPTABILITY	7.70 ^a	7.15 ^b	7.70 ^c	7.30 ^d	7.80 ^d

Values are means, with same expressions in column not significantly different at 5% level of confidence.

KEY

001 Potato porridge,

002 Iyan and Egusi soup,

003 Amala and Ewedu in fish stew,

004 Abari,

005 Ekuru and Eko in okra soup

TABLE 2: PROXIMATE COMPOSITION OF SELECTED DISHES

PARAMETER	SAMPLES				
	001	002	003	004	005
MOISTURE	52.22±0.2 ^d	54.62±0.25 ^e	59.11±1.11 ^d	47.32±0.02 ^c	56.41±0.11 ^b
ASH	1.73±0.02 ^a	5.32±0.02 ^a	2.34±0.02 ^c	4.86±0.02 ^b	1.64±0.025 ^e
FIBRE	1.34±0.02 ^c	2.04±0.02 ^a	1.13±0.02 ^d	1.93±0.02 ^b	0.57±0.02 ^e
PROTEIN	7.24±0.02 ^b	5.06±0.11 ^e	5.42±0.25 ^d	6.42±0.02 ^c	12.54±0.02 ^a
FAT	5.65±0.02 ^d	9.53±0.01 ^b	10.21±0.0 ^a	5.95±0.026 ^c	4.93±0.25 ^e
CARBOHYDRATE	31.81±0.0 ^b	24.42±0.02 ^d	21.79±0.04 ^e	33.51±0.02 ^a	26.89±0.09 ^c

Values are means, with same expressions in column not significantly different at 5% level of confidence.

DISCUSSION

SENSORY EVALUATION

Sensory evaluation is presented in Table 1. There were no significant differences ($P \leq 0.05$) between the Appearance, Texture, Taste, Flavour, and Overall acceptability of the samples. 003 (Amala, gbegiri and ewedu in beef stew), sample 005 (Ekuru and Eko in okro stew) was most preferred by the panelists having the highest score of 7.80, 7.70, 7.60, 7.55 and 7.50 respectively in Appearance, 004 (Abari) having the least preferred with a mean sensory score 6.95 in Flavour. All the dishes had general acceptability score of 7.70, 7.20, 7.30 and 7.80 for sample 001 (potato pottage), sample 002 (Iyan and Egusi soup), sample 004 (Abari), sample 005 (Ekuru and Eko in okra soup) and 003 (Amala, gbegiri and ewedu in beef stew).

PROXIMATE ANALYSIS

Proximate compositions of the local dishes are presented in Table 2. The protein (5.06 - 12.32%), mineral (4.93 - 9.53%), ash (1.64 - 5.32%), crude fiber (0.57 - 2.04%), moisture (47.32 - 56.41%) and carbohydrate (21.79 - 33.51%) respectively.

Protein content is one of the most important quality of any food. Hence, the recommended value for any food commodity is 20% according to the Food Agricultural Organization (1996). The sample 005 (Ekuru and Eko in okro stew) had the highest protein content of 12.54%. The sample 002 (Iyan and Egusi soup) had the lowest value of 5.06%. This is in agreement with previous studies by Sunday et al. (2012) in Proximate and micronutrient compositions of some selected foods and diets in South-South Nigeria. According to Gordon and Margaret (2004), protein is necessary for growth, building body blocks and for repair of damaged tissues. It is also clear from the result that the selected local dishes were nutritious, since the products provided one third of the recommended dietary allowance (RDA) with respect to protein (10 to 12%) (Table 2) as recommended by Food and Agriculture Organization (2009) and National Institute of Nutrition (1992) for children and rural mothers. This value makes it suitable for consumption as a necessity for body development, maintenance of fluid balance, formation of hormones and enzymes and contribution to immune function (Sunday et al., 2012).

The fat content ranged from 4.93 to 9.53%. The values of the fat contents were higher than the compositions of some selected foods and diets in South-South Nigeria.

The moisture contents ranged from 47.32 to 56.41% while the sample 005 (Ekuru and Eko in okra stew) having the highest value of 56.41% while the sample 004 (Abari) had the least value of 47.32%. Moisture content is used as a quality parameter of food products, as it influences the shelf stability of foods; the lower the moisture the better the storage potential of the food product. The moisture content of any food is an index of its water activity (a_w). High water activity encourages the growth of fungi (Adegumwa et al., 2015). These values, High moisture content are very high compared to 10% recommended by FAO (2008). High moisture content encourages microbial proliferation that leads to spoilage (Ezeama, 2007; Akhtar et al., 2008 & Elenuch et al., 2011).

The ash content of the dishes ranges from 1.64% to 5.32%, with sample 002 (Iyan and Egusi soup) recording the highest value (5.36%) and sample 005 (Ekuru and Eko in okra stew),

having the least value (1.64%). Ukam, (2008) stated that the lower the ash content, the higher the nutrient quality.

The fibre content of the dishes ranges from 0.57 to 2.04%, The least fibre content (0.57%) was recorded in sample 005 (Ekuru and Eko in okra stew) while the highest value (2.04%) was recorded in sample 002 (Iyan and Egusi). Lisa, (1997) reported that fibre have the ability of cleansing digestive tract by removing potential carcinogens from the body and preventing the absorption of excessive cholesterol. Fibre hinder cancer - keep them away from the cells lining the colon (Ensminger& Ensminger, 1996).

The carbohydrate content of the dishes ranges from 21.79 to 33.51%. The highest value (33.51%) was obtained from sample 004 (Abari) while 21.79% was obtained from sample 003 (Amala, gbegiri and ewedu in beef stew). The prime role of carbohydrates is to produce energy required for the body as they are the pivotal nutrients required for adequate diet (Sunday et al., 2012).

CONCLUSION

This work has provided baseline information on local dishes consumed in Osun State. The low income groups would benefit from nutrient potentials of local foods, particularly at times of seasonal buoyancy of staple crops.

RECOMMENDATIONS

- I. Regular consumption of local foods should be established and implemented to eradicate malnutrition.
- II. Adequate nutrition education on local foods should be established, especially on its production, processing and preservation as it contributes to household food security.
- III. There should be more nutritional information on the health benefits of local foods.
- IV. The populace should be encouraged to grow local foods that are environmentally stable in order to reduce the distance food travels before it gets to a consumer.

IMPLICATION FOR POLICY: Awareness of the nutritional quality of these local dishes will enable a person to make wise choices when selecting food thereby reducing malnutrition.

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