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# Acceptability Of Roast Dioscorea Rotundata With Fortified Gongronema Latifolium Sauce For Consumption In Nigeria Restaurants

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***Abstract:*** ***Consumption of roast Dioscorea rotundata with palm oil sauce is an age long practice by the Ibo traditional society. Over the years, this delicacy is seen as peculiar to the Ibo nation, as little attention has been paid to the nutritional and health benefits of the delicacy by non-Ibo consumers, hence production and consumption of the delicacy has been referred to the Ibo populace to date. This study examined the pattern of acceptability and consumption of roast D. rotundata using palm oil sauce fortified with assorted ingredients (including G. latifolium leaves and stockfish) by consumers other than those of the traditional Ibo society, to observe whether (or not) it will be marketable in the hospitality industry in Nigeria. Related literature was reviewed to find out the nutritional and health benefits of the product constituents. Sample of raw D. rotundata was roasted and served with fortified palm oil sauce of G. latifolium leaves and other constituents including dried stockfish. The product was subjected to sensory analysis for palatability factors including appearance, colour, stability, odour desirability, flavour, and overall acceptability by twenty non-Ibo respondents. Results were presented in tables and bar charts, while data was analyzed in means and standard deviation; hence the product was ranked acceptable for consumption by respondents. It was recommended that the product be integrated for production and marketing in the hospitality industry through a gradual process in order to achieve the desired result.***

***Keywords: acceptability, food tourism, health benefits, innovative culinary, product development.***

## I. INTRODUCTION

Yams are one of carbohydrate rich, staple tuber vegetables of West African origin. Botanically, they belong to the family *Dioscoreaceae*, in the genus, *Dioscorea*. There are several hundred cultivars of Dioscorea. However, only few of them are worth commercial importance. Some of the popular yam tubers grown are *Dioscorea rotundata* (white guinea), *D. alata* (yellow), *D. bulbifera* (aerial), *D. opposita* (Chinese), *D. esculenta* (Southeast Asian) and *D. dumenterum* (trifoliate). Besides their use as food, yams have been symbolically associated with culture, and ritualism all over Africa, Asia, and Latin Americas (Farombi, 2003).

The yam plant is a perennial vine cultivated for its large, edible, underground tuber, which can grow up to 120 pounds in weight and up to 2 meters in length. They are similar in appearance to sweet potatoes, however, they are not at all related to it. Some important differences distinguished them from sweet potatoes. Yams are monocotyledons, larger in size, features thick, rough, dark brown to pink skin depending on the cultivar type; whereas sweet potatoes (*Ipomoea batatas*) are dicotyledonous, relatively smaller in size and possess very thin peel.

Although the tuber is grown throughout Africa, Nigeria is by far the world's largest producer of yams, accounting for over 70–76 percent of the world production. According to the Food and Agricultural Organization report, in 1985, Nigeria produced 18.3 million tons of yam from 1.5 million hectares, representing 73.8 percent of total yam production in Africa. According to 2008 figures, yam production in Nigeria has

nearly doubled since 1985, with Nigeria producing 35.017 million metric tons with value equivalent of US$5.654 billion (Farombi, 2003).

The consumption pattern of yam among the ethnic nationalities of Nigeria takes different dimensions as observed by literature. Fu, Kikuno, and Maruyama (2011) observed that; "Yams are mainly consumed for lunch in the form of boiled yam and yam porridge. Roasted yam is also commonly consumed by farmers that roast tubers during farm work and eat as lunch". They further stated that… "The role played by yam in the Nupe culture is minor, although it is traditionally important in most parts of Nigeria". Furthermore, the National Bureau of Statistics (NBS) discovered that; "Yams are an integral component of food consumption and agriculture sales in Nigeria" (NBS, 2014). However, analysis of the 2010-2011 Living Standards Measurement Study- Integrated Survey on Agriculture LSMS-ISA data shows that the crop's role differs for the poor and non-poor. In that survey, relatively better off households are consuming more yams (particularly those acquired through purchases), but selling less harvested yam than poorer households. Poorer households consume fewer yams, but depend more heavily on yam sales and income than their richer counterparts (NBS, 2014). The implication is that yam is consumed by most households in all Nigerian ethnicities. The difference is the consumption pattern, which may differ by culture or ritual. Consequently, the role yam consumption ought to play in the food tourism segment of Nigeria's cultural tourism should not be overemphasized, as emphasis should be placed on integrating the product (in refined form) as a food tourism product, towards boosting Nigeria's local tourism content, through a systemic product development strategy. This should be done bearing in mind that, of late, tourism has assumed a social dimension and traditional approach of poverty reduction in the developing world (Nwokorie, 2016), as producers of food tourism commodities will earn income through raw materials production and delivery.

## RESEARCH OBJECTIVE

This study determined the level of the acceptability of roast yam (*Dioscorea rotundata*) consumed with edible palm oil sauce, fortified with *Gongronema latifolium leaves* and dried stockfish, as a delicacy in local restaurants in Nigeria. From the viewpoint of the ethnic diversity of Nigeria, this consumption pattern is peculiar to the South-Eastern ethnic nationality of the country and is still relegated to South-Eastern Nigeria households; hence the study tends to explore the possibility of introducing the delicacy into local restaurants across Nigeria, not just for customer base expansion, but for cultural enrichment of the food tourism segment of the local tourism sector.

## II. THEORETICAL LITERATURE

Nwokorie (2015) wrote that; "Food (and wine) play an important role in the tourism strategy of many destinations". Visitors travelling from far regions demand new and exotic experience from the new destination, which include innovative culinary experiences. The food consumed in the place of interest is of utmost importance both to the tourist and the tourist service provider. This is because traditional and ethnic delicacies play important roles in encouraging visitors to spend longer periods within the destination, which benefits the local economy from the multiplier effect as a result of businesses generated by local stakeholders.

Roast *D. rotundata* served with *G. latifolium* (utazi) sauce is an example of ethnic delicacies that would be of special interest to both local and foreign visitors within Nigeria considering its unique presentation and taste. It is important to understand that, aside consumption for the fun of it, ethnic delicacies should be consumed considering the nutritional and health benefits they offer, since visitors equally relish the nutritional experiences they acquired while on vacation without compromising their health conditions through the consumption of exotic foods at the destination.

## NUTRITIONAL AND HEALTH BENEFITS OF YAM

Rudrappa (2009) discussed some of the health benefits of yam in which it was observed that yam is a good source of energy; 100 gram provides 118 calories. Its crunchy edible part chiefly composed of complex carbohydrates and soluble dietary fiber. Rudrappa also wrote that the dietary fiber helps reduce constipation, decrease bad (LDL) cholesterol levels by binding to it in the intestines and lower colon cancer risk by preventing toxic compounds in the food from adhering to the colon mucosa. Additionally, being a good source of complex carbohydrates, it regulates steady rise in blood sugar levels, and, for the same reason, recommended as low glycemic index healthy food. Furthermore, the tuber is an excellent source of B-complex group of vitamins. It provides adequate daily requirements of pyridoxine (vitamin B6), thiamin (vitamin B1), riboflavin, folic acid, pantothenic acid and niacin. These vitamins mediate various metabolic functions in the body (Fu, et al., 2011).

Similarly, Ahamefule, Obua, Ibeawuchi and Udosen (2006) found out that fresh yam root also contains good amounts of anti-oxidant vitamin; Vitamin C, providing about 29% of recommended levels per 100 gram. Vitamin C has some important roles in anti-aging, immune function, wound healing, and bone growth. Yam, according to Rudrappa (2009) contains small amounts of vitamin-A, and beta-carotene levels. Carotenes convert to vitamin A in the body. Both compounds are strong antioxidants. Vitamin A has many functions like maintaining healthy mucus membranes and skin, night vision, growth and protection from lung and oral cavity cancers (Iqbal, Khalil, Ateeq, and Khan, 2005).

Further, the tuber is indeed one of the good sources of minerals such as copper, calcium, potassium, iron, manganese, and phosphorus. 100 gram provides about 816 milligram of Potassium. Potassium is an important component of cell and body fluids, which helps controlling heart rate and blood pressure by countering hypertensive effects of sodium (Ahamefule, et al., 2006). Copper is required in the production of red blood cells (Ajayi, Oderinde, Kajogbola, and Ukponi, 2006). Manganese is used by the body as a co-factor for the antioxidant enzyme, *superoxide dismutase* (Akwaowo, Ndon,

and Etuk, 2000). Iron is required for red blood cell formation (Rudrappa, 2009).

## NUTRITIONAL FACTS AND CHEMICAL COMPOSITION OF G. LATIFOLIUM

Research confirms that *G. latifolium* is a good source of protein. According to Afolabi (2007), its protein content (27.2% DM) is quite high and compares favourably with percent DM values reported for chickpea (24.0%), cowpea (24.7%), lentil (26.1%), greenpea (24.9%), fluted pumpkin leaves (22.4%), *Tamarindus indica* (24.3%), *Mucuna flagellipes* (24.9%), *Hibiscus esculentus* (23%) and *Parkia biglobosa* (20.9%) (Glew, Vanderjagt, Lockett, Grivetti, Smith, Pastuszyn, and Millson, 1997; Akwaowo et al., 2000; Ajayi et al., 2006; Iqbal et al., 2005).

Consumption of 100 g (DM) of *G. latifolium* may be capable of providing 27 g of protein which satisfies recommended daily allowance of protein for children. Thus, *G. latifolium* leaves appear to represent a potentially rich source of some, but not all, of the essential amino acids that are essential for humans (Afolabi, 2007).

The crude fat content of *G. latifolium* (6.07%) compare favourably with percent DM values reported for leafy vegetables like *Brachystegia eurycoma* (5.87%) and *Tamarindus indica* (7.20%) (Ajayi et al., 2006). A child consuming 100 g of *G. latifolium* would be ingesting approximately 6.07 g of fatty acid which translates into 54.6 kcal of energy or about 3%~3.5% of their daily total energy requirement. Apart from providing energy, the lipid fraction of *G. latifolium* contains modest but useful amounts of the essential fatty acid, linoleic acid (31.1%,) (Afolabi, 2007).

Linoleic acid is an important component of membrane phospholipids, a precursor to another critical fatty acid one finds in virtually all tissue membranes of humans, namely arachidonic acid (Glew, VanderJagt, Huang, Chuang, Bosse, and Glew, 2004). Arachidonic acid is important for another reason; it is metabolized to various prostaglandins which regulate many normal processes, including blood pressure and gastric acid secretion (Lauritzen, Hansen, Jorgensen, and Michaelsen, 2001). Prostaglandins play a critical role in inflammation and anaphylaxis (Glew et al., 2004). About 76.9% of the PUFA of *G. latifolium* leaf oil can be attributed to the presence of oleic, linoleic and α-linoleic acid. These fatty acids are important from the nutritional and stability point of view. Nutritionally, edible triglycerides, such as those in olive oil (which are rich in oleic acid), have cardioprotective effects, as opposed to dietary fats that are rich in saturated fatty acids and which are associated with increased risk of macrovascular diseases (e.g., stroke, heart attack) (Glew et al., 2004). The presence of PUFA is very important in human feeding and physiology, the most important ones being n-3 fatty acid which are predominant in cold water and deep sea fishes. With the current emphasis on increasing polyunsaturated and monounsaturated fats intake, the use of *G. latifolium* leaf oil in food processing/formulations may be acceptable. The chemical composition of *G. latifolium* suggests that it may find use in food/feed formulation/supplementation operations. This would be particularly so where protein content is of prime importance, hence its choice as food additive in the consumption of yam.

## ANTIBACTERIAL ACTIVITY OF *G. LATIFOLIUM*

It is worthy of note that *G. latifolium* is an important source of medicinal antibacterial. According to literature the activity of methanol extract of *G. latifolium* against *S. aureus* (MIC 5 mg,) was low compared with those reported for methanol extract of *Azadirachta indica* leaf (MIC 2.0 mg) and *Ginkgo biloba* (MIC 0.5 mg) against *S. aureus* (Ross, 2001). Although compounds responsible for the observed bioactivity are unknown at a point, preliminary works and other reports show the presence of saponins and flavonoids which had been shown to possess antioxidant and antimicrobial properties (Morebise and Fafunso, 1998; Hernández, Tereschuk, and Abdala, 2000).

## STOCKFISH (CODFISH) ESSENTIALITY

Stockfish is locally known as bacalà, okporoko, or panla. This type of fish is usually unsalted (especially the Atlantic cod) and they can be preserved either through air drying, sun drying or wind drying by spreading them on wooden racks. Dried stockfish usually has a longer storage life span which means the fish can last for several years after preservation for easy delivery to consumers. As Okpala (2015a) wrote; "Stockfish is among the list of the foreign food products that are usually distributed across the country and this fish has been reported to be packed with several nutritional benefits, which support why it is essential to regularly include it in our diets."

## NUTRITIONAL AND HEALTH BENEFITS OF STOCKFISH

- ✓ Prevention of cancer growth: Researchers reveal that Cod fish has protective power against cancer caused as a result of metastasis. Metastasis is caused as a result of high intake of omega-6 fatty acids (Atuanya and Nwogu, 2013). However, consuming high fish oil such as cod fish oil is ideal for preventing the growth of cancer cells found in breast cancer and colon cancer (Martínez-Alvarez, and Gómez-Guillén, 2005). Cod stockfish oil is equally essential for preventing cachexia caused by cancer due to its anti-cancer properties (Oranusi, Obioha, and Adekeye, 2014).
- ✓ Promotion of cognitive functioning: The anti-inflammatory abilities and the presence of omega-3 fatty acids in cod stockfish make this fish ideal for boosting the cognitive functioning of the brain, memory and concentration (Berr, Akbaraly, Arnaud, Hininger, Roussel, Barberger and 2009).
- ✓ Regulation of cholesterol level: Cod stockfish oil is an excellent source of low-fat protein and omega-3 fatty acids which are essential for maintaining good HDL cholesterol, as well as for reducing the risk of heart diseases such as heart attacks (Hamre, Lie, and Sandnes, 2003).

- ✓ Weight management: Cod stockfish contains low-caloric value thus eating the fish helps an individual to maintain a balanced weight (Eze and Ogbuehi, 2015). Moreover, stockfish makes someone to easily feel full and satisfied thereby indirectly helping such individual to reduce the caloric intake.

Okporoko is an excellent source of several vitamins, minerals and nutrients which are vital for the healthy functioning of the human body. They include; protein, omega-3 fatty acids, vitamin B, iron and calcium (Hamre, et al., 2003).

VISCOSITY ADDITIVES FOR THE SAUCE

Potash (akanwu) is a type of lake salt (sodium carbonate) that is dry and hydrated in nature. Studies reveal that the akanwu salt is the second most popularly used salt in Nigeria (Opkala, 2015b). It is used for mixing water and oil while preparing local dishes like abacha, ugba and nkwobi (Adebayo and Imokhe, 2011). Although the potash is used for certain food preparations however, studies reveal that it is not suitable for our health thus curtailing the level of consumption is highly advisable. Palmfruit ashes (ngu), ashes of roasted peels of unripe plantain and baking soda are healthier alternatives to potash (Oyeleke, 1998).

Some health benefits of baking soda according to Whitaker (2016) include the prevention kidney disease and cancer. Bicarbonate (found in baking soda) is an alkaline substance naturally produced in the body that buffers acids and helps keep pH in check. Studies have shown that dietary measures to boost bicarbonate levels can increase the pH of acidic tumors without upsetting the pH of the blood and healthy tissues thus helping the body fight against kidney ailment and cancer issues. Since baking soda is safe and well tolerated it could be adopted as part of overall nutritional and immune support protocol for patients who are dealing with cancer (Whitaker, 2016). Other health benefit of baking soda include, according to Whitaker; treatment of occasional heartburn and indigestion, oral health hygiene and improved athletic performance.

## III. MATERIALS AND METHODS

MATERIALS FOR ROAST YAM

- ✓ Two sizeable tubers of *D. rotundata* (white yam)
- ✓ Charcoal/firewood
- ✓ Metal bowl/basin
- ✓ Roasting net

MATERIALS/RECIPE FOR G. LATIFOLIUM SAUCE

- ✓ 10 grams of onion
- ✓ 5 grams of baking soda
- ✓ 1kg of dried stockfish
- ✓ Salt
- ✓ One (seasoning) cube
- ✓ Ground fresh pepper
- ✓ Water
- ✓ 250 grams of *G. latifolium* leaves
- ✓ 20cl of palm oil

METHOD OF PREPARATION FOR ROAST D. ROTUNDATA

- ✓ Set up fire (heat) using charcoal arranged in the metal bowl
- ✓ Place roasting net over the fire
- ✓ Cut yam into sizeable portions
- ✓ Place yam onto roasting net and turn until roasted (the yam will become less heavy when entirely roasted).
- ✓ Scrape brown dust off the yam and cut to open and ready to serve.

METHOD OF PREPARATION OF G. LATIFOLIUM SAUCE

- ✓ Add 5 grams of baking powder into a small bowl of 100ml of water and allow to settle
- ✓ Poor about 15 to 20cl of palm oil into a small pot
- ✓ Add the (baking powder) water to the palm oil gradually and stir thoroughly to form the sauce
- ✓ Add chopped onions and ground pepper
- ✓ Add (tenderly) boiled stockfish, chopped *G. latifolium* leaves and stir
- ✓ Add seasoning and salt to taste
- ✓ Pour sauce in a pot, place on light fire and allow to simmer for 2 to 3 minutes.
- ✓ Stir and pour into service plate.

It is worthy of note that the roast yam and the *G. latifolium* sauce are best served while still warm; as cold temperature may affect the tenderness of the yam as well as thicken the sauce, thereby affecting the taste.

## IV. RESULT AND DISCUSSION

Fifteen non-Ibo respondents were studied for sensory evaluation of roast *D. rotundata* served in *G. latifolium* sauce fortified with assorted ingredients including dried stockfish. The dish was prepared using traditional native technology, and served to the respondents to assess the product for sensory qualities and acceptability factors. The palatability and acceptability of the dish was considered by the respondents. Table 1 shows the demographic distribution of sample, and their reactions to the acceptability of the end product (*G. latifolium* sauce) were represented using the scorecard in Table 2.

| Strata of Respondents | Male | % Male | Female | % Female | Sub-(total) | % Total |
|---|---|---|---|---|---|---|
| South-South | 1 | 5.0 | 3 | 15.0 | 4 | 20.0 |
| South-West | 3 | 15.0 | 2 | 10.0 | 5 | 25.0 |
| North-Central | 2 | 10.0 | 2 | 10.0 | 4 | 20.0 |
| North-East | 2 | 10.0 | 1 | 5.0 | 3 | 11.0 |
| North-West | 3 | 15.0 | 1 | 5.0 | 4 | 20.0 |
| **Sub (Total)** | **11** | **55.0** | **9** | **45.0** | **20** | **100** |
| Polytechnic Students | 3 | 15.0 | 4 | 20.0 | 7 | 35.0 |
| Public Servants | 8 | 40.0 | 5 | 25.0 | 13 | 65.0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Sub (Total)** | **11** | **55.0** | **9** | **45.0** | **20** | **100** |

n = 20

*(Source: Survey, 2017).*

*Table 1: Demographic Distribution of Sample*

| S/N | Palatability Factors | Code | Response | Response (%) |
|---|---|---|---|---|
| 1. | Appearance | a ↔ d | (a2) (b15) (c2) (d1) | (a10.0) (b75.0) (c10.0) (d5.0) |
| 2. | Colour Type | a ↔ d | (a13) (b3) (c2) (d2) | (a65.0) (b15.0) (c10.0) (d10.0) |
| 3. | Colour Desirability | a ↔ d | (a11) (b4) (c3) (d2) | (a55.0) (b20.0) (c15.0) (d10.0) |
| 4. | Stability | a ↔ d | (a10) (b5) (c1) (d4) | (a55.0) (b25.0) (c5.0) (d20.0) |
| 5. | Odour Desirability | a ↔ d | (a12) (b5) (c3) (d0) | (a60.0) (b25.0) (c15.0) (d0.0) |
| 6. | Viscosity (Consistency) | a ↔ d | (a5) (b14) (c1) (d0) | (a25.0) (b70.0) (c5.0) (d0.0) |
| 7. | Spreadability | a ↔ d | (a3) (b16) (c1) (d0) | (a15.0) (b80.0) (c5.0) (d0.0) |
| 8. | Flavour: Sourness | a ↔ d | (a4) (b14) (c2) (d0) | (a20.0) (b70.0) (c10.0) (d0.0) |
| 9. | Flavour: Desirability | a ↔ d | (a12) (b7) (c1) (d0) | (a60.0) (b35.0) (c5.0) (d0.0) |

*CODE KEY:*

- ✓ *a. very bright; b. bright; c. dull; d. very dull.*
- ✓ *a. orange yellow; b. orange; c. red orange; d. dark red orange*
- ✓ *a. very desirable; b. desirable; c. undesirable; d. very undesirable.*
- ✓ *a. very stable; b. stable; c. oily; d. very oily.*
- ✓ *a. very desirable; b. desirable; c. undesirable; d. very undesirable.*
- ✓ *a. very thin; b. thin; c. thick; d. very thick.*
- ✓ *a. very spreadable; b. spreadable; c. hard to spread; d. very hard to spread.*
- ✓ *a. very sour; b. sour; c. neutral; d. bland; e. very bland.*
- ✓ *a. very desirable; b. desirable; c. undesirable; d. very undesirable.*

*n = 20*

*(Source: Survey, 2017).*

*Table 2: Scorecard for G. latifolium Sauce*

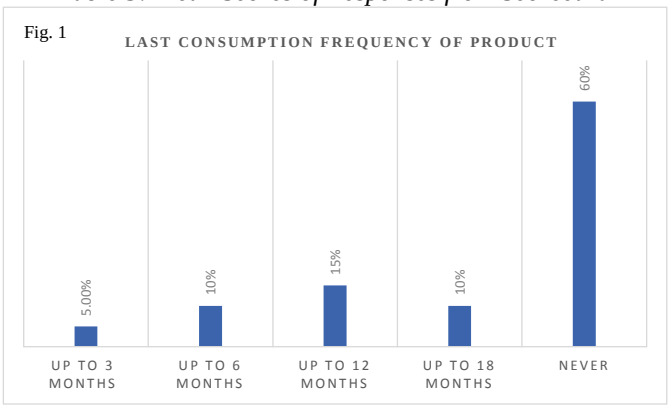
| Statement | Responses | | | | | |
|---|---|---|---|---|---|---|
| | a (%) | b (%) | c (%) | d (%) | Mean | Std. Deviation |
| **Palatability Factors** | | | | | | |
| 1. Appearance | 2 (10.0) | 15 (75.0) | 2 (10.0) | 1 (5.0) | 2.95 | 0.60 |
| 2. Colour Type | 13 (65.0) | 3 (15.0) | 2 (10.0) | 2 (10.0) | 3.35 | 0.70 |
| 3. Colour Acceptability | 11 (55.0) | 4 (20.0) | 3 (15.0) | 2 (10.0) | 3.20 | 0.66 |
| 4. Stability | 10 (50.0) | 5 (25.0) | 1 (5.0) | 4 (20.0) | 3.05 | 0.62 |
| 5. Odour Desirability | 12 (60.0) | 5 (25.0) | 3 (15.0) | 0 (0.0) | 3.45 | 0.73 |
| 6. Consistency | 5 (25.0) | 14 (70.0) | 1 (5.0) | 0 (0.0) | 3.20 | 0.66 |
| 7. Spreadability | 3 (15.0) | 16 (80.0) | 1 (5.0) | 0 (0.0) | 3.10 | 0.63 |
| 8. Flavour: Sourness | 4 (20.0) | 14 (70.0) | 2 (10.0) | 0 (0.0) | 3.10 | 0.63 |
| 9. Flavour Desirability | 12 (60.0) | 7 (35.0) | 1 (5.0) | 0 (0.0) | 3.55 | 0.80 |
| **Overall Rank** | **Acceptable** | | | | | |

*n = 20*

*(Source: Survey, 2017).*

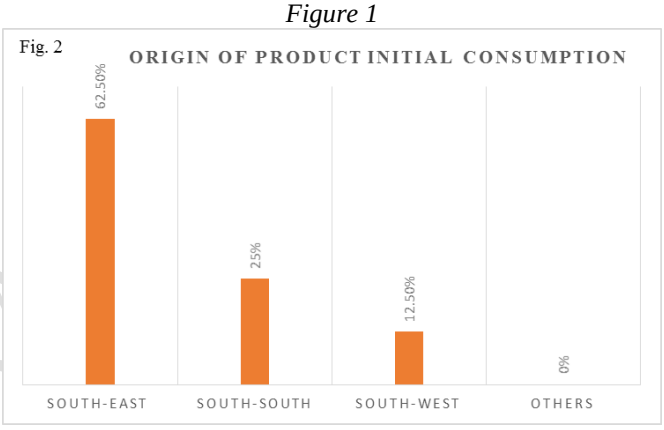
*Decision Rule: Respondents do not accept, if Mean ≤ 2.49. Respondents accept, if Mean ≥ 2.50.*

*Table 3: Mean Scores of Responses from Scorecard*



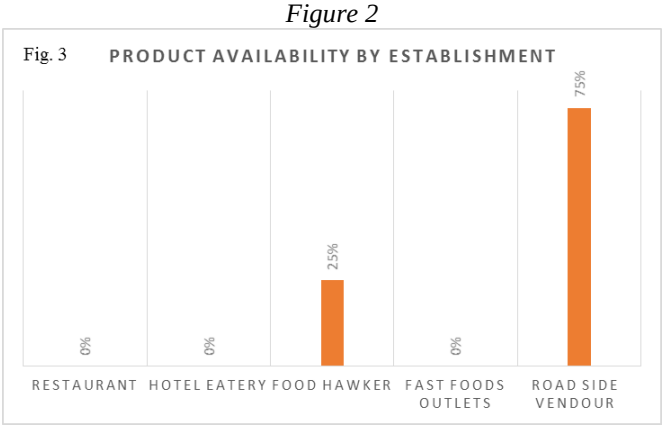

*n = 20*

*Figure 1*




*n = 8*

*Figure 2*




*n = 8*

*Figure 3*

## ANALYSES OF RESPONSES

Table 1 shows how respondents were distributed among the ethnic nationalities other than the South-East, as they are made up of male and female respondents. Female respondents are 9 (45.0%), while male respondents are 11 (55.0%). South-South respondents make up to 20.0% of the sample, 25.0% are from the South-West, and another 20.0% are from the North-Central. While the North-East has up to 11.0%, North-West

respondents equally account for 20.0% of the sample. Tertiary institution students account for 35.0% (7) of the respondents, while 65.0% (13) are public servants drawn from various establishments.

Data presented in Table 2 indicates the responses from sample for palatability factors of the product in which mean score and standard deviation for the responses are presented in Table 3. Results show that all palatability factors had means scores of ≥ 2.50, as the least mean score recorded in data analyses was ≥ 2.95 (for appearance), and a maximum score of ≥ 3.55 (for flavour desirability). Accordingly, respondents confirmed the acceptance of the product by consumers from various ethnic nationalities of Nigeria, which translates to easy adaptation of the product as a national food tourism product using the best product development and marketing approach.

Analysis presented (in Fig.1) shows that 60.0% of the respondents never consumed the product in any form. Only 5% (1) consumed the product in the last three months. While 10.0% (4 each) consumed the product in the last six and 18 months respectively, three (15.0%) had a taste of it in the last 12 months. Of the eight respondents that have consumed the product on previous experience, 62.5% consumed it from South-Eastern origin, while 25.0% and 12.5% consumed it in the South-South and South-West (Fig. 2).

Fig. 3 shows source of the product at the time of consumption, according to respondents. Roadside food vendors accounted for up to 75.0% supply of the product to respondents, while hawkers supplied to the remaining 25.0% respondents. The product was not available for the respondents through restaurants, hotels eateries fast food outlets.

Respondents affirmed having knowledge of availability of roast *D. rotundata* with *G. latifolium* sauce in the food market. However, the sauce is primarily prepared using raw palm oil, salt and pepper according to the respondents. Consequently, this shows the existence of the product, but in less fortified and presentable form. The method of preparation, the added ingredients and the presentation constitute the difference, hence the enhanced nutritional benefits.

## V. CONCLUSION

Consumption of roast *D. rotundata* with palm oil sauce has been practiced among the local populace for a very long time in South-Eastern Nigeria, but has been seen as an ordinary local delicacy for the indigenous consumers. No attempt has been made in the past by hospitality industry practitioners to introduce the dish to as many tourists as necessitated by their influx within the industry setting. This study has shown that consuming roast *D. rotundata* with fortified *G. latifolium* sauce it is not just a delicious meal; as it has tremendous health potentials. This work equally shows that *G. latifolium* leaves have potentials for use in food formulation operations in view of its amino acid profile and fatty acid contents, and is acceptable by a variety of consumers. The observed antibacterial activity in the plant, according to literature, suggests that it may play dual role in food and non-food systems where it may also find use.

The work also revealed the general acceptability of the meal by patrons outside the South-Eastern native consumers of the country, showing that it could be transformed from a regional to a national menu using the right product development approach, thereby boosting the food tourism content of the hospitality sub-sector, and the tourism sector generally. Making the product available would equally benefit the local (micro) economy, due to the fact that the primary product (yam) is cultivated and consumed in all the ethnic nationalities of the country, and could therefore benefit the local people as greater participation in the cultivation and marketing of the raw materials (yam and utazi leaves) will be necessitated, thereby improving micro revenue for the local people.

## RECOMMENDATION

The increase in innovative culinary experience goes along with a rise in emphasis on food tourism in contemporary global tourism. It is imperative for the local restaurant industry to integrate the production and service of Roast *D. rotundata* with fortified *G. latifolium* Sauce in their menu. Since the commodities for the production of the dish have an all-year availability, and the dish is equally acceptable by numerous consumers considering its numerous nutritional and health benefits, emphasis should be placed on transforming the delicacy from a regional menu to a standard national delicacy and a tourism product. It is, therefore, recommended that a gradual take-off in the introduction process of the delicacy in local restaurants be undertaken in order to achieve the desired result of new product development in boosting the local content of the food tourism segment of the tourism sector in Nigeria.

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