# Evaluation of Physicochemical, Functional and Sensory Qualities of Ofada Rice (*Oryza sativa L.*)- Sweet Potato (*Ipomoea batatas Lam*)-Wheat (*Triticum aestivum*) Cake

***Adegoke, Adekola[1], Ajala, Pelumi[1], Omohimi, Celestina[1], Adebowale, Abdul-rasaq[1], Kajihausa, Olatundun[1], Adekoyeni, Oludare[2], John, Ebenezer[3] and Sanni, Lateef[1,4]**

[1]*Department of Food Science and Technology, Federal University of Agriculture, Abeokuta, Ogun State, Nigeria*
[2]*Department of Home Science and Management, Federal University Gashua, Yobe State, Nigeria*
[3]*Department of Nutrition and Dietetics, Federal University of Agriculture, Abeokuta, Ogun State, Nigeria.*
[4]*International Institute of Tropical Agriculture, Ibadan, Nigeria*

***Corresponding author:** saintadekolaadegoke@yahoo.com*

***ABSTRACT***

***Background:*** *There is a compelling need to create suitable wheat alternative, as the demand and price of wheat has been exacerbated by economic realities. Ofada rice-sweet potato-wheat flour mixes could reduce overdependence on wheat flour and increase culinary and industrial utilization of ofada rice and sweet potato.*

***Objective:*** *This study aimed to make cake out of a combination of ofada rice-sweet potato-wheat flour mixes and improve the nutritional content of the cake.*

***Methods:*** *The flours were produced using standard laboratory procedures and their samples were analyzed. The results of the chemical and organoleptic analyses were subjected to Analysis of Variance at a significance level of 5% using SPSS.*

***Results:*** *Moisture, ash, protein, fat, crude fiber, and carbohydrate contents varied from 30.23 to 36.08%, 2.05 to 2.43%, 5.29 to 6.08%, 17.21 to 21.36%, 2.95 to 5.88%, and 33.99 to 38.78%, respectively. The functional characteristics (bulk density, water and oil absorption capacity, and foaming capacity) varied from 0.61 to 0.81 g/ml, 139.07 to 168.2%, 120.51 to 126.59%, and 1.50 to 7.25%, respectively. However, sensory evaluation results revealed that composite cake A, D, F, E and G were the best in overall acceptability but, A, D, E and G were the best in volume and weight increase. The sensory analysis revealed that the Sample D cake had similar values to the 100% wheat flour cake.*

***Conclusion:*** *The cake samples were generally accepted and the wheat flour fortified with ofada rice and sweet potato flours yielded high-quality cakes.*

**Keywords:** *Ofada*, proximate, functional, overall acceptance

## INTRODUCTION

Cakes are sweet and frequently baked food items made mostly from wheat flour, sugar, shortening, baking powder, and egg (1, 2). Breads were formerly reformed to produce cakes from many sorts of preparations, which might be basic or intricate. Cakes originated as bread adaptations and it is frequently offered as a celebratory food.

Sweet potato has been designated as a food security crop because it includes a sufficient number of bioactive substances such as beta-carotene, ascorbic acid, polyphenols, dietary fiber, vitamins, minerals, and proteins (3, 4). Although, it is high in starch and carbohydrate, and its flour may be used in a variety of industrial

applications, the crop is currently neglected (5). Because of the existence of different quantities of phenolic chemicals and colour in their tubers, the most generally available sweet potato types contain purple, yellow, and white tubers (6, 7). Sweet potatoes are processed into intermediate products such as High-Quality Flour that may be blended into other food items to reduce post-harvest losses (8, 2).

One of the rice grown and processed in the rice-producing clusters of Nigeria's south-west is referred to as *Ofada* rice (9, 10). Reports revealed that the first cultivation was in Egba zone, Ogun State, Nigeria. It is preferred above other local kinds because of its distinct flavour, fragrance, and nutritional benefits (11, 12). Due to the texture and taste it imparts to completed products, rice flour may also be used to manufacture confectionery items such as rice cakes, macarons, and various types of buns (13, 14).

Wheat is the most commonly used grain in the confectionery industry due to the unique qualities of its gluten, which combines the strength and flexibility needed to make bread, cookies, cakes, and pastries (15). Wheat is the world agriculture's universal grain and the most widely eaten agricultural plant, followed by rice and maize (16). Wheat is categorized as soft or hard depending on the amount of gluten it contains. Soft wheat has a low gluten level, whereas hard wheat has a high gluten concentration. Hard flour, often known as bread flour, is strong in gluten, containing 12 to 14% gluten, and its dough is elastic and keeps its shape well once baked. Soft flour has a lower gluten content than hard flour, resulting in a finer, crumblier texture in the bread loaf (17).

Many developing nations that rely on wheat as a main crop are unable to produce enough wheat to meet their needs (16). Composite flour is a blend of flours derived from roots, tubers, cereals, and legumes, with or without wheat flour, with the goal of producing goods that are superior to the individual components (18). Many of the developing countries that depend on wheat as a staple crop are not self-sufficient in wheat production, and accordingly, there is a pressing need to create a suitable wheat alternative, as the demand for and price of this crop might be exacerbated by fluctuating currency rates (19). In developing nations, sweet potato flour is useful since it decreases the importation of wheat flour and stimulates the use of locally grown foods (20).

The goal of this study was to make cakes out of a combination of *ofada* rice, sweet potato, and wheat flour, supplementing wheat flour with low-cost staples like sweet potato flour, reducing overdependence on wheat and improving the nutritional content of wheat based foods.

## MATERIALS AND METHODS

### Materials

Sweet potato, *ofada* rice, and Honeywell wheat flour were purchased at Lafenwa market, Abeokuta, Ogun state, Nigeria. Margarine, egg, sugar, baking powder, and flavouring were obtained from Modu mall, Abeokuta. The ingredients were obtained from the mall to ensure they have integrity, that is, well stored and kept prior to their use.

### Sweet potato flour preparation

However, (21) reported a method for making good quality sweet potato flour. Sweet potatoes were hand-peeled with knives after being rinsed with water to eliminate dirt and other pollutants. With the use of a slicer, the peeled potatoes were cut into smaller, consistent pieces. To prevent browning, the sliced potatoes were immediately immersed in water that had already been treated with sodium metabisulphite. The washed potatoes were dried for 6 hours at 60°C in a Gallenkamp convective hot air drier. Dried potato chips were grounded into flour, sieved, and sealed in a zip lock bag.

### *Ofada* rice flour preparation

For the production of *ofada* rice flour, (22) technique was adopted. The *ofada* rice paddy (2 kg) was soaked in cold water at ambient temperature for 5 days. The soaked paddy was parboiled for 15 minutes at 120°C under continuous pressure in a digital autoclave. The parboiled paddy was allowed to cool for 30 minutes before being air dried at room temperature. In a grantex cono disc milling machine, the rice was milled (hulled and de-hulled). Before being used, the raw rice grains were pulverized in a hammer mill, sieved (200 micron size), and stored in an airtight container.

### Cake preparation

Laboratory cake preparation methods described by (13) and (23) were used. In a stainless-steel dish, the margarine and sugar were mixed for 10 minutes with a hand mixer until light and fluffy.

The egg was beaten for 3 minutes before being used in the batter. This was done to keep the batter from curdling. The vanilla essence was added once the batter had developed a soft velvety feel. While beating proceeded, the batter was gradually added to the creamed mixture. Flour blends of potato, rice and wheat flours were prepared in the following proportion: 0:0:100, 5:5:90, 10:10:80, 15:15:70, 20:20:60, 25:25:50, 100:0:0, 0:100:0. The samples were coded as shown below in all the experiments:

A = 100% wheat flour,
B = 100% sweet potato flour,
C= 100% ofada rice flour,
D = 90% wheat flour, 5% ofada rice flour and 5% sweet potato flour,
E = 80% wheat flour, 10% ofada rice flour and 10% sweet potato flour,
F = 70% wheat flour, 15% ofada rice flour and 15% sweet potato flour,
G= 60% wheat flour, 20% ofada rice flour and 20% sweet potato flour,
H = 50% wheat flour, 25% ofada rice flour and 25% sweet potato flour

The composite mixes were sieved, baking powder was added, and spooned into prepared cake pans. The mixture was transferred to a baking sheet and cooked for 30 minutes at 130°C in a preheated oven. To check if the cake was done, a skewer was pushed into the center. The cake samples were taken out of the oven once baked and allowed to cool at room temperature.

## ANALYSIS OF SAMPLES

### Determination of proximate composition

The proximate composition (moisture content, ash content, crude fat, protein content, crude fiber, carbohydrate) was determined in accordance with the AOAC guidelines (24) in Food Processing Laboratory of Department of Food Science and Technology, FUNAAB, Abeokuta.

## WATER AND OIL ABSORPTION CAPACITY

Association of Official Analytical Chemists method reported by (25) was used to assess water absorption capacity. One gram (1g) of flour was measured into a centrifuge tube, and the sample was well mixed with 10 ml distilled water for 30 seconds before being left to remain at room temperature for 30 minutes. After centrifuging the sample at 4000rpm for 30 minutes, the unabsorbed water was decanted and quantified. The volume of water absorbed per gram of sample was used to calculate the water absorption capacity. When water was replaced with vegetable oil, the same process was applied to measure oil absorption capability. In 10ml graduated centrifuge tubes, 1g of each sample was put to 5ml of sorrel oil (0.88g/ml). To disseminate the sample oil, the mixture was swirled using a glass rod. It was centrifuged for 30 minutes at 3500rpm after being held for 30 minutes. The proportion of oil bound by a 100g sample was used to calculate the surplus oil absorbed.

## BULK DENSITY

Ten (10ml) measuring cylinder was weighed empty and then filled up with the sample. The bottom of the measuring cylinder was tapped on the bench several times until there was no longer reduction in the level of the sample. The measuring cylinder was reweighed and the volume of the sample in the cylinder was also noted. Bulk density was expressed as the weight of tapped sample per unit volume. The weight of tapped sample per unit volume was used to calculate bulk density (24).

## FOAMING CAPACITY

With minor modifications, the foaming capacity was calculated using the method reported by (26). In a graduated cylinder, 1.0 g flour was added to 50ml distilled water at 302°C. To froth the suspension, it was combined and shook for 5 minutes. The volume of foam after 30 seconds after whipping was calculated using the formula:

$$Foaming\ capacity\ (\%) = \frac{Volume\ of\ foam\ AW - Volume\ of\ foam\ BW}{Volume\ of\ foam\ BW} \times 100$$

Where, AW=after whipping, BW=before whipping

To evaluate foam capacity as a percentage of original foam volume, the volume of foam was measured 1 hour after whipping.

## SENSORY EVALUATION

A team of fifty (50) untrained panelists assessed the cake samples using their senses. (27) used a nine-point hedonic scale to score the sensory qualities of crust color, taste, fragrance, appearance, mouth-feel, flavor, and overall

acceptability.

**Statistical Analysis**

All of the generated data from the analyses were put to Analysis of Variance (ANOVA) in triplicates, with the deviation of the scores from the mean being added. Duncan's Multiple Range Test was used to separate the means using SPSS.

## RESULTS

**Functional Properties of Flour Blend Samples**

Table 1 lists the functional characteristics of the flour mixes. The bulk densities of the flours differed greatly, ranging from 0.69 to 0.81%. The particle size and density of the flour may have influenced the bulk density, which is critical in determining packing needs, material handling, and use in wet processing in the food business (28). Higher flour bulk density is often necessary for ease of dispersibility, which reduces paste thickness, which is a significant component in convalescent kid feeding (28). The greatest ash concentration was 0.81% in sample C, while the lowest was 0.69 percent in sample A. Sweet potato flours (0.72%) had similar values to those found by other studies (29).

The water and oil absorption capabilities of the flours varied significantly, ranging from 139.07 to 168.2% and 120.51 to 126.59%, respectively. Sample C had the greatest value of 168.2 and 126.59%, whereas sample A had the lowest value of 139.07 and 168.2%, which might be related to granule size differences boosting the flours' capacity to absorb water and oil. Because starch lacks non-polar sites compared to proteins, oil absorption in starch is mostly based on physical trapping of oil inside the starch structure (30). The ability of flours to absorb oil is also vital for the creation of novel food items and has a significant impact on their storage durability (31). Sample B had the maximum foaming capacity, whereas Sample C had the lowest.

**Proximate Composition of Cake**

Moisture, ash, protein, fat, crude fiber, and carbohydrate contents of cake samples from various flour blends ranged from 30.23 to 36.08%, 2.05 to 2.43%, 5.29 to 6.08%, 17.21 to 21.36%, 2.95 to 5.88%, and 33.99 to 38.78%, respectively (Table 2). The cake made entirely of sweet potato flour had the greatest levels of protein (6.08%), fiber (5.88%), and ash (2.43%), but the lowest levels of moisture (30.23%) and carbs. Due to its low moisture content, the 100% sweet potato cake has a strong stability propensity. It has been claimed that food with a reduced moisture content has a longer shelf life and better quality (32). The percentage of amylose and amylopectin in flour ingredient blends might predict moisture absorption among the samples. Also, (32) found that adding sweet potato flour to a rice and sweet potato composite used in biscuit making increased the moisture content significantly.

The greatest protein content in the 100% sweet potato cake might be related to its diversity, while the general low protein content in the cakes could be due to high baking temperatures, which can cause protein loss in foods (33, 34, 2).

**Proximate Composition of Cake**

Moisture, ash, protein, fat, crude fiber, and

**Table 1: Functional properties of wheat flour, sweet potato flour and *ofada* rice flour**

| Samples | Bulk Density (g/ml) | WAC (%) | OAC (%) | FC (%) |
|---|---|---|---|---|
| A | $0.69 \pm 0.005^{a}$ | $139.07 \pm 1.344^{a}$ | $120.51 \pm 0.467^{a}$ | $5.00 \pm 0.000^{b}$ |
| B | $0.72 \pm 0.002^{b}$ | $151.68 \pm 0.707^{b}$ | $122.56 \pm 0.431^{b}$ | $7.25 \pm 0.354^{c}$ |
| C | $0.81 \pm 0.014^{c}$ | $168.20 \pm 0.233^{c}$ | $126.59 \pm 0.247^{c}$ | $1.50 \pm 0.000^{a}$ |

Values are mean ± Standard deviation of duplicate determinations. Mean values along the same column with different superscripts are significantly different ($p \leq 0.05$).

Keys:
A = 100% wheat flour, B = 100% sweet potato flour, C= 100% *ofada* rice flour
WAC = Water absorption Capacity
OAC = Oil Absorption capacity
FC= Foaming Capacity

**Table 2: Proximate composition of cake prepared from wheat flour, sweet potato flour and *ofada* rice flour blends**

| Sample | Moisture Content (%) | Dry Matter Content (%) | Fat Content (%) | Ash Content (%) | Crude Fibre Content (%) | Crude Protein Content (%) | CHO Content (%) |
|---|---|---|---|---|---|---|---|
| A | 33.05±0.050$^{d}$ | 66.96±0.050$^{e}$ | 17.84±0.021$^{b}$ | 2.10±0.021$^{ab}$ | 2.95±0.050$^{a}$ | 5.57±0.021$^{c}$ | 38.52±0.064$^{d}$ |
| B | 30.23±0.035$^{a}$ | 69.73±0.035$^{h}$ | 21.36±0.035$^{e}$ | 2.43±0.028$^{g}$ | 5.88±0.021$^{e}$ | 6.08±0.091$^{e}$ | 33.99±0.141a |
| C | 30.77±0.042$^{c}$ | 69.22±0.057$^{f}$ | 17.61±0.028$^{a}$ | 2.28±0.021$^{e}$ | 4.79±0.085$^{d}$ | 5.77±0.021$^{de}$ | 38.78±0.099d |
| D | 33.45±0.163$^{e}$ | 66.56±0.163$^{d}$ | 19.31±0.078$^{d}$ | 2.15±0.014$^{c}$ | 3.22±0.064$^{a}$ | 5.67±0.014$^{d}$ | 36.22±0.007c |
| E | 34.79±0.099$^{g}$ | 65.23±0.078$^{b}$ | 17.76±0.035$^{b}$ | 2.12±0.014$^{bc}$ | 3.97±0.728$^{c}$ | 5.50±0.014bc | 35.89±0.686bc |
| F | 36.08±0.050h | 63.93±0.050a | 17.76±0.028b | 2.05±0.014a | 3.36±0.028ab | 5.29±0.042a | 35.47±0.064b |
| G | 30.45±0.042b | 69.55±0.042g | 21.36±0.021e | 2.35±0.042f | 4.25±0.050cd | 5.85±0.050e | 35.76±0.035bc |
| H | 33.72±0.021f | 66.29±0.021c | 18.90±0.035c | 2.20±0.007d | 3.95±0.042bc | 5.43±0.021b | 35.81±0.071bc |

Values are mean ± Standard deviation of duplicate determinations. Mean values along the same column with different superscripts are significantly different ($p \leq 0.05$)

**Table 3:Colour analysis of cake samples prepared from blends of wheat flour, sweet potato flour and *ofada* rice flour**

| Samples | L | A | B | L▲ | A▲ | B▲ |
|---|---|---|---|---|---|---|
| A | 56.23±1.082$^{e}$ | 1.18±0.113$^{b}$ | 20.29±0.403$^{e}$ | 63.02±1.018$^{e}$ | 1.36±0.127$^{b}$ | 29.20±0.389$^{f}$ |
| B | 49.95±0.035$^{b}$ | 4.59±0.657$^{f}$ | 19.07±0.028$^{d}$ | 54.07±0.035$^{b}$ | 5.53±0.064$^{g}$ | 30.33±0.085$^{g}$ |
| C | 43.47±0.311$^{a}$ | 4.49±0.028$^{f}$ | 17.53±0.163$^{b}$ | 50.53±0.262$^{a}$ | 5.66±0.424$^{g}$ | 28.52±0.219$^{e}$ |
| D | 49.21±0.841$^{c}$ | 0.77±0.007$^{a}$ | 17.90±0.191$^{c}$ | 56.03±0.438$^{c}$ | 0.92±0.007$^{a}$ | 27.10±0.219$^{c}$ |
| E | 52.57±0.537$^{d}$ | 2.14±0.099$^{c}$ | 19.17±0.205$^{d}$ | 59.56±0.509$^{d}$ | 2.51±0.106$^{c}$ | 28.30±0.212$^{de}$ |
| F | 46.82±0.078$^{b}$ | 3.15±0.000$^{d}$ | 16.77±0.000$^{a}$ | 53.94±0.085$^{b}$ | 3.81±0.000$^{d}$ | 25.61±0.021$^{a}$ |
| G | 48.76±0.290$^{c}$ | 3.55±0.057$^{e}$ | 18.21±0.050$^{c}$ | 55.66±0.000$^{c}$ | 4.25±0.064$^{e}$ | 27.87±0.134$^{d}$ |
| H | 46.35±0.509$^{b}$ | 3.65±0.099$^{e}$ | 17.01±0.212$^{a}$ | 53.47±0.509$^{b}$ | 4.43±0.106$^{f}$ | 26.25±0.240$^{b}$ |

Values are mean ± Standard deviation of duplicate determinations. Mean values along the same column with different superscripts are significantly different ($p \leq 0.05$).

**Table 4:Physical properties (%) of cake prepared from wheat flour, sweet potato flour and *ofada* rice flour**

| Samples | Weight (g) | Volume ($cm^3$) |
|---|---|---|
| A | 32.00±1.414 | 58.00±0.000 |
| B | 31.00±1.414 | 55.00±1.414 |
| C | 31.50±0.707 | 53.00±0.000 |
| D | 31.50±0.707 | 58.00±1.414 |
| E | 31.50±0.707 | 58.00±0.000 |
| F | 31.50±0.707 | 51.00±1.414 |
| G | 31.50±0.707 | 52.00±1.414 |
| H | 31.50±0.707 | 51.00±0.000 |

Values are mean ± Standard deviation of duplicate determinations.

carbohydrate contents of cake samples from various flour blends ranged from 30.23 to 36.08%, 2.05 to 2.43%, 5.29 to 6.08%, 17.21 to 21.36%, 2.95 to 5.88%, and 33.99 to 38.78%, respectively (Table 2). The cake made entirely of sweet potato flour had the greatest levels of protein (6.08%), fiber (5.88%), and ash (2.43%), but the lowest levels of moisture (30.23%) and carbs. Due to its low moisture content, the 100% sweet potato cake has a strong stability propensity. It has been claimed that food with a reduced moisture content has a longer shelf life and better quality (32). The percentage of amylose and amylopectin in flour ingredient blends might predict moisture absorption among the samples. Also, (32) found that adding sweet potato flour to a rice and sweet potato composite used in biscuit making increased the moisture content significantly.

The greatest protein content in the 100% sweet potato cake might be related to its diversity, while the general low protein content in the cakes could be due to high baking temperatures, which can cause protein loss in foods (33, 34, 2).

**Colour parameters of cake samples from blends of wheat flour, *ofada* rice flour and sweet potato flour**

Table 3 shows the colour characteristics of cakes made with various wheat mixtures. The cakes created were discovered to be of various colour. There was a significant difference ($p< 0.05$) between the lightness (L*), redness (+a*), and yellowness (+b*) of the cake's crust colour. Low L* value causes darkening, positive a* value causes reddishness, and low b* value causes yellowishness. The brown hue is the brown hue (h*) as expressed in the polar L*C*h* space, which is created by mixing red, blue, and yellow hues. Low lightness is often connected with the results of caramelization and Maillard reactions of sweetener utilized, therefore this colour may be attributed to it (35). Sample A had a higher L (63.02) than any other cake sample created, followed by sample E (59.56), resulting in a lighter and more yellowish cake, but cake from sample C had a darker colour due to its low value (50.53). There is a considerable rise in a* with the addition of more sweet potato and *ofada* rice to the flour, as well as a reduction in wheat flour, as seen in the data below. Sample B has the greatest value for b*.

**Sensory attributes of the cake**

Table 5 shows the sensory qualities of cake samples made from wheat flour, *ofada* rice flour, and sweet potato flour mixes. Crust, appearance, taste, scent, appearance, flavor, mouth feel, and overall acceptability were the sensory attributes evaluated. The look of the crust and the appearance of the cake samples created received ratings ranging from 4.8 to 7.32 and 5.44 to 7.4, respectively. All of the samples showed a significant difference ($p< 0.05$).

**DISCUSSION**

Cake made with 60% wheat flour, 20% *ofada* rice flour, and 20% sweet potato flour had the greatest fat content, while cake made with 100% *ofada* rice flour had the lowest fat content. As the amount of *ofada* rice flour and sweet potato flour in the blends grew, the fat content of the cake gradually rose. This might be due to the high starch and sugar content of these flours (36). As the amount of substitution of *ofada* rice flour and sweet potato flour blends rose, the fiber content of

**Table 5:Sensory analysis (%) of cake prepared from wheat flour, sweet potato flour and *ofada* rice flour**

| Samples | Flavour | Mouth Feel | Appearance | Taste | Aroma | Crust Appearance | Overall Acceptability |
|---|---|---|---|---|---|---|---|
| A | 7.40±1.143$^{d}$ | 7.10±1.359$^{d}$ | 7.40±1.294$^{d}$ | 7.58±1.263$^{d}$ | 6.84±1.754$^{cd}$ | 7.26±1.322$^{d}$ | 7.68±1.096$^{e}$ |
| B | 4.43±2.016$^{a}$ | 4.04±2.040$^{a}$ | 5.44±2.002$^{a}$ | 4.16±1.983$^{a}$ | 4.36±2.211$^{a}$ | 4.80±1.948$^{a}$ | 4.40±2.148$^{a}$ |
| C | 5.34±2.455$^{b}$ | 5.34±2.430$^{b}$ | 5.86±1.818$^{ab}$ | 5.32±2.394$^{b}$ | 5.48±2.073$^{b}$ | 5.50±2.033$^{b}$ | 5.50±2.297$^{b}$ |
| D | 7.34±1.394$^{d}$ | 7.24±1.393$^{d}$ | 7.24±1.333$^{d}$ | 7.52±1.328$^{d}$ | 7.22±1.329$^{d}$ | 7.32±1.168$^{d}$ | 7.50±1.233$^{de}$ |
| E | 6.80±1.414$^{cd}$ | 6.58±1.566$^{cd}$ | 6.36±1.793$^{bc}$ | 6.78±1.556$^{c}$ | 6.62±1.441$^{cd}$ | 6.40±1.906$^{c}$ | 6.86±1.690$^{cd}$ |
| F | 6.60±1.457$^{c}$ | 6.58±1.553$^{cd}$ | 6.78±1.389$^{cd}$ | 6.84±1.419$^{c}$ | 6.46±1.474$^{c}$ | 6.64±1.522$^{cd}$ | 6.92±1.353$^{cd}$ |
| G | 6.40±1.370$^{c}$ | 6.26±1.482$^{c}$ | 6.48±1.297$^{bc}$ | 6.40±1.471$^{c}$ | 6.26±1.482$^{c}$ | 6.28±1.604$^{c}$ | 6.82±1.351$^{cd}$ |
| H | 6.14±1.980$^{c}$ | 6.02±1.890$^{bc}$ | 6.46±1.705$^{bc}$ | 6.26±1.676$^{c}$ | 6.36±1.509$^{c}$ | 6.38±1.563$^{c}$ | 6.58±1.715$^{c}$ |

Mean values along the same column with different superscripts are significantly different ($p \leq 0.05$).

the cakes increased. This demonstrates that the composite mixes are high in fiber and may be utilized to make useful food items. High fiber diets have been related to lower rates of hemorrhoids, diabetes, high blood pressure, and obesity (36).

The cakes have a lot of ash in them. The cake with the lowest ash concentration was made using 70% wheat flour, 15% *ofada* rice flour, and 15% sweet potato flour. Sweet potatoes were discovered to have a beneficial influence on ash content (38, 39). The cake made entirely with *ofada* rice has the largest carbohydrate content. High levels of carbohydrates are desirable in cake products because when starch granules are heated in the presence of water, they expand and create a gel, which is necessary for the characteristic textures and structures of baked goods, starting at 10% and decreasing to 50%. Rice and sweet potato, according to (2), are good carbohydrate sources. The protein content of cake was considerably reduced ($p<0.05$) when the amount of sweet potatoes and rice flour used in the recipe was increased. Sweet potatoes have a high glucose content, which might explain this.

Although, according to (35), the bulk density of flour affects the weight and volume of baked goods. According to the results, there was no significant difference in the weight and volume of cake samples (wheat, *ofada* rice, and sweet potato flour) when different flour formulations were used.

Samples A (100% wheat flour) and D (90% wheat flour, 5% *ofada* rice flour, and 5% sweet potato flour) had the highest ratings, while Sample B (100% Sweat potato flour) received the lowest ratings respectively. The cake samples generated varied in scent and tongue feel from. Sample D (90% wheat flour, 5% *ofada* rice flour, and 5% sweet potato flour) had the highest and lowest ratings, whereas sample B (sweet potato flour) received the lowest and highest ratings. The taste and flavour of the cake samples created received good ratings. Sample D (90% wheat flour, 5% *ofada* rice flour, and 5% sweet potato flour) had the greatest and lowest ratings, while Sample B (sweet potato flour) received the lowest ratings. In addition, the overall acceptability was good. Sample A had the highest overall acceptance, while Sample B had the lowest overall acceptability. Overall, consumer acceptability revealed that the cake samples were well received by the panelists. According to the sensory assessment results, the most favored cake sample was made with 100% wheat flour, while the least preferred cake sample was made with 100% potato flour.

## CONCLUSION

The production of a cake combining *ofada* rice and sweet potato flour mixes with wheat was effective, and only minor substitutions were necessary for sensory quality, functionality, and nutrition to be acceptable. This would assist to broaden the uses of sweet potato and *ofada* rice in meals, as well as reduce post-harvest losses and save foreign exchange wasted on wheat imports. The use of *ofada* rice and sweet potato flours in cake manufacturing will considerably increase the usage of these crops in Sub-Saharan African nations such as Nigeria, where they are underutilized. However, further study should be done on the goods' shelf stability as well as their micro nutritional content.

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