

NUTRITIONAL AND SENSORY, EVALUATION OF BLENDED FLOUR OF WHITE- MAIZE, BENISEED AND DATE- FRUIT FOR PRODUCTION OF CAKE FOR ACTUALISING SUSTAINABLE DEVELOPMENT GOALS.

OPALEKE, D. O.¹, SALAMI, L. I., IHENSEKHEN, I.² & ISHAQ, H. O.¹

Department of Home Economics and Food Science,
Faculty of Agriculture, University of Ilorin, Ilorin, Nigeria.

²Department of Vocational and Technical Education,
Faculty of Education, University of Benin,
Benin City, Nigeria.

Corresponding author: dopaleke@yahoo.com, oluyemisi@unilorin.edu.ng
+2348053826321.

Abstract

The study evaluated the sensory and nutritional attributes of blends of white maize and beniseed (*Gorigo*) flour sweetened with date fruit in cake production. The experimental research design was adopted for the study. Six coded samples of cake produced from wheat, Maize flour, beniseed flour and date fruit: WHS(100% Wheat + Sugar), WHD(100% Wheat + Date), MS(100% Maize + sugar), MD(100% Maize + Date), MBS(50% Maize + 50% Beniseed + sugar), MBD(50% Maize + 50% Beniseed + Date) were subjected to proximate content determination and sensory evaluation. The data obtained were subjected to descriptive and inferential statistics. The result revealed that there was significant difference ($p < 0.05$) in the colour, aroma, taste, texture and overall acceptability of the products, with the sample WHS being most preferred and the sample MD (being least preferred). Sample MBD was least preferred across all sensory quality and overall acceptability. Result of nutritional composition of samples showed that crude protein, moisture, crude fat, crude fibre and ash increased from 7.31 to 11.70, 9.80 to 12.47, 17.26 to 20.17, 2.03 to 2.35, and 1.05 to 1.84 respectively in the maize-beniseed-date sample. However, carbohydrate content reduced from 60.27 in the wheat-date sample to 51.49 in the maize-beniseed-date sample. WHS was most preferred with mean score of 7.73, while sample MD was least preferred with mean score of 5.40. The study concludes that the maize-beniseed-date sample was least preferred across all sensory qualities, the nutritional composition of sample showed that crude protein, moisture, crude fat, crude fibre and ash increased in the maize-beniseed-date sample. It was therefore recommended that *the production of maize-beniseed-date sample should be encouraged for its rich source of nutrients, and dietitians should recommend the maize-beniseed-date cake to patients with gluten sensitivity (Celiac patients) and those with protein-energy malnutrition.*

Keywords: Sensory, Chemical Composition, Maize, Beniseed, Date, Cake.

Introduction

Cake is a snack that is usually readily available and enjoyed by children and adults. It is a convenient food product. According to Eke (2008) & (Atef, Mostafa & Samia 2011) Cake is usually served as dessert for meals at ceremonial occasions, like wedding anniversaries, and birthdays. Ingredients usually contain wheat flour, sugar, eggs, butter or oil with some varieties also requiring liquid (such as milk) and leavening agents such as baking powder and flavourings. Generally, wheat flour is commonly used in baking cake and high demand of wheat flour for the production of baked product has led to high cost of purchased.

Maize or corn (*Zea mays*) is an important annual cereal crop of the world belonging to family of Poaceae. Maize (*Zea mays*) is a cereal plant that produces grains that can be cooked, roasted, fried, grind, pounded or

crushed to prepare various food items like *Pap*, *Tuwo*, *Gwate*, *Donkunu*, *Aadun*, *Egbo* and many others. All these foods are readily available in various parts of Nigeria among different ethnic groups notably among Yoruba, Hausas, Igbo's. Apart from food, Maize is also useful for medicinal purpose and as raw materials for some industries (Suresh and Samsher, 2013). Maize lack amino acids which are lysine and tryptophan which are present in legumes (Janice, Thompson, Linda 2010) therefore, it should not be taking alone. Sesame commonly known as "beniseed" in Nigeria has been regarded as a crop of insignificant importance compared to groundnut, soybean and other legumes. It is widely grown in Northern and Central part of the country as a minor crop, owing to this, there has been little research efforts on the crop. Peters Henry., Mgbang John Edward., Essien N. A & Ikpeme Christine Emmanuel (2016) reported that beniseed has good nutritional value similar to soybean, which is

important for children, such as dietary fiber, iron, vitamin c and B-6, magnesium and potassium. Beniseed is an oilseed rich in protein, and methionine

hence it has potential use in food products as a protein supplement, and there is a need to utilize the defatted sesame meal for edible purposes.

Beniseed nutrition profile (Sesame indicum) values per 100g.

Principle	Nutrient value	Percentage of RDA
Energy	573kcal	29%
Carbohydrates	23.45g	18%
Protein	17.73g	32%
Total fat	46.67g	166%
Cholesterol	0mg	0%
Dietary fibre	11.8g	31%
VITAMINS		
Folates	97µg	25%
Niacin	4.515mg	28%
Panthothenic acid	0.050mg	1%
Pyridoxine	0.790mg	61%
Riboflavin	0.247mg	19%
Thiamin	0.791mg	66%
Vitamin A	9 IU	1%
Vitamin C	0	0%
Vitamin E	0.25mg	2%
ELECTOLYTE		
Sodium	11mg	1%
Potassium	468mg	10%
MINERALS		
Calcium	975mg	98%
Copper	4.082 mg	453%
Iron	14.55%	182%
Magnesium	351 mg	88%
Manganese	2.460 mg	107%
Phosphorous	629 mg	90%
Selenium	34.4µg	62.5%
Zinc	7.75mg	70%

Source: (www.nutrition-and-you.com)

Date fruits (phoenix dactylifera) are important commercial crop in the Middle East with a high percentage of carbohydrate, fat; comprising 14 types of fatty acids, 15 salts and minerals, protein with 23 different amino acids, six vitamins and a high percentage of dietary fibre (Walid *et al.*, 2003)& (Food and Agriculture Organization, 2006). Dates is known as “Dabino” in Nigeria and mostly used by the Muslim to break their fast. In Northern Nigeria, Date and pepper are added to traditional beer so as to make it less intoxicating. Dates are one of the best sweet and versatile foods that can regulate the digestive process.

Previous studies (Hane, 2013) and (Sahiet *et al.*, 2003; Sakiyanet *et al.*, 2004) described cake ingredients to be flour (which can be from wheat, maize or any other cereal), fat, sweetener e.g., sugar, eggs, baking powders, and flavorings are used for specialty cakes. The quality and quantity of what makes up the cake are important and has influence on the properties of the final product as well as the stability of quality during shelf life. Flour: Flour is the core ingredient in baking as it gives structure by building up frame work (Rabb, 2004).

Statement of the Problem

Beniseed is a highly nutritious but underutilized legume crop in Nigeria; it has been regarded as less significance compared to groundnut, soybean and other legumes in which it has nutritional value of oil (58%), protein (25%), Carbohydrate (13.5%) and ash (5%) similar to soybean which is important for children. Malnutrition has been a major problem affecting most people in the world especially children. Malnutrition during childhood can lead not only to long- term health problems but also to educational challenges and limited work opportunities in future. Most children are malnourished due to poor nutrition and since children enjoys eating snacks and even consumes snacks as part of their major diet therefore, there is need to produce cake such that it meets the nutritional requirements of children by fortifying cakes in other to make it balanced. It has also been identified that there are people who are intolerant to certain protein (gluten) in wheat (Celiac patient). Wheat flour is the most commonly used flour for baked products and pastries, high demand of wheat flour for the production of baked product has led to high cost of purchase because it is not produced locally. Several attempts have been made to produce cake from non-wheat flours. Atef et al., (2011), reported the use of fava beans and cowpea flour in the production of gluten-free cake to combat the prevalence of autism and celiac disease (CD), an intolerance of gluten the active ingredients of cakes which are wheat flour, sugar and fat have been known to be linked to some health-related problems like the celiac disease, diabetes and obesity. Therefore, this study is aimed at evaluating the qualities of cake produced from blends of white maize with beniseed (Gorigo) sweetened with date fruit to address the issue of malnutrition in children and to use the product to manage the health-related issue like celiac disease, ataxia, dermatitis, herpetiformis and also obesity, therefore increasing the usage of maize flour and beniseed.

Objective of the Study

The main objectives of the study are to investigate the possibilities of using date fruit as a sweetener in the production of cake with blend of white maize and beniseed flour. Specifically, the study:

1. determined the nutritional and sensory qualities of cake produce from wheat only and blends of white maize and beniseed flour sweetened with date fruit.
2. determined the level of acceptability of cake produced from wheat flour only and cake from blends of white maize with beniseed flour.

Research Questions

The following research questions were answered.

1. What are the nutritional and sensory qualities of

cake produced from wheat flour only and cakes from blends of white maize and beniseed flour?

2. What is the level of acceptability of cake produced from wheat flour only and cake from white maize with beniseed flour?

Research Hypothesis

The following hypothesis was formulated for the study:

H₀: There is no significant difference between the acceptability of wheat flour cake and white maize flour cake fortified with beniseed.

Design of the Study

The research design adopted for this study is experimental research design. Hassan (2003) defined experimental research design as the disciplined investigation conducted in the context of the development of a product for the purpose of improving on the thing being developed.

Instrumentation

The study used Sensory Evaluation Score Card (SESC) to be filled by participants during the testing session of the cake from blends of white maize, beniseed and date fruit to test for sensory parameters: appearance, aroma, texture, taste and overall acceptability on a 9-point hedonic scale. The card used was divided into two sections, A and B.

Method of Data Analysis: The data collected was subjected to data analysis using descriptive statistics such as mean and standard deviation and inferential statistics.

Materials and Methods

Sources of Raw materials: Maize grain (*Zea mays*), beniseed (*sesum indicum*), date fruits and wheat flour and other ingredients like fat, sugar, baking powder, egg were purchased from local market Oja-oba, Ilorin west Local Government Area of Kwara State, Nigeria.

Production Process of products; Processing of Maize Flour

The method of Houssou & Ayemor (2002) was used to prepare the maize flour. The white maize was sorted to remove stones, dirt and other foreign materials. Water was sprinkled on the cleaned maize seeds so as to allow water absorption, toughening the pericarp and germ so they do not splinter during milling. The grains were left for about 10 min before dehulling and milling. The flour was sieved using 250µm mesh size sieve

Processing of Beniseed Flour

The method of Peters et al., (2016) was used to prepare the beniseed flour. Beniseed grains were washed three (3) times to remove sand and debris and then allowed to drip dry through a mesh. The washed grains were then oven dried at 70°C for 12 hours on aluminum foil and

milled with a milling machine to obtain flour which was subsequently sieved to yield a fine flour texture.

Processing of date fruit extract

Date powder was produced using method described by Nnwaneki & Agbuba (2015).the seeds of the fruits were first removed manually using knife and weighing the dried palm fruit. The date palm fruit was washed

with water to remove dirt. The de- seeded fruit was then oven dried at 65 °C for 8 hours and subsequently milled using hand milling machine.

Production of Cake

The cake was produced using method described by Sanful et al., (2010) It is explained further by the flowchart below.

Table 1: Recipe for the production of cake

Ingredients	Quantity
Flour	250 (g)
Fat	250 (g)
Date (powdered)	250 (g)
Milk (full fat, powdered)	5.0 (g)
Egg (fresh, whole)	6 eggs
Vanilla flavor	1teaspoon

Source:Saufu et al, (2010)

Weigh all ingredients. Creaming of margarine and date powder, add beaten egg, mixed with baking powder and sieve flour. Pour into well-greased baking pan and bake at 120-200C for 15minutes. Remove and place on a cooling rack.

Method of Data collection

Proximate analysis of the blend of wheat, maize and beniseed flour, sweeten with date fruit for production of cake.

The proximate composition of the samples was analysed using the standard methods of (Association of Analytical Chemist (OAC, 2000&2005). The samples were analysed for moisture, total ash, crude fibre, crude fat, crude protein and carbohydrate (by differences).

Sensory Evaluation

The cakes were allowed to cool on racks for about 30 minutes before evaluation. Cakes were organoleptically estimated for the tested attributes by panellists comprising of both sexes drawn among the students of Home-Economics and Food science, University of Ilorin. Each sample was rated on

perceived intensities of standard sensory attributes (acceptability, flavor, texture and colour) using a 9-point hedonic scale, where (9 points) was expressed as liked extremely, (8 points) liked very much, (7 points) liked moderately, (6 points) liked slightly, (5 points) neither liked nor disliked slightly, (4 points) disliked slightly, (3points) dislike moderately and (1 point) dislike extremely.

Sample Formulation

The table revealed the compositional ratio of four possible formulations of Wheat flour supplemented with maize flour and beniseed flour sweetened with date fruit for production of cake. These are WHS(100% Wheat+ Sugar only), WHD(Wheat +Date only), MS C(Maize+ sugar), MD (Maize + Beniseed), MBD (Maize +Beniseed+ Date), MBS (Maize+ beniseed + Sugar).An electrical weighing balance and a blender were used for weighing the flour

Table 2: Product formulation

Sample		Wheat flour (%)	Maize flour (%)	Beniseed flour (%)
WHS	A	100	-	-
WHD	B	100	-	-
MD	C	-	100	-
MS	D	-	100	-
MB	E	-	50	50
MBS	F	-	50	50

Keys:

WHD: 100% wheat +sugar

WHS: 100% wheat + date

MD: 100% Maize+ date

MS: 100% Maize + sugar

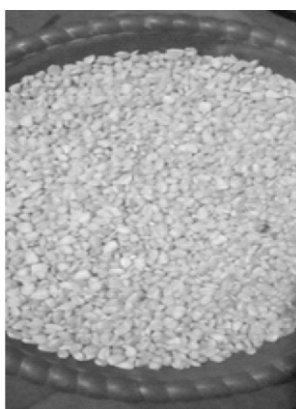
MBD:50%Maize; 50%Beniseed + date

MBD:50%Maize; 50% Beniseed + sugar

PLATE 1: RAW MATERIALS USED



WHEAT GRAIN



WHITE MAIZE



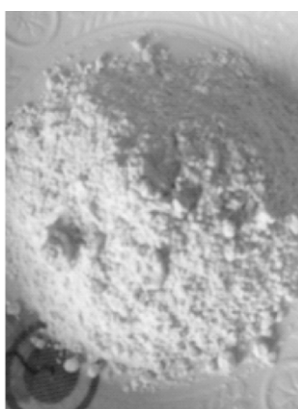
BENISEED



DATE FRUIT



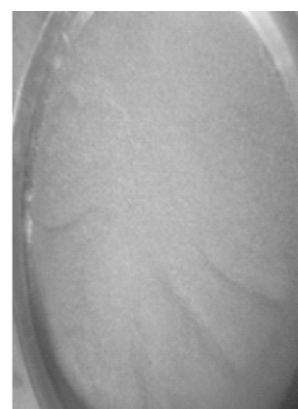
WHEAT FLOUR



MAIZE FLOUR



BENISEED FLOUR



DATE POWDER

PLATE 2: CAKES PRODUCED



SAMPLE A



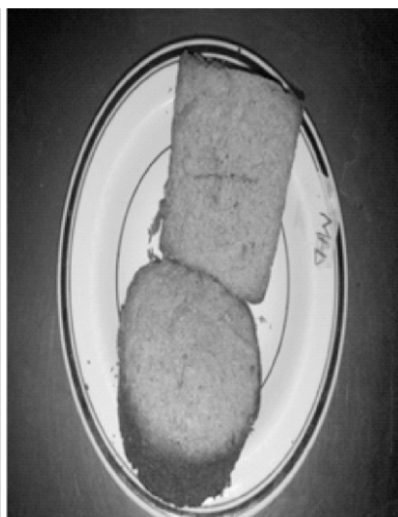
SAMPLE B



SAMPLE C



SAMPLE D



SAMPLE E



SAMPLE F

Method of Data Analysis: The judges evaluated the samples using a 9-point hedonic scale. The data collected was subjected to analysis using descriptive statistics such as mean and standard deviation and inferential statistics. One-way analysis of variance (ANOVA) was used to test for significant differences in the acceptability of cakes produced. Hypotheses using Analysis of variance (ANOVA) and independent t-test. All hypotheses were tested at 0.05 level of significance.

Results and Discussion

Table 1: Interpretation of demographic data of the respondent

Variable	Frequency	percentage%
Gender		
Male	14	46.7
Female	16	53.3
Total	30	100
Age		
16-20	9	30
21-25	18	60
26-30	3	10
TOTAL	30	100
Level		
100	4	13.3
200	4	13.3
300	6	20
400	10	33.3
500	6	20
TOTAL	30	100

Source: Research work (2019).

Table (1) shows that **14(46.7)** males and **16(53.3)** female participated in the sensory evaluation session of the research. 9 respondents representing 30% were aged (16-20), 18 respondent which represents 60% were age (21-25) and 3 representing 10% were age (26- 30). The table further show that 4 (13.3%) respondents represent 100 & 200 levels respectively. 6 (20%) represents 300level and 400level at same time, while 10(33.3%) were 500level of Home economics and Food science, University of Ilorin.

Research Question 1: What is the nutritional and sensory quality of cake produced from wheat and cake produced from blended flour of white maize and beniseed.

Table 2: Nutritional composition of cake produced from wheat flour and cake produced from white maize and benniseed sweetened with date.

Samples	Crude protein	Moisture	Crude fat	Crude fibre	Ash	Carbohydrate
WHS A	8.81 ^d ±0.04	10.22 ^d ±0.01	19.13 ^c ±0.02	2.03 ^t ±0.05	1.05 ^t ±0.04	58.78 ^b ±0.06
WHD B	9.26 ^c ±0.01	9.80 ^e ±0.00	17.26 ^f ±0.04	2.09 ^c ±0.02	1.34 ^d ±0.02	60.27 ^a ±0.00
MS C	8.63 ^e ±0.03	12.34 ^c ±0.00	18.48 ^e ±0.21	2.11 ^d ±0.02	1.64 ^c ±0.01	58.82 ^c ±0.50
MD D	7.31 ^f ±0.31	12.47 ^b ±0.04	18.69 ^d ±0.50	2.15 ^c ±0.03	1.26 ^e ±0.04	58.16 ^d ±0.50
MBD E	11.70 ^a ±0.21	12.47 ^b ±0.21	20.17 ^b ±0.50	2.35 ^a ±0.03	1.84 ^b ±0.03	51.49 ^e ±0.28
MBS F	10.75 ^b ±0.03	12.61 ^a ±0.42	22.18 ^a ±0.21	2.27 ^b ±0.02	2.24 ^a ±0.01	49.98 ^f ±0.35

Values are Means $\pm$ S.D. Means in the same column having different superscript are significantly (< 0.05) Different.

KEY:

WHS: 100% wheat + sugar

WHD: 100% wheat +date

MD: 100% Maize+ date

MS: 100% Maize + sugar

MBD: 50%Maize; 50%beniseed + date

MBS: 50% Maize; 50% beniseed + sugar

Table 3: Sensory qualities of cakes produce from blends of white maize and beniseed flour sweetened with date fruit.

Sample		Colour	Aroma	Taste	Texture	Overall acceptability
WHS	A	7.30 ^a ±1.12	7.20 ^a ±1.0	7.67 ^a ±1.27	7.37 ^a ±1.07	7.73 ^a ±1.11
WHD	B	6.37 ^{bc} ±1.52	6.70 ^{ab} ±1.32	7.00 ^{ab} ±1.51	6.50 ^b ±1.57	7.00 ^b ±1.49
MD	C	5.63 ^c ±1.61	5.47 ^d ±1.55	4.97 ^d ±1.77	5.00 ^d ±1.60	5.40 ^d ±1.45
MS	D	7.30 ^a ±1.18	6.33 ^{bc} ±1.45	6.57 ^b ±1.48	6.03 ^{bc} ±1.33	6.77 ^b ±1.38
MBD	E	5.70 ^c ±1.58	5.87 ^{cd} ±1.74	5.60 ^{cd} ±1.52	5.30 ^{cd} ±1.44	5.93 ^{cd} ±1.57
MBS	F	6.47 ^b ±1.22	6.20 ^{bcd} ±1.32	6.30 ^{bc} ±1.37	5.53 ^{cd} ±1.85	6.33 ^{bc} ±1.47

Values are Means ± S.D. Means in the same column having different superscript are significantly (< 0.05) different.

KEY:

WHS: 100% wheat + sugar

WHD: 100% wheat +date

MD: 100% Maize+ date

MS: 100% Maize + sugar

MBD: 50%Maize; 50%beniseed + date

MBS: 50% Maize; 50% beniseed + sugar

What is the level of acceptability of cake produced from wheat only and cake from white maize with beniseed flour sweetened with date fruit.

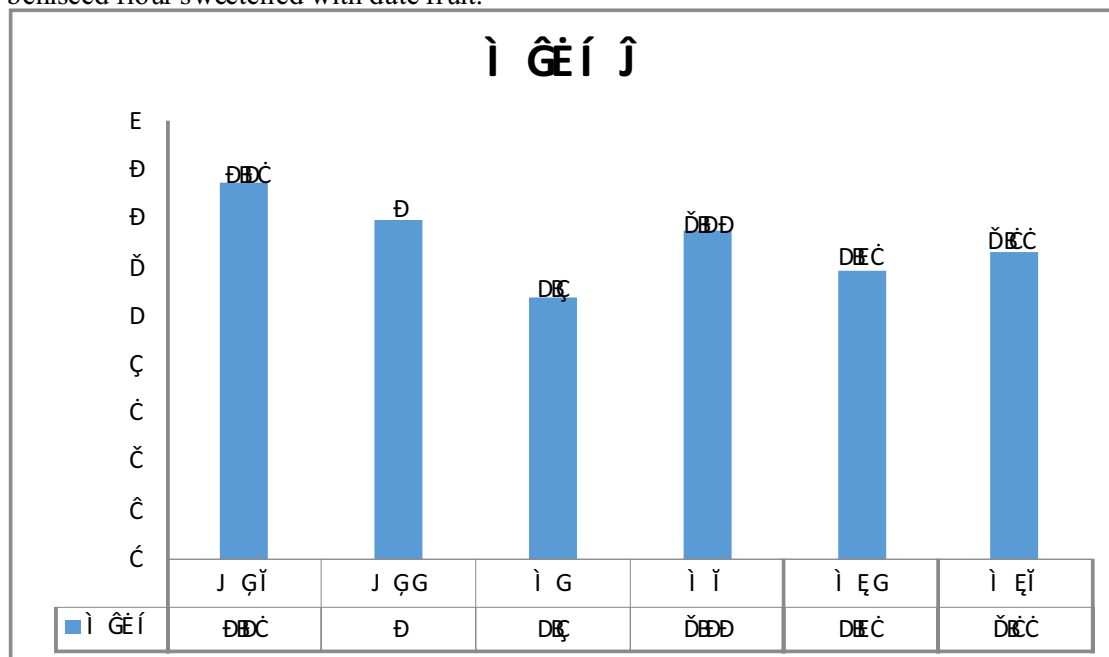


Figure 1: Level of general acceptability of cake produced from wheat flour and cakes made from blends of white maize and beniseed flour.

KEY:

WHS: 100% wheat + sugar

WHD: 100% wheat +date

MD: 100% Maize+ date

MS: 100% Maize + sugar

MBD: 50%Maize; 50%beniseed + date

The result of level of acceptability reveals that sample **WHD**= Wheat & date only has mean rating of $\bar{X} = 5.4^d \pm (1.45)$ while **MBS**=Maize, beniseed & sugar has mean rating of $\bar{X} = 6.77^a \pm (1.11)$ while **MD**= Maize+ beniseed +Date= $\bar{X} = 5.4^d \pm (1.45)$ beniseed+ Sugar has mean rating of $\bar{X} = 6.77^a \pm (1.11)$. The sample **WHS**=Wheat & sugar only was most preferred with mean score $\bar{X} = 6.77^a \pm (1.11)$ while sample **MD**= Maize & date was least preferred with mean score $\bar{X} = 5.4^d \pm (1.45)$. Approximately 25% of judges accepted each of the samples.

Hypothesis One: There is no significant difference with respect to the acceptability of wheat flour cake and the white maize flour cake enriched with beniseed.

Table 5: ANOVA on overall acceptability of cake produce from wheat only and cakes blends of white maize and beniseed flour.

	Sum of squares	df	Mean Square	F	Sig
Between Groups	101.894	5	20.379	10.103	.000
Within Groups	350.969	174	2.017		
Total	452.861	179			

$\alpha = 0.05$

Table 5: shows an F-value of 10.13 and p-value of .000 since the p-value is less than the alpha level ($p < 0.05$) the null hypothesis which states that ‘There is no significant difference in the sensory qualities of cake produce from wheat only and cakes blends of white maize and Beniseed flour, was rejected.

Discussion of Result

Research question1: Showed the nutritional composition that Sample **MBD**= Maize, beniseed and date fruit has the **highest crude protein content** (11.70%) closest to this value of **MBS**= Maize, Beniseed & sugar (10.75%) While sample **MD**=Maize & Date fruit has the lowest crude protein content of (7.31%). This is in agreement with **Ayinde et al.**, (2012). Who was able to find out in their research that the crude protein increased with increase in the proportion of the DBF (defatted beniseed flour) levels in the ‘‘Kokoro’’ Samples to be 5.32 and 6.74 respectively. High protein contents are expected in samples with beniseeds since it is rich in protein.

Sample **MBS**=Maize, beniseed & sugar has the **highest moisture content** (12.61%) while sample **WHD**=Wheat & date only has the least moisture content (9.80%). This disagrees with **Oyeyinka et al.**, (2014). Find out in their study that the cake produced from 100%wheat sweetened with date has the highest moisture content (22.37%).

Sample **MBS**= Maize, beniseed & date fruit has the **highest fat contents** (22.18%) with MBS having a close value of (20.17%) and the sample with the least

fat content was **WHD**= Wheat & date only which has value (17.26%). This is in accordance with research carried out by **Olumakaiye et al**(2012). In which cookies made from the composite flour (plain flour & beniseed had higher crude fat contents than samples made from 100% plain flour. Fat content increased as the level of beniseed substitution increased. The study also agrees with (**Tunde- Akintunde et al.**, 2012) who stated that because of the excellent quality of the edible oil it produces 50.0; sesame is often called queen of the oil seed crops.

Sample **MBD**= Maize, beniseed & date fruit has the **highest crude fibre contents** to be (2.35%) While sample **WHS**= Wheat & sugar was least with 2.03%. This does not agree with **Oyeyinka et al.**, (2014) who reported in their study that all cakes produced were not significantly different ($p < 0.05$) except for cake from wheat sweetened with sugar (0.89%), in which in this study the cake produce from wheat and sweetened with sugar has the highest fibre content. This disagrees with **Ayinde et al.**, (2012). That **LMA** (60:40) had the least value of crude fibre 1.09% and **AZO** (100%maize) had the highest crude fibre content and there was decrease in crude fibre obtained with increase in the proportion of DBF (defatted beniseed flour).

Sample **MBD**= *Maize, beniseed & date fruit has the highest total ash contents (2.24%), and sample with the least total ash contents has value of (1.05%) is Sample WHS*= Wheat & sugar only. This disagrees with Oyeyinkaet *al.*, (2014). Who reported that Cake produced from 100% wheat flour sweetened with sugar had the highest ash content while cake from composite flour sweetened with sugar had the lowest. Ash content of all the cakes sweetened with sugar was higher than cake sweetened with date fruit extract except for cakes produced from 100% cowpea flour. Ash content has to do with mineral in a food product.

Sample **WHD**= *Wheat & date only has the highest carbohydrate contents of (60.27%) While sample MBS*= *Maize, beniseed & date fruit has the lowest carbohydrate content (49.98%)*. This in accordance with Olumakaiyeet *al*(2012)who reported that the control had the highest carbohydrate content (65.86%) while cookies with composite had the least value of carbohydrate. The result of proximate of this study also shows that the carbohydrate level of maize decreases with addition of beniseed flour. This is due to high content of protein in benniseed.

Research question two revealed that for colour, the sample **WHS** = Wheat & Sugar only, **MS**= Maize & sugar only was the most preferred with mean score ($\bar{x}$) = $7.30^a \pm (1.12)$ and mean score ($\bar{x}$)= $7.30^a \pm (1.18)$, respectively. While sample **MD**= *Maize & date only* was least preferred with mean score($\bar{x}$)= $5.63^c \pm (1.61)$. Low sensory evaluation for other cakes base on colour was concluded to be due to the presence of date which is brownish and also beniseed which is roasted to reduce fat.

For aroma, the sample **WHS**=*Wheat & sugar only* was the most preferred with mean score ($\bar{x}$)= $7.20^a \pm (1.0)$ with **WHD**= Wheat & date having a close value of while the sample **MD** = *Maize & date* was the one preferred least with mean score ($\bar{x}$ 6.70) while the sample **MD** = *Maize & date* was the one preferred least with mean score($\bar{x}$)= $5.47^d \pm (1.55)$. This is in accordance with Oyeyinkaet *al*(2014).Who in their studies discovered that cake produced from wheat and sugar had the highest preference base on aroma while cake from composite flour had the least preference.

For taste, the sample **WHS**= *Wheat & sugar only* was the most preferred with mean score ($\bar{x}$)= $7.67^a \pm (1.27)$, while sample **MD**= *Maize & date* was least preferred with mean score ($\bar{x}$) = $4.97^d \pm (1.77)$. The result of sensory evaluation base on taste can be attribute to

study carried out on cookies using plain flour and beniseed by Olumakaiyeet *al*(2012). Where the taste of the cookies tends to decrease with increase in addition of beniseed this could be firstly due to the bitter taste of some compounds in beniseed flour particularly at high temperature.

Texture, the sample **WHS**= Wheat & sugar only was the most preferred with mean score ($\bar{x}$) = $7.37^a \pm (1.07)$ while sample **MD**= *Maize & date* was least preferred with mean score ($\bar{x}$) = $5.00^d \pm (1.60)$. It is observed that Sample **MD** has does not have fine texture this may be attributed to high fibre contents in maize and date fruit.

Result of research question three on level of acceptability cake produced from wheat flour only and cake from white maize with beniseed flour, using the mean value of the general acceptability of cake produced from wheat flour only and cake produce from white maize flour with beniseed sweetened with date revealed that sample **WHD**= *Wheat & date only* has the mean rating of = $\bar{x}$ 7.0) which is closer to the value of cake produced with wheat and sugar only.

Overall acceptability, the sample **WHS**= *Wheat & sugar only* was the most preferred with mean score ($\bar{x}$) = $7.73^a \pm (1.11)$ while sample **MD**= *Maize & date* was least preferred with mean score ($\bar{x}$) = $5.40^d \pm (1.45)$. This in accordance with Olumakaiyeet *al*,(2012). Sensory evaluation scores of the cake decreased with increasing level of beniseed flour in the cake, though at 10% substitution the product was still acceptable probably because the Organoleptic qualities was similar to the conventional cake (control sample). Due to the same level of substitution of maize with beniseed (50% maize; 50% beniseed) causes decrease in sensory attributes in terms of colour, taste in which beniseed contributed nutty taste to the cake which contributed to low acceptability of fortified maize flour.

WHS=Wheat & sugar only= ($\bar{x}$ 7.73), **MD**= *Maize & date* = ($\bar{x}$ 5.4), **MS**= Maize & Sugar has mean rating = ($\bar{x}$ 6.77)while **MBD**= Maize+ beniseed +Date=($\bar{x}$ 5.93) and Maize+ beniseed+ Sugar has mean rating of= ($\bar{x}$ 6.33). The sample **WHS**=Wheat & sugar only was most preferred with mean score $\bar{x}$ = $7.73^a \pm (1.11)$ while sample **MD**= *Maize & date* was least preferred with mean score $\bar{x}$ = $5.4^d \pm (1.45)$. Result of hypothesis one revealed that there is significance ($P < 0.05$) difference in the acceptability of cake produced from wheat flour and the cake produced from white maize flour with beniseed flour, based on colour, aroma, taste and the

texture of cakes produced. WHS- Wheat & Date only having being the most accepted. This may be due to the fact that making cake from maize, beniseed and date is a new product and people are already use to cakes produced from wheat and sugar and maize has a finer texture in terms of mouth feel, but it is not as if the new product was totally rejected. Result of hypothesis two revealed that there is no significance ($P>0.05$) difference in the overall acceptability of cakes made from wheat flour only and cakes made from white maize fortified with beniseed.

Conclusion

Considering all the analysis carried out, the study concludes that using maize flour and beniseed and substituting sugar with date fruit to produce cake is acceptable. It was observed that production of cake from maize flour fortified with beniseed improved the protein content of the product. As samples fortified with beniseed (MBD and MBS) has the highest value in terms of crude protein contents and Ash contents which is rich in minerals. The production should be encouraged as it allows for children and older individuals to eat balanced pastries to curb malnutrition, management of diet related disease and to make use of our resources available around us to sustain the economic. Therefore, reduce the overall dependent on wheat flour. However, it is advised if the date can be in syrup or any other modified form because the maize becomes hard after getting cold and also the powdered date add to its hardness.

References

- Association of Analytical Chemists. (AOAC, 2000). Official Methods of Analysis of the Association Official analytical chemists. 17th Edition, Washington D.C.
- Association of Analytical Chemists. (AOAC, 2006). Official Methods of Analysis of the Association Official analytical chemists. 18th Edition, Washington D.C.
- Association of Analytical Chemists (AOAC, 2010). Official Methods of Analysis of the
- Association Official analytical chemists. 20th Edition, Washington D.C.
- Atef, A., mostafa, R. and Samia A. (2011). Utilization of faba bean and cowpea flours in gluten free cake production. *Australian Journal of Basic and Applied Sciences*, 5 (12), 2665-2672.
- Ayinde, F., Bolaji, O., Abdus-Salaam, R. & Osidipe O. (2012). Functional properties and quality evaluation of “Kokoro” blended with Beniseed cake *Sesame indicum. african Journal of Food Science*. 6(5), 117-123.
- Food and Agriculture Organization, Statistics Division (FAOSTAT, 2005). Food and Agricultural Organization Statistical Databases. URL: <http://www.faostat.fao.org/>
- Hanee M. (2013). Cake flour: functionality and quality. *European scientific Journal*, 9(3), 7857-7881.
- Hansen (2011). *Sesame Profile*. from http://www.agmrc.org/commodities/products/grainsoilseeds/sesame_profile.cfm. 19/08/11
- Iwuoha, C.I (2004). Comparative evaluation of physicochemical qualities of flours from stem processed yam tubers. *Journal of food chemistry* 85, 541-551.
- Janice L. Thompson., Linda Vaughan and Melinda Manore. (2010). *The Science of nutrition*. (2010, hardcover new edition)
- Lee, J., Lee, Y., and Choe, E. (2008). Effects of sesamol, sesamin and sesamol extracted from roasted sesame oil on the thermal oxidation of methyl linoleate. *Food Science and Technology*, 42, 1871-1875.
- Makinde, F., & Akinoso, R. (2014). Comparison between the nutritional quality of flour obtained from raw, roasted and fermented sesame (*Sesamum indicum* L.) seed grown in Nigeria. *Acta Sci. Pol., Technol. Aliment* 13(3). 309-319.
- National Agriculture Extension and Research Liaison Services. (NAERLS, 2010). Beniseed production and utilization in Nigeria. Extension Bulletin No 154, Horticulture Series No 5. 17/07/11. Available at www.naerls.gov.ng/extension/bulletins/Beniseed.pdf
- Olumakaiye, F. & Sanni, O. (2012). Nutritional and Sensory Properties of Beniseed and Plain Flour Blends in Cookies. *Journal of Nutritional Ecology and Food Research*. 1, 1-6.
- Origin, History and Uses of Corn. *Iowa State University, Department of Agronomy*. February 11, 2014. Archived from the original on February 23, 2019.

- Oyeyinka S., Opaleke D., Karim, O., Kolwole, F., Ogulakin, G. & Olayiwola, O. (2014). Cake production from wheat (*triticumaestivum*) and cowpea (*vigna unguiculata*) flours using date fruit as a sweetener. *Annals food science and technology*. 15(1), 20-28.
- Peters Henry., Mgbang John Edward., Essien N. A. & Ikpeme Christine Emmanuel (2016). Nutritional evaluation of breadfruit and Beniseed composite flours. *America Journals of food science and technology*. 4 (6), 182-187.
- Suresh Chandra & shamsher (2013). Assessment of properties of different flours, *Academic Journals*. 8 (38), 489-4852.
- Tunde-Akintunde, T., Oke, O., and Akintunde, B. (2012). Sesame Seed, Oilseeds, Dr. Uduak G. Akpan (Ed.), ISBN: 978-953-51-0665-4, In Tech,
- Availabe from: <http://www.intechopen.com/books/oilseeds/sesameseed>.
- Udensi, E.A & Okaka, J.C (2000). Predicting the effect of blanching, drying temperature and particle size profile on the dispersibility of cowpea flour. *Nigerian food journal* 18, 25-31.
- Walid A. & R. J. Marshall (2003). The fruit of the date palm: it's possible use as the best food for the future? *International Journal of Food Sciences and Nutrition*, 54(4), 247-259.