



COMPARATIVE ANALYSIS AND SENSORY EVALUATION OF CAKE ENRICHED WITH COCONUT (*Cocos nucifera*) AND TIGERNUT MILK (*Horchata De Chufa*)

Aderibigbe, I.A, Lhameed, A.W and Olaniyan J.O

Department of Home and Rural Economics, Oyo State College of Agriculture and Technology, Igboora, Oyo State.

Corresponding Email: iyabode60@gmail.com Phone No: +2348127368351

Abstract

The production of cake with the use of coconut milk and tigernut milk with the use of different percentage based on 100% coconut milk, 100% tigernut milk and 50% coconut milk with 50% tigernut milk was produced and administered using 9-point hedonic scale ranging from like extremely (9) to dislike extremely (1) denoted as parameters with frequency and score rate also were ranged in term of colour, texture, taste, appearance and overall acceptability and the highest score rate is gotten from cake production using 100% coconut milk with 15(75.0%), had 8 in with like very much in parameters and the proximate analysis revealed that, the highest percent score in both 100% tigernut milk and 50% coconut milk with 50% tigernut milk had ash content, moisture content and dry matter with 1.80%, 10.0% and 90.0%, and finally the highest score rate in crude fibre is 8.80% and is denoted in 100% tigernut milk, crude protein had 8.40% in 50% coconut milk with 50% tigernut milk, crude fat had 5.80% and it had highest score of 5.80% is is gotten from 100% tigernut milk in cake production, so therefore it is hereby recommended that food processor should make use of cake production with the use of coconut milk and tigernut milk in different percentage and people should be enlightened on the proximate analysis of cake using coconut milk and tigernut milk in different percentages and finally home makers and food scientist should be enlightened on how to produce cake with milk of coconut and tigernut so as to prevent monotonous use of wheat flour to maximize degree of likeness of consumers. Conclusively, carbohydrate content had 75.0% from 100% coconut milk in cake production that's the conclusion of the research work.

Keyword: Cake; Extraction; Coconut; Tigernut; Production.

Introduction

Cake is a sweet food made from flour, sugar and other important ingredients, that is, usually baked and cakes were modifications of bread but cakes now cover a wide range of preparations that can be simple or elaborate and that share futures with other desserts such as pastries, meringues, custards and pies asserted by Catalano and Christina (2002). Cake is often served as a celebratory dish on ceremonial occasions, such as weddings anniversaries, birthdays to mention in view. Besides, the milk and eggs, flour and sugar are the main ingredients in cake, which are excellent sources of carbohydrates (which do provide the body, brain and muscles with energy). Cake had 18% total fats (12g), 10% saturated fat (2g), 17% cholesterol (50mg), 8% sodium (180mg), 1% potassium (36mg), 1% dietary fiber (0.2g) and sugars (28g) illustrated by Castella., (2010).

Coconut is the fruit of the coconut palm (*Cocos nucifera*), which is commonly used for its water, milk, oil and tasty meat. Coconut trees are considered as the most naturally widespread fruit tree on the planet and

are native to Southeast Asia and Islands between the Indian and Pacific oceans (Shurtleff, William and Aoyagi, Akiko; 2013). The coconut water is a liquid found in the center of a young, green coconut and it helps to nourish the fruit (Naik, Aduja; Venu; Prakash, Maya and Raghavaro; 2013). As the coconut matures, that takes around 10-12months, some of the liquid remains while the rest ripens into solid white flesh known as coconut meat. Coconut water contains 94% water and very little fat and it should not be confused with coconut milk which is made by adding water to grated coconut meat and coconut milk contains about 50% water and is quite high in fat. Coconut milk comes from white flesh of mature brown coconuts and the milk has a thick consistency and a rich and creamy texture nutritionally, coconut milk is high in calorie, about 93% of its calories come from fat, including saturated fat known as medium-chain triglycerides (MCTs). The milk is also a good source of several vitamins and minerals. One cup (240grams) contain: calories (552), fat (57g), protein (5g), carbs (13g), fiber (5g), vitamin C (11% RDI), folate, (10%



RDI), iron (22% RDI), magnesium (22% RDI), potassium (18% RDI), copper (32% RDI), manganese (110% RDI) and selenium (21% RDI) spinned by Singh; Mori; Chen; Mendis; Moshiri *et al.*, 2000).

In Nigeria, tiger nut milk (Horchata De Chufa) also known as kunnu-aya is a beloved concoction that in its most basic form is made from just two (2) ingredients: tigernuts and water and this particular milks are gotten from tigernuts seed and the milk is full of protein and high in fiber, is often served cold on its own and it can also be pour over cereals (Belewu; and Belewu; 2007). Nutritionally, it is rich in vitamin C and E, minerals such as phosphorus, magnesium, potassium, calcium, iron and some enzymes which help in digestion. In fact, this tigernut milk contains more iron, magnesium and carbohydrates than the cow's milk (Bosch; Alegria and Farre; 2005).

Objective of the study

The objective of the study is to assess the proximate and sensory evaluation of cake enriched with coconut milk and tigernut milk. The specific objectives are to:

- Produce cake using 100% coconut milk and 100% tigernut milk.
- Produce cake produced using 50% coconut milk and 50% tigernut milk.
- Examine the proximate analysis of cake production with the use of 100% coconut milk and 100% tigernut milk with 50:50% coconut milk and tigernut milk.
- Assess the sensory evaluation of cake produced from 100% and 50:50% of coconut milk and tigernut milk.

Material and method

Flour, margarine, baking powder, sugar, eggs (according to size), nutmegs, fruits, flavour, tiger nut and coconut were purchased from Towobowo Market, Igboora, Oyo State.

Processing methods

10kg of coconut and tiger nut were collected, the coconut was broken and the shell were removed and the coconut meat was grounded and squeezed to extract the milk and then use mesh to sieve the milk. The tigernut was selected to remove the dirt, stones and others, rinsed and wet milled, sieved for milk extraction.

Recipe of Cake production enriched with 100% coconut milk and tigernut milk and 50:50% coconut milk and tigernut milk

Recipe	Quantities Used
Wheat flour	500g
Margarine	250g
Baking Powder	2 Tablespoon (Tsp)
Sugar	200g
Egg	15 (according to size)
Nutmeg	4 teaspoon (tsp)
Fruit	15g
Flavour	3 teaspoon (tsp)
Coconut Milk	100% and 50:50%
Tigernut milk	100% and 50:50%

Method used in the preparation of cake using coconut milk and tigernut milk

- Rub in margarine and sugar in a bowl until it's fluffy.
- Add wheat flour, baking powder (sieved) and nutmeg and mix all together.
- Beaten egg and flavour were added to the mixture of margarine and sugar.
- Mixed with coconut milk and tigernut milk with different in percentages until a fine paste is achieved.
- Baking tins were greased with little margarine.
- Pour the mixture of cake into the greased baking tins.
- Bake at accurate temperature by regulating the temperature for about 35 minutes.

**Sensory evaluation of cake enriched with extraction of milk from coconut and tigernut****(A) Cake Production using 100% Coconut Milk**

Parameter	Score	Colour	Texture	Taste	Appearance	Flavour	Overall acceptability
Like extremely	9	6 (30.0)	4 (20.0)	7 (35.0)	6 (30.0)	7 (35.0)	2 (10.0)
Like very much	8	13 (65.0)	8 (40.0)	10 (50.0)	8 (40.0)	9 (45.0)	15 (75.0)
Like moderately	7	1 (5.0)	8 (40.0)	2 (10.0)	5 (25.0)	3 (15.0)	3 (15.0)
Like slightly	6	00	00	1 (5.0)	1 (5.0)	1 (5.0)	00
Neither like nor dislike	5	00	00	00	00	00	00
Dislike slightly	4	00	00	00	00	00	00
Dislike moderately	3	00	00	00	00	00	00
Dislike very much	2	00	00	00	00	00	00
Dislike extremely	1	00	00	00	00	00	00
TOTAL		20(100.0)	20(100.0)	20(100.0)	20(100.0)	20(100.0)	20(100.0)

Source: Field Survey, 2022

(A) Cake Production using 100% Tigernut Milk

Parameter	Score	Colour	Texture	Taste	Appearance	Flavour	Overall acceptability
Like extremely	9	13 (65.0)	9 (45.0)	10 (50.0)	6 (30.0)	10 (50.0)	12 (60.0)
Like very much	8	4 (20.0)	6 (30.0)	5 (25.0)	9 (45.0)	7 (35.0)	4 (20.0)
Like moderately	7	2 (10.0)	5 (25.0)	3 (15.0)	5 (25.0)	3 (15.0)	4 (20.0)
Like slightly	6	1 (5.0)	00	2 (10.0)	00	00	00
Neither like nor dislike	5	00	00	00	00	00	00
Dislike slightly	4	00	00	00	00	00	00
Dislike moderately	3	00	00	00	00	00	00
Dislike very much	2	00	00	00	00	00	00
Dislike extremely	1	00	00	00	00	00	00
TOTAL		20(100.0)	20(100.0)	20(100.0)	20(100.0)	20(100.0)	20(100.0)

Source: Field Survey, 2022

(C) Cake Production using 50% Coconut Milk and 50% Tigernut Milk

Parameter	Score	Colour	Texture	Taste	Appearance	Flavour	Overall acceptability
Like extremely	9	10 (50.0)	3 (15.0)	8 (40.0)	5 (25.0)	9 (45.0)	8 (40.0)
Like very much	8	6 (30.0)	12 (60.0)	7 (35.0)	9 (45.0)	6 (30.0)	9 (45.0)
Like moderately	7	1 (5.0)	3 (15.0)	2 (10.0)	4 (20.0)	2 (10.0)	1 (5.0)
Like slightly	6	3 (15.0)	2 (10.0)	3 (15.0)	2 (10.0)	3 (15.0)	2 (10.0)
Neither like nor dislike	5	00	00	00	00	00	00
Dislike slightly	4	00	00	00	00	00	00
Dislike moderately	3	00	00	00	00	00	00
Dislike very much	2	00	00	00	00	00	00
Dislike extremely	1	00	00	00	00	00	00
TOTAL		20(100.0)	20(100.0)	20(100.0)	20(100.0)	20(100.0)	20(100.0)

Source: Field Survey, 2022

Colour: The result obtained in the colour of the production of cake ranges from 5.0%, 50.0% and 65.0% in which the highest score rate in term of colour were found in cake production using 100% coconut milk with like very much in parameter and with score of 8 and also cake production using 100% tigernut milk also had highest percentage of 65.0% in like extremely in parameter with 9 in frequency indicating that both enrichment of 100% tigernut and coconut milk were liked by the consumer also accepted totally by the trained panelists.

Texture: The score obtained in texture of cake production using coconut and tigernut milk ranges from 40.0%, 45.0% and 60.0%. The highest score is gotten from cake production using 50% tigernut milk and 50% coconut milk and the score is 60.0% with 12 in frequency, 8 in score rates and like very much in parameter indicating the degree of likeness of cake production were excellent in consumption.

Taste: The taste score of cake using extraction of milk from coconut and tigernut using different percentages were gotten from both 100% coconut milk and 100% tigernut milk both with 10 in frequency and like very much in parameters but the score ranges between 8 and 9 indicating that the taste were liked by the consumers.

Appearance: The appearance of cake production using coconut milk and tigernut milk in different percentages, the highest score rate is from 100% tiger nut milk and 50% tigernut milk with 50% coconut milk and the score is 45.0% and both had 9 in frequency, 8 in score rates and finally like very much in parameters indicating the appearances was accepted by the consumers.

Flavour: The flavour score of the production of cake using tigernut milk and coconut milk in different percentages the highest score rate is from cake production using 100% tigernut milk with 50.0%, 10 in frequency, 9 in score rate and finally like extremely in parameter which means the cake production using 100% tigernut were liked by the panelists.

Overall acceptability: In term of colour, texture, taste, appearance and flavour the overall acceptability of cake production using tigernut and coconut milk with different in percentages, the production of cake using 100% coconut milk had highest score rate of 75.0% with 15 in frequency, 8 in score and was liked very much by the panelists, indicates that the production and sensory evaluation of cake using coconut milk with 100% was generally acceptable by the panelists.

Proximate Analysis of Cake using Coconut and Tiger nut Milk using Different Percentage

Sample	Cake Production	Ash%	Moisture%	Dry Matter%	Crude Fibre%	Crude protein%	Crude Fat%	Carbohydrate%
A	100% CNM	1.70	9.50	9.50	3.60	5.90	4.30	75.0
B	100% TNM	1.80	10.00	90.00	8.80	7.90	5.80	65.7
C	50%CNM+ 50% TNM	1.80	10.00	90.00	3.10	8.40	5.10	71.6

Source: Elerewe, 2022.

Note: CM= Coconut milk, TNM= Tigernut Milk

Discussion:**Ash content:**

The ash content of cake production using Coconut Milk (CM) and Tigernut Milk (TNM) with using different percentage, the 100% TNM and 50% TNM with 50% CNM the both had highest score rate of 1.80% in ash content which indicate that in the inorganic residues remaining after the water and organic have been removed by heating process in the presence of oxidizing agents which provides a measure of the total amount of minerals within a food so therefore, the presence of ash in cake production poses that it contain amount of mineral content.

Moisture content:

The result reveals that the moisture content of cake that have highest score rate is gotten from cake production with the use of 100% Tigernut Milk (TNM) and 50% Coconut Milk (CM) with 50% TNM and the score is 10.00% and this is due the consumption which is invariably with the help of the osmoregulation of the body system also aid digestion.

Dry matter content:

The dry matter of food sample of cake production using CM and TNM with the use of different percentage consists of all its constituents excluding water and the dry matter of food include carbohydrates, fats, proteins, vitamins, minerals and antioxidants such as thiocyanate, anthocyanin and quercetin and this is from both in the production of cake using 100% TNM and 50% TNM with 50% coconut milk and it contain 90.0% indicating the acceptance of consumption.

Crude fibre content:

The obtained crude fibre from the production of cake is 8.80% and this indicates that lower crude fibre is not likely to have any positive effect in gastro intestine

organ of a man and this is gotten from 100% TNM in the production of cake.

Crude protein content:

There was a considerable high amount of protein in cake production using different percentages of coconut milk and tiger nut milk and the production of cake with the use of 50% CM with 50% tiger nut milk and it had 8.40% and this indicate that the protein content of the accepted highest score helps in maintaining healthy body system.

Crude fat content:

The results in fats content reveals that cake producing using 50% CM with 50% TNM had 8.40% indicated that the higher reductions obtained in the fat content of cake had dietary fats represent the most compact energy available to man and they contain twice the caloric value of an equivalent weight of sugar.

Carbohydrate content:

The result showed that the carbohydrate level was high in the production of cake using 100% CM and it had 55.0% which is very high and the high content of carbohydrate indicate that there is enough level of energy content and also provide the consumers with considerable amount of calories needed for daily activities.

Conclusion

The production of cake with the use of coconut milk and tiger nut milk with the use of different percentage based on 100% coconut milk, 100% tiger nut milk and 50% coconut milk with 50% tiger nut milk was produced and administered using 9 point hedonic scale ranging from like extremely (9) to dislike extremely (1) denoted as parameters with frequency and score rate also it was ranged in term of colour, texture, taste, appearance and overall acceptability and the highest score rate is gotten from cake production using 100% coconut milk with 15(75.0%), 8 in score



rate and like very much in parameters and in the process of proximate analysis reveals that the highest percent score in both 100% tiger nut milk and 50% coconut milk with 50% tiger nut milk had ash content, moisture content and dry matter with 1.80%, 10.0% and 90.0%, and finally the highest score rate in crude fibre is 8.80% and is denoted in 100% tiger nut milk, crude protein had 8.40% in 50% coconut milk with 50% tiger nut milk, crude fat had 5.80% and it had highest score of 5.80% is gotten from 100% tiger nut milk in cake production and finally carbohydrate content had 75.0% from 100% coconut milk in cake production that's the conclusion of the research work

Recommendations

It was recommended that, food processor should make use of cake production with the use of coconut milk and tiger nut milk in different percentage and people should be enlightened on the proximate analysis of cake using coconut milk and tiger nut milk in different percentages and finally home makers and food science should be enlightened on how to produce cake with milk of coconut and tiger nut so as to prevent monotonous use of wheat flour to maximize degree of likeness of consumers.

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