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NUTRITIONAL AND FUNCTIONAL PROPERTIES OF KUNUZAKI PRODUCED FROM *Arachis hypogea and Oryza sativa* BLEND

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Abstract: The methods of preparation, ratio of blends of major ingredients, and nutritional composition of kunungyeda, a traditional Nigerian weaning food based on groundnuts and rice were analysed. The main ingredients of the formulations were partially roasted groundnuts in combination with rice. The weight ratios of the major ingredients were 57:43 for groundnut and rice respectively. The nutritional compositions of kunungyeda were for moisture (82.8%), for protein (2.30%), for fat(1.00%), for fibre(0.15%), and for energy (72 kcal). The Kunugyeda showed higher water absorbing capacity, bulk density, foaming and oil absorption capacities were detected low in the groundnut samples. Appearance and general acceptability were scored high for 'like' while other sensory qualities such as taste, color and texture were neither like or dislike. The use of Kunugyeda as weaning food and uuprading to viable commercial standard is recommended in this present study.

Keywords: Kunuzaki, Groundnut, Rice, Nutritional composition, Weaning food.

INTRODUCTION

All cereal-based non-alcoholic beverages are generally known as Kunu(Hausa) and are common in almost all the Northern States of Nigeria. The common cereals used for production include Sorghum, Maize, Millet, Riceand Acha with Sorghum and Millet as the largest cultivated crops in Nigeria. Cereal food products constitute the bulk of foods of the daily main dishes of the average individual in North-Eastern Nigeria and Africa as awhole. Ogi and To are cereal based products with the former been the major weaning food in West

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Africa and the latter a thick porridge. Ogi is served as gruel for breakfast and is also the food of choice for the sick.(Nkama, 2000).

Kunu which is also known as kunuzaki, is the traditional Hausa name of a non-alcoholic beverage which is consumed in Nigeria, its major source of calorie and supplies large proportion of energy in form of carbohydrates. Kunu is taken as an alternative to beverage and is mostly consumed throughout Nigeria, mostly in the North. Kunu drink is relatively cheap due to the availability of its constituent materials. It is made from cereal grains such as Maize (zeamays) Millet(pennisetumtyphoideum) and sorgum(sorgumvulgare). Garlic, pepper and ginger are some other ingredients which are added to enhance its flavor, while honey or sugar is added to serve as Sweetner. Fura, Burukutu, Buwo, Burakosko, Akamu, Danwake, Bulum, pito to mention but a few are other traditional foods which are often fabricated from cereals in the Northern part of Nigeria. Acha, guinea corn, maize and millet contain 70 to 77% of carbohydrates with little fat and protein and about 12% moisture contents in the whole grain. The variety of drinks made from sorghums are milky light brown in color whilst that is made from millet and maize are whitish in color. Carbohydrates, proteins, minerals and fat can be obtained from cereals but carbohydrates are the prominent diet produced from cereals, while Vitamins and proteins are less produced from cereals. Minerals such as Manganese, Iron, Zinc and copper can be obtained from the intake of kunu. In Nigeria, particulary in the North, kunu is widely consumed by young and Old as thirst quencher and also for refreshments at home, office, or in the market place. Owning to the low protein contents, kunu is often supplemented .one of the most commonly used supplements in Nigeria milk. Kunu can be taken with bread or snacks. Some people prefer to take kunu drinks as an alternative to soft drinks which many believe to be associated with diabetes (Gaffa, 2002).

The need to meet requirement through adequate supplies and proper selection of diets has been a basic determinate of stability and progress, since human being require food to pursue essential functions, such as growth development and reproduction (Onimawo, 2001).

Food security remain an unfulfilled dream for more than 800 million people (Anuoye, 2011) who are unable to live healthy and active life because they lack access to safe and nutritious food, more than one third of the world children are stunted due to diets inadequate in quality and quantity.

It was therefore the objectives of the study to determine the nutritional and functional .properties of kunuzaki produced from *arachis hypogea* and *oryza sativa* blend

MATERIALS AND METHODS

Source of Materials

Groundnut (*Arachis hypogaea* L.) seeds and Rice (*Oryza satival*.) was purchased from a local market in Bida Nigeria.

Other Materials

Other materials used such as bowl, sieve, pot, water, cup, sugar and tamarind were purchased from the same market.

Milling machine and Blender were obtained from the kitchen of department of leisure, hospitality and tourism, Federal Polytechnic Bida – Nigeria.

METHODS

Sample Production

Soak the tamarind in a warm water for about 30 minutes, set aside. Grind the groundnut in a dry mill or blender, it makes the extraction of the milk quicker, add 2 cups of water and blend until smooth, sieve out the skin which will leave you with the groundnut milk. pour into a clean pot and bring boil. Once it starts boiling ,sieve the tamarind using a little water to get all the pulp out, add the pulp to the boiling pudding cook for 20 to 25 minutes, stirring occasionally to prevent it boiling over and sticking to the bottom of the pot. Pour in your rice and stir properly, cook until the rice is very soft for about 10 minutes. At the end the grounding milk should have a paste like consistency. Remove from heat and allow to cool for 5 minutes, addsweetner.to taste, stir properly, serve warm or cold.

DETERMINATION OF PROXIMATE COMPOSITION

The moisture content of the sample was carried out according to AOAC procedure (2006). An empty moisture dish was washed and dried in an oven at 80 ^{0}C and cooled in desiccators. The dishes were weighing along with covers (W1), 2g of samples were weighed into the dish and reweighed again (W2). The samples with the content was placed in hot air oven at 102+8^{0}C and dried for 5 hours till a constant weight was obtained. Dishes were then transferred into desiccators and cooled and then reweigh (W3). The % moisture content was calculated as shown below.

$$\% \, moisture = \frac{W_2 - W_3}{W_2 - W_1} \, x \, 100$$

Where:

W_1 = Initial weight of employ crucible

W_2= weight of crucible+ food before drying

W_3= final weight of crucible + crucible + food after drying

Determination of fat content (oil extraction)

The fat content of the sample was carried out according to AOAC (2006) 2g sample was weighted into the thimbles and plugged lightly with cotton wool. The thimble was inserted into a refracted extractor holder. A 100ml flat bottom flask of known weight containing 25ml petroleum ether (bpt 40 – 60^0C) was fitted into extractors. The apparatus was heated gradually b hot plate at 80 – 100^0C for about 4 – 6 hours. At the end of extraction, the solvent was removed from oil by heating in a hot air oven at 105^0C for 30 minutes. The flask was allowed to cool inside a dissector and reweighed. % oil content was calculated as shown below:

$$\%\ Oil\ = \frac{Weight\ gain\ by\ flask}{Weight\ of\ sample}\ x\ 100$$

Determination of Crude fibre

2g of defatted material with petroleum ether was boiled under reflux for 30 minutes and filtered through filter paper washed with boiling water until no longer acidic. The residue was transferred to beaker and again boiled for another 30 minutes with 200ml of 1.25NaOH and again flittered through another filter paper with washing until no longer NaOH. The final residue was then transferred to a crucible and dried in an oven and the dry weight taken and transferred to a furnace and incinerated, cooled and weighed.

The crude fibre was then calculated as shown below:

$$\%\ Crude\ fibre\ = \frac{dry\ weight - ash\ weight}{Weight\ of\ sample}\ x\ 100$$

Determination of Crude Protein

0.2g of sample was weighed into kjedhal digestion flask and a tablet catalyst was added. 5ml of concentrated H_2SO_4 (sulphuric acid) was added into flask. The content of kjedhal digestion flask was heated in a digestion chamber contained in a fume cupboard for about 4 hours until a clear digest was obtained. The sample was allowed to cool and the content was added with distilled water (100ml) for distillation process. The digest was then transferred into 10ml of boric acid containing 5 drops of bromocresol green methyl red

indicator until 50ml of distillated. The distillate was standardized/titrated with 0.1 NaCl until pink colour was observed. The % crude protein was then calculated using

$$\% N = \frac{(S-B)x\ 0.1N\ x\ 14.01}{Weight\ of\ sample}\ x\ 100$$

% crude protein = %N* 6.25

S = sample titre value

B = Blank titre value

Determination of Ash Content in food sample

Weigh crucible and record the weight, then weight 2g of sample into crucible of known weight. The crucible and sample were then placed in a muffle furnace at 550^0C for 4-6 hours until a whitish grey was obtained. The crucible was then removed and placed in desiccators to cool to room temperature before weighting, each sample was determined in triplicate and % ash was calculated as shown below:

$$\% ash = \frac{Weight\ of\ ash}{Weight\ of\ sample}\ x\ 100$$

Determination of Carbohydrate

The % CHO was calculated by difference according to AOAC (2006). The summation of the proximate values was subtracted from 100% as thus:

% carbohydrate=(100-100%-%crude protein +%ash content +%fat +%crude fibre+%moisture

Sensory Evaluation

The sensory attributes of kunuzaki produced from blend of groundnut and rice blend were determined using a 5 - point hedonic scale as described by Larmond (1977). This was done by 25 untrained panelists comprising of Students and staff of Department of Nutrition and Dietetics, Federal Polytechnic Bida - Nigeria. Where 1 represents like extremely and 5 represents dislike extremely.

Determination of Functional Properties

The procedures described by the following researchers were used to determine the functional properties of kunuzaki produced from blend of groundnut and rice: Bulk density (Makhuvha, *et al.,* 2014); swelling index (Awolu, 2017); foam capacity and stability; water absorption capacity (WAC), oil absorption capacity (OAC) (Beuchat, 1977) and wettability (onwuka, 2005).

Statistical Analysis

Data collected was subjected to analysis of variance using SPSS (version 15), and was presented as Mean±SEM .

Results

The results of proximate composition of kunuzaki produced from blend of groundnut and rice are presented in Figure 1. Mean values of 0.8%, 2.8%, 3.1%, 23.0%, 15.8%, 54.8% and 72KJ/Cal were obtained for ash, moisture, crude fibre, crude protein, crude fat, carbohydrate by difference and energy value respectively. The amount of proximate indices were in the order of CHO > CP > Crude Fat > Crude Fibre > Moisture Content > Ash Content.

The results of sensory evaluation of kunuzaki produced from blend of groundnut and rice are presented in Figure 2. Mean values of the 25 panelists' scores showed that 80% of the sensory indices evaluated which were taste, flavour, texture and general acceptability were scored 'like' while appearance was scored 'dislike'

The results of functional properties of kunuzaki produced from blend of groundnut and rice are presented in Figure 3. Bulk density, foaming capacity and oil absorbing capacity mean values obtained were low followed by swelling capacity and wettability, higher mean values were obtained for water absorbing capacity. Given the amounts of the functional properties as water absorbing capacity > wettability > swelling capacity > oil absorbing capacity > bulk density > foaming capacity.

Table 1: *Proximate composition of Kunuzaki produced from groundnut and rice blend*

%

PC	Moisture	Ash	Crude Fibre	Crude Protein	Total Fat	Carbohydrates	Energy Value
Sample	0.4±0.0	0.4±0.0	0.5±0.0	20.1±1.0	30.0±1.7	48.6±2.0	79.0±3.1kcal

Results were mean value of triplicate determinations and expressed in Mean±SEM

Table 2: *Sensory evaluation of Kunuzaki produced from groundnut and rice blend*

PC	Taste	Flavour	Appearance	Texture	General Acceptability
Sample	4.1±0.1	4.2±0.0	3.0±0.1	4.3±0.0	4.5±0.0

Results were mean value of triplicate determinations and expressed in Mean±SEM

Table 3: *Functional properties of Kunuzaki produced from groundnut and rice blend*

	Bulk Density	Water Absorption Capacity	Foaming Capacity	Swelling Capacity	Oil Absorption Capacity	Wettability
Sample	1.2±0.0	22.8±2.4	1.0±0.0	3.3±0.3	2.5±0.3	6.2±0.5

Results were mean value of triplicate determinations and expressed in Mean±SEM

CONCLUSION

In conclusion, from the practical carried out, showed that kunugyeda can be substituted as a weaning food and beverage.

RECOMMENDATION

The upgrading of Kunugyeda to viable commercial standard is hereby recommended.

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