BERKELEY PUBLICATION
AND RESEARCH INTERNATIONAL
03.31.2023
Journal of Health, Metabolism & Nutrition Studies Vol. 21 No. 3

EFFECTS OF SUPPLEMENTATION ON THE PROXIMATE COMPOSITION AND CONSUMER ACCEPTABILITY OF LOCAL SNACKS (ALKAKI) PRODUCED FROM WHEAT, RICE AND BENINSEED FLOUR BLENDS

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ABSTRACT

This paper is to study the effects of supplementation on the proximate composition and consumer acceptability of local snacks (Alkaki) produced from Wheat, rice and beninseed flour blends. The Alkaki is a Sweet snack mainly eaten during special occasions like weddings in the Northern part of Nigeria. Alkaki is rich in carbohydrate, Mineral (To maintain the body PH; it makes your bone strong) vitamins and antioxidants that helps prevent the body from certain cell damage. In the previous study protein-energy malnutrition has been identified as one of the most important problems in

Introduction:

Alkaki is a Sweet snack mainly eaten during special occasions like weddings in the Northern part of Nigeria Aletor and Ojelabi, 2007). This is usually made for the bride in a large quantity. Globally a nutrition transition is occurring, as shown by swift and widespread shifts in food consumption patterns towards the western diet and lifestyle. Accompanying this is an increased prevalence of diet-related diseases. Developing countries are

ISSN: 1213-4406

Africa. For the purpose of this study materials sampled at 100% Wheat Alkaki; 10% Benniseed and 90% wheat; 20% Benniseed and 80% wheat; 0% Benniseed and 100% Rice and 0% Wheat; and 5%Wheat and 10%Beninseed and 85% Rice. The results of analysis indicated that sample A (20.12±0.03) was significantly higher in protein content ranges from (15.74±0.97 to 20.12±0.03). These values were higher than other related previous studies. The study reveal that the Local snacks can be produced from Wheat/rice and Benniseed blend using cooking method.

Keywords: Supplementation, Proximate, Composition, Acceptability, Local Snacks (Alkaki).

Gradually experiencing a shift from the utilization of indigenous snacks in favour of pastries and western type of snacks especially amongst urban and urban dwellers (Briggs, 2011).

Alkaki is a Hausa snack prepared with local ingredient by the Hausa people. It is a snack served to visitors mostly during occasions. Like in weddings, it is usually prepared in large quantities for the bride to welcome her visitors and well wishers. Alkaki is rich in carbohydrate, Mineral (To maintain the body PH; it makes your bone strong) vitamins and anti oxidants that helps prevent the body from certain cell damage.

Wheat (*Triticum)* is a major cereal crop in many part of the world. It belongs to the tricieum family, of which there are many species, T. aestium and T. durum are the most imported commercially (Mekeuin, 2014). Wheat is divided into six classes based on different genetic characteristics. Some of the glasses are hard red winter, hardened spring, soft white, soft red, and durum and hard white (Tayloer *et al*., 2005). The consumption of these and other snacks dates back several decades in the country's history, especially among the low income populace, thus contributing to the overall dietary nutrient intake (Aletor and Ojelabi, 2007). However, some indigenous snacks are deficient in one or more essential nutrient. There is

therefore a need to improve their nutritional quality thus providing a nutritious and healthier alternative to western snacks which can be acceptable by the consumers.

With high protein content, along with energy values and important vitamin and mineral content, legumes have been recognized for their nutritional importance (Vadiveli and Janardhanan, 2005).

Among legumes, Benniseed is predominantly grown and consumed in India. However, this genus is now thought to be congeneric with Atylosia and Endomallus, and also includes species of Rhychosia and Dtulbaria. Cajanus is now recognized as having 32 species. It is a leguminous shrub that can attain a height of 5m. It is typically moist when cooked giving sticky rice which is perfect for dessert and pudding (Owusu-Kwarteng, 2010). Rice is the seed of grass species (*Oryza sativa or Oryza glanberrima)* as a cereal grain it is the most widely consumed staple for large part of the worlds human population, especially in Asia, it is the agricultural commodity with third highest worldwide production. Rice is a food grain that contains a number of vitamins and mineral that are extremely healthy for us (FAO, 2014).

Statement of Problem

Protein-energy malnutrition has been identified as one of the most important problems in Africa (Aletor and Ojelabi, 2007). Attempts have been made to devise strategies for combating this nutritional problem. Nutritious foods of high protein and energy value based on cereal-legume combinations have been suggested (Owusu-Kwarteng, 2010).

Justification of the Study

In developing countries, particularly sub-Saharan Africa, ready to use meals for both adults and infants are based on local staple diet made from cereals, legumes, roots, cassava and potatoes tubers. However, results from previous studies note that most cereals are limited in essential amino acids such as threonine and tryptophan even though rich in lysine (Perez-

Consesa *et al.*, 2012; Mensa-Wilmot *et al.*, 2011; Nnam, 2011; Onweluzo and Nnamuchi, 2009), while most oil seeds and legumes are rich in these essential amino acid particularly the Sulphur amino acids. So therefore incorporation of sesame and rice crops will improve the food qualities which will eradicate all kind of malnutrition related diseases among the children, adults and lactating mothers in Nigeria. Also, there is dearth information on production and enrichment of Alkaki snacks using readily available staple foods. Therefore, this informed the decision on the execution of this research work.

Materials and Methods

Preparation of samples

Rice flour was prepared according to the method adopted by Nwosu et al., 2011. The Rice grain (3 kg) was cleaned, sorted and washed. Clean rice sample was soaked in water for 4 hours, drain and sun dried. The dry rice was milled using attrition milled. Thereafter it was then sieve using 300µm mesh to obtain the flour. Benniseed was cleaned to remove dirt and other foreign particles and soaking was carried out for 1hours after that the water was drained out then Benniseed was spread on mat, allow to germinate for 72hours and sun-dried. The dried sesame was dulled then milled to obtain fine flour. Two kilogrammes (2kg) of wheat was clean, sort and washed then drained and dried in a hot air oven at 60^0 c for 2 hours. The wheat was grind into a fine powder. Thereafter, it was blended together and packaged until required for use.

Table 1: Formulation of Blends for the Production of Local snacks (Alkaki) using wheat, Rice and Benniseed

Sample	Wheat	Benniseed	Rice
A	100%	0%	0%
B	90%	10%	0%
C	80%	20%	0%

D	0%	0%	100%
E	5%	10%	85%

Keys

A= 100% Wheat Alkaki
B= 10% Benniseed and 90% wheat
C= 20% Benniseed and 80% wheat
D= 0% Benniseed and 100% Rice and 0% Wheat
E= 5%Wheat and 10%Beninseed and 85% Rice

Proximate Analysis

The sample was analyzed for proximate composition such as carbohydrates, crude fat content, crude fiber, crude protein, ash content and moisture content using the method of (AOAC 2010).

The sensory evaluation of the products was carried out using a 9 point hedonic scale ranking 1-9, where 1 = extremely dislike, 2=dislike moderately 3=dislike slightly 4=dislike very much 5= neither like or dislike 6= like very much 7= like slightly 8= like moderately and 9 = like extremely with 12 panelist which comprises of Staff and students of Nutrition and dietetics in Federal Polytechnic Bida who will assess the product for flavor, fluffiness, color, taste and overall acceptability.

Results and Discussions

The mean values of proximate composition of the developed samples are shown in Table 4.1. The results revealed some significant changes at $p<0.05$. The result of moisture content ranges from (2.45 ± 0.70 to 4.71 ± 0.28) with highest values observed in sample C. The higher value observed could be due to high content of legumes that have the ability to imbibe moisture from environment and swell. Similarly, legumes have

been shown to have hygroscopic or water absorbing properties (Wasserman, 2010). Low moisture in other sample could add advantage of prolonging the shelf life of the product if properly packaged. The result of ash content ranges from (1.33±0.28 to 2.67±0.63) with highest values observed in sample E. Lower ash content were observed in all the samples which could reduce the flammability of the products that could easily produce ash on combustion (Wasserman, 2010). The result of analysis showed that fat content of developed products were generally high ranges from (6.20±0.14 to 8.90±0.07) with highest values observed in sample C. Significant differences were observed among the samples. High fat content could be responsible for addition of oil and legumes to the products, since most legumes contain reasonable amount of fat (Ihekoronye and Ngoddy, 1985). The results of analysis indicated that sample A (20.12±0.03) was significantly higher in protein content ranges from (15.74±0.97 to 20.12±0.03). These values were higher than other related previous studies (Agunbaide and Ojezele, 2010). The high protein content could be attributed to the presence of legumes used in the products. The progressive solubilization and leaching out of the nitrogenous substances during processing could be responsible for changes in protein (Ukachukwu and Obioha, 2000). The result of fibre content indicated that all the samples were within the range. Fibre is needed to assist in digestion and keep the gastrointestinal tract healthy including glucose stability. It also slows down the release of glucose during digestion which requires less insulin to absorb the glucose by the cell. It has been reported that people with metabolic complication should consume 25-50g of fibre per day (Tridinidal*et al.*, 2006). Regarding Nitrogen free extracts, the higher values observed could be attributed high content of cereals and legumes used as the principal ingredients during preparation (Kanu*et al.*, 2009). Unlike energy, the values represent the amount of energy in food that can be

supplied to the body for maintenance of basic body function including breathing, circulation of blood, physical activities and thermic effect of food.

Table 2: Proximate composition of Local Snacks (Alkaki) produced from wheat/rice and Benniseed flour blend

Parameters	Sample A	Sample B	Sample C	Sample D	Sample E
Moisture	4.05±0.70	4.20±0.42	4.71±0.28	2.45±0.70	3.45±0.87
Ash	1.33±0.28	1.53±0.18	1.45±0.07	2.45±0.14	2.67±0.63
Crude fat	8.46±0.08	6.24±0.06	8.90±0.07	6.75±0.07	6.20±0.14
Crude protein	20.12±0.03	15.81±0.18	19.59±0.03	15.74±1.97	17.75±0.35
Crude fibre	4.46±0.14	4.70±0.07	4.60±0.21	3.50±0.07	3.50±0.14
Carbohydrates	61.73±0.63	67.57±0.20	60.55±0.66	69.21±0.55b	66.38±1.19
Energy value	363.54±1.66	349.67±1.06	362.16±4.03	360.55±0.77	357.63±5.49

Values are mean± SD. Values with different superscripts on the same row are significantly different at $p<0.05$.
Key: Sample A (100:0), Sample B (90:10), Sample C (80:20:0), Sample D (0:0:100), Sample D (5:10:85)

The results of sensory properties of Alkaki produced from wheat/rice and Benniseed flour blend indicated highest significant differences in taste and flavor which could be attributed to cooking. This result is in agreement with report of Iwe (2001) who observed the increase in texture when cereal was blended with legumes. He also suggested that taste and flavor are physiologically and physically connected with one another depending on the respondents. Similarly, results from this work indicated that taste and flavor of the alkaki were enhanced during processing. Furthermore, Iwe (2001) explained that slight variation of values observed in taste and

flavor could be due to higher cooking temperature. In addition to color rating and general acceptability all the samples were statistically($p<0.05$) higher compare to other samples. These results were in agreement with Rampersad*et al.* (2003) who reported the degree of likeness in all the sensory attributes.

Table 3: Sensory Evaluation of Local Snacks (Alkaki) produced from wheat/rice and Benniseed flour blend

Parameters	Sample A	Sample B	Sample C	Sample D	Sample E
Taste	7.66±1.11	7.53±1.30	6.93±1.33	7.53±1.35	6.86±1.35
Appearance	7.40±1.04	7.53±0.1.24	7.26±1.16	7.33±0.07	7.13±0.35
Aroma	7.13±0.08	7.60±1.47	7.80±0.07	7.20±0.07	7.46±0.09
Colour	7.53±0.03	7.66±0.18	7.66±0.03	7.73±0.19	7.20±0.10
Texture	7.73±0.14	7.46±0.07	7.53±0.21	7.33±0.07	7.66±0.08
Acceptability	7.83±0.07	7.53±0.21	7.40±0.04	7.13±0.15	7.00±0.13

Values are mean± SD. Values with different superscripts on the same row are significantly different at $p<0.05$.

Key: Sample A (100:0), Sample B (90:10), Sample C (80:20:0), Sample D (0:0:100), Sample D (5:10:85)

Conclusion

In this work, different samples of local snacks were produced. Out of the five samples prepared, sample C was enhanced in terms of proximate

composition and sensory attributes. In conclusion therefore, Local snacks can be produced from Wheat/rice and Benniseed blend using cooking method.

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