

## The proximate analysis and sensory evaluation of “Okpa” prepared with fluted pumpkin and scent leaves

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### Abstract

“Okpa” is a well cherished food, especially among the inhabitants of the eastern part of Nigeria. It is prepared using flour from bambara nut. The proximate analysis and sensory evaluation of the “Okpa” prepared with vegetables fluted pumpkin (*Telfairia Occidentales*) and scent leaves (*Ocimum Viridis*) were carried out. The results show that the addition of the leaves altered the ash and fiber content of the “Okpa”. Fluted pumpkin leaf had the highest ash content ( $4.52 \pm 0.03$ ) followed by the combination of the leaves ( $4.51 \pm 0.02$ ), and then the scent leaf ( $4.45 \pm 0.01$ ) compared with the control ( $4.09 \pm 0.05$ ), confirming that the presence of these vegetables boosted the ash (mineral) contents of the “Okpa”. The “Okpa” with scent leaf had the highest crude fiber ( $11.92 \pm 0.20$ ), followed by “Okpa” with a combination of these leaves ( $11.30 \pm 0.06$ ), and then the fluted pumpkin leaf ( $10.01 \pm 0.12$ ) compared with the control ( $3.37 \pm 0.11$ ). These vegetables also increased the crude fiber content of “Okpa” which could ease off the dryness and hardness of “Okpa” to the palate and constipation. The percentage crude protein, fats, carbohydrate, moisture and energy values were not altered significantly. The sensory evaluation of the samples did not show any significant change at  $P = 0.05$ . Therefore, addition of vegetables, especially fluted pumpkin leaves could serve as a boost to the nutritional value of “Okpa”.

**Key words:** Bambara nut, fluted pumpkin and Okpa, scent leaves

### Résumé

L’Okpa est un aliment bien envié, surtout par les habitants de la partie orientale du Nigeria. Il est préparé avec de la farine de noix bambara. L’analyse immédiate et l’évaluation sensorielle de l’Okpa préparé avec des légumes de citrouille cannellée (*Telfairia Occidentales*) et les feuilles odorantes (*Ocimum Viridis*) ont été réalisées. Les résultats montrent que l’addition des feuilles a modifié la teneur en cendres et en fibres de l’Okpa. La feuille de citrouille cannellée avait la plus forte teneur en cendres ( $4,52 \pm 0,03$ ), suivie par la combinaison des

feuilles ( $4,51 \pm 0,02$ ), puis la feuille odorante ( $4,45 \pm 0,01$ ), par rapport au témoin ( $4,09 \pm 0,05$ ), confirmant que la présence de ces légumes a stimulé les teneurs en cendres (minéraux) de l'Okpa. L'Okpa avec la feuille odorante avait la plus haute teneur en cellulose brute ( $11,92 \pm 0,20$ ), suivie par Okpa combiné à ces feuilles ( $11,30 \pm 0,06$ ), puis la feuille de citrouille à cannelures ( $10,01 \pm 0,12$ ) par rapport au témoin ( $3,37 \pm 0,11$ ). Ces légumes ont également augmenté la teneur en cellulose brute de l'Okpa qui pourrait relâcher la sécheresse et la dureté des Okpa pour le palais et la constipation. Le pourcentage en protéine brute, graisses, hydrates de carbone, humidité et les valeurs énergétiques n'ont pas été modifiés de façon significative. L'évaluation sensorielle des échantillons n'a montré aucun changement significatif à  $P = 0,05$ . Par conséquent, l'addition de légumes, en particulier les feuilles de citrouille à cannelures, pourrait servir de relance à la valeur nutritive des Okpa.

Mots clés: Noix bambara, citrouille à cannelures et Okpa, feuilles odorantes

## Background

“Okpa” is a well-cherished food, especially among the inhabitants of the eastern part of Nigeria. However it is derived from Bambara nuts (*Voandzeia Subterranean*). It is a legume, indigenous to tropical Africa (Kay, 1979). Bambara is grown extensively in Nigeria (Oguntunde, 1985, Enwere, 1998) but it is one of the lesser utilised legume in the country.

In Nigeria, the freshly harvested pods are cooked, shelled and eaten as a vegetable snack, while dry seeds are either roasted and eaten as a snack (Kay, 1979; Aloba, 1999) or milled into flour and used in preparation of moi-moi (Olapade *et al.*, 2005) an equivalent of “okpa” among the Igbo of Nigeria.. For most food uses, the seed coats of legumes including Bambara are removed to reduce the anti-physiological factors and fiber content. This result in better appearance, texture, cooking quality, palatability and digestibility of the products (Akinjayeju and Enude, 2002).

Dehulling can be accomplished manually or mechanically depending on the type of legume and /or quantity involved (Ehiwe and Reichert, 1987). Dehulling has been a limiting factor in producing acceptable moi-moi, most especially with respect to texture and flavour. The conventional method used always result into a product with a very hard texture and a strong bean flavour (Aloba, 1999). Lack of knowledge of the functional, chemical

## Materials and Methods

and nutritional properties of some legumes grown in developing countries is responsible for their less utilisation in food formulations (Udensi *et al.*, 1999).

The extract from the nut of *Voandzeia subterranean* particularly the protein extracts can be used directly in cosmetic formulation and provides specific properties and notable particular effects. The nut can be used quite freely to replace the high-priced meat for adequate nutrition. The unique properties of bambara nut make “Okpa” a balanced food with almost all the vital nutrients that promotes good health (Obizoba and Egbuna, 1992).

**Preparation of bambara flour.** The seeds were thoroughly cleaned and sorted to remove extraneous materials. The clean seeds weighing 200grams were steeped in cold water at room temperature (25°C) for 8hrs. The seeds were later dried in an air draught drier at 65°C for 48hrs to about 10% moisture content. The seeds were separately dehulled using a plate mill with clearance of 6mm between the plates. The cotyledons were hammer milled to pass through 0.8mm size screen.

**Preparation of the “OKPA” samples.** Fresh paste was prepared from 200g of bambara flour. The flour was hydrated with 300ml of warm water (60°C) and mix thoroughly. The paste was divided into four equal parts. To the first portion, plain paste was dispensed into a clean banana leaf. The second portion was made of paste mixed with sliced fluted pumpkin leaves. This was dispensed into another clean banana leaf.

The third portion was made of paste mixed with sliced scent leaves, while the fourth portion (paste with fluted pumpkin leaves mixed with scent leaves). These too were dispensed into a clean banana leaf. All four were steamed for 45minutes.

**Analysis.** After steaming, 5g of each sample was taken and carefully coded. The four samples were coded A, B, C and D, respectively. The samples were then subjected to proximate analysis where the ash content, crude fiber, protein moisture, fat and carbohydrate contents were determined using the standard Association of Official Analytical Chemist 1984 method.

**Sensory evaluation.** Sensory evaluation of the “Okpa” samples was also carried out. The four samples (were presented

Table 1. Proximate analyses of the “OKPA” samples.

Samples	Crude protein (%)	Crude fiber (%)	Fat (%)	Ash (%)	Moisture (%)	Carbohydrate (%)	Energy value (Kcal)
A	16.92 ±0.20	3.73±0.11**	4.93±0.01	4.09±0.05*	47.44±0.92	26.62±0.77	216.28±24.70
B	16.80± 0.35	10.01 ±0.12**	4.91±0.03	4.52±0.03*	48.13±0.07	25.64±0.31	213.98±23.90
C	16.68±0.40	11.92±0.02**	4.90±0.03	4.45±0.01*	47.95±0.08	26.01±0.33	214.86±24.71
D	16.69±0.20	11.30±0.06**	4.91±0.01	4.51±0.02*	48.11±0.04	25.80±0.16	214.11±24.31

Values = Means ± Standard deviation; Values with \*\* are highly significant, and \* are significant at  $p \leq 0.05$ ; Values without asterisk are not significant at  $p \leq 0.05$ .

to a panel of ten judges who were familiar with the product for sensory evaluation. The trained panel scored for appearance, flavour, taste, and texture and overall- acceptability of the “Okpa” using a nine point hedonic scale, in which 9 indicate extremely like and 1 extremely dislike. Data obtained were statistically analysed using one way ANOVA at 95% confidence interval ( $P \leq 0.05$ ).

## Research Application

The results of proximate analysis are shown in Table 1. Addition of vegetables affected the ash contents significantly ( $P \leq 0.05$ ). Sample B had the highest ash content ( $4.52 \pm 0.03$ ), followed by sample D, ( $4.51 \pm 0.02$ ), and then by sample C, ( $4.45 \pm 0.01$ ) compared with the control sample A ( $4.09 \pm 0.05$ ). This shows that addition of vegetables could serve as a boost to the ash content of the “Okpa”. The ash content of a sample is a measure of its mineral content.

Crude fiber was also affected significantly ( $P \leq 0.05$ ). Sample C had the highest crude fibre ( $11.92 \pm 0.20$ ) followed by sample D ( $11.30 \pm 0.06$ ), and then sample B ( $10.01 \pm 0.12$ ). The control has the least crude fibre content ( $3.73 \pm 0.11$ ). This also indicates that addition of vegetables especially scent leaf to “Okpa” increases its fiber content which may help in bowel movement and reduce or stop constipation. It also ameliorate the dryness and hardness of “Okpa” to the palate experienced by consumers while ingesting. The percentage crude protein, fats, carbohydrate, moisture and energy values were not altered significantly.

The results of the sensory evaluation (data not shown) did not show any significant change at  $P = 0.05$ .

It is therefore concluded from the study that addition of vegetables especially fluted pumpkin leaves or scent leaves to “Okpa” a delicacy produced from Bambara nut increases its ash (mineral) and fiber contents. This increase could ameliorate the dryness and hardness of “Okpa” to the palate experienced by consumers during ingestion.

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