

The vitamin and mineral contents of “Okpa” prepared with fluted pumpkin and scent leaves

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Abstract

The bambara nut flour is often processed into “Okpa” by the inhabitants of the eastern part of Nigeria. In this study, the vitamin and mineral contents of “Okpa” prepared with fluted pumpkin and scent leaves were determined. The result shows that the addition of the vegetables increased the vitamin B₁, B₂, and B₃ contents of “Okpa” compared with the control at $P \leq 0.05$, but did not alter that of vitamin C levels at $P \leq 0.05$. This implies that the presence of these vegetables could serve as a booster to the vitamin contents of “Okpa”. The mineral contents, especially phosphorus, magnesium and calcium in “Okpa” were also significantly influenced by addition of vegetables in bambara nut. The “Okpa” with fluted pumpkin leaves had the highest phosphorus ion contents (136.623 ± 0.372), followed by “Okpa” with fluted pumpkin and scent leaves combined (114.433 ± 0.377) and then “Okpa” with scent leaf (92.783 ± 0.377). The Magnesium levels were highest in “Okpa” with fluted pumpkin (18.400 ± 1.131) followed by “Okpa” with combined leaves (16.000 ± 1.131) and then “Okpa” with scent leaf (12.800 ± 2.263). The potassium contents was also highest in “Okpa” with fluted pumpkin leaf (165.860 ± 0.377), followed by “Okpa” with scent leaf (153.600 ± 0.653) and “Okpa” with the combined leaves (143.733 ± 28.097). The levels of calcium ion was highest in “Okpa” with scent leaf and “Okpa” with the combined leaves (85.50 ± 1.890) respectively, followed by “Okpa” with fluted pumpkin leaf. Sodium levels were not affected significantly. These results suggest that the vegetables especially fluted pumpkin leaves could serve as a booster to the mineral and vitamin contents of “Okpa”.

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

Résumé

La farine de noix bambara est souvent transformée en “Okpa” par les habitants de la partie orientale du Nigeria. Dans cette étude, les teneurs en vitamines et en minéraux de “Okpa», préparé avec de la citrouille à cannelures et les feuilles odorantes ont été déterminées. Le résultat montre que l’ajout des légumes a augmenté les teneurs en vitamine B1, B2 et B3 et le contenu

de "Okpa" par rapport au témoin à $P \leq 0,05$, mais n'a pas modifié celle des niveaux en vitamine C à $P \leq 0,05$. Cela implique que la présence de ces légumes pourrait servir pour rehausser les teneurs en vitamine de l'Okpa. Les teneurs en minéraux, en particulier le phosphore, le magnésium et le calcium dans l'Okpa ont également été fortement influencées par l'ajout de légumes dans le noix bambara. L'Okpa avec des feuilles de citrouille à cannelures avait la plus haute teneur en ions de phosphore ($136,623 \pm 0,372$), suivi par "Okpa" avec de la citrouille à cannelures et les feuilles odorantes combinées ($114,433 \pm 0,377$), puis "Okpa" avec la feuille odorante ($92,783 \pm 0,377$). Les concentrations en magnésium étaient plus élevées dans "Okpa" avec la citrouille cannelée ($18,400 \pm 1,131$), suivi par "Okpa" avec des feuilles combinées ($16,000 \pm 1,131$) et puis "Okpa" avec la feuille odorante ($12,800 \pm 2,263$). Les teneurs en potassium étaient également plus élevées dans l'Okpa avec la feuille de citrouille cannelée ($165,860 \pm 0,377$), suivi par Okpa avec la feuille odorante ($153,600 \pm 0,653$) et l'Okpa avec les feuilles combinées ($143,733 \pm 28,097$). Les niveaux d'ions de calcium étaient plus élevés dans "Okpa" avec la feuille odorante et "Okpa" avec les feuilles combinées ($85,50 \pm 1,890$) respectivement, suivis par «Okpa» à la feuille de citrouille à cannelures. Les niveaux de sodium n'ont pas été affectés de manière significative. Ces résultats suggèrent que les légumes, en particulier les feuilles de citrouille cannelée, pourraient servir pour rehausser les teneurs en minéraux et en vitamine de l'"Okpa".

Mots clés: Noix bambara, citrouille cannelée, Okpa, feuilles odorantes

Background

"Okpa" is cherish food, especially among the inhabitants of the Eastern Nigeria prepared from the flour of the legume bambara nut. (*Voandzeia subterranean* (L.) thouars)

Bambara nut Bambara nut which constitutes a complete food stuff and is reported to contain protein, carbohydrate and lipids. It can be consumed at different stages of maturation (National Research Council, 2006). The plant has a potential to improve malnutrition and boost food availability.

The plant is distributed in Africa and grows best under bright sunshine, high temperature and at least 4 frost-free months and frequent rain. However, it is highly adaptable and tolerates harsh weather conditions better than most crops. Bambara nuts are

used locally as food stuff for preparing “Okpa” (moi-moi) (Nigeria, Igbo). It can be boiled and eaten as nut and can also be ground into flour for preparing fufu maize or to fortify maize for pap in Nigeria. . The dry seeds can last a very long time and serves as a famine food resesrve (National Research Council, 2006).

Bambara plant is also used to sustain soil fertility thus mainitaining high crop yields. It is also used in cosmetic formulations. . The nut can be used as a nutritional substitute for meat. The fatty acid present in the nut oil is among the essential fatty acids needed in the body. The nut also contains tannins which are anti-nutritional factors (Obizoba and Egbuna, 1992). The unique properties and composition of Bambara nut make it serve as an almost balanced food. However, consumers often complain that “Okpa” is hard, dry and heavy to the palate. Therefore, to improve its palatability, it can be prepared with vegetables. This study sought to determine the vitamin and mineral contents of “Okpa” prepared with fluted pumpkin and scent leaves.

Materials and Methods

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 and analysis of “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.

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 mineral and

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water soluble vitamins analysis using the standard Association of Official Analytical Chemist 1984 method.

Results in Table 1 shows that the addition of the vegetables significantly altered vitamin B₁ (thiamin), vitamin B₂ (riboflavin) and vitamin B₃ (niacin) contents of “Okpa”. Vitamin C levels were however not affected. The highest vitamin B₁ contents was recorded in sample B (0.167± 0.009), followed by sample D (0.151 ± 0.005), and then sample C (0.147 ± 0.005).

Sample C (0.446 ± 0.007) had the highest riboflavin (vitamin B₂) levels, followed by sample D (0.443 ± 0.002) and then sample B (0.429 ± 0.002). For niacin (vitamin B₃), levels decreased from were sample sample B (1.103± 0.009) followed by D (1.073± 0.005), then C (1.053 ± 0.005) and was least in the control (0.883 ± 0.009). The vitamin C contents were not significantly affected.

Table 2 shows that the mineral contents especially phosphorous, magnesium, potassium and calcium were significantly changed with addition of vegetables to “Okpa”. The change was greatest

Table 1. The vitamin contents (mg/100g) of the samples.

Samples	Vitamin B ₁ Thiamin	Vitamin B ₂ Riboflavin	Vitamin B ₃ Niacin	Vitamin C Ascorbic acid
A	0.131±0.009*	0.320±0.002**	0.883±0.009***	2.933±0.415
B	0.167±0.009*	0.429±0.002**	1.103±0.009***	13.787±0.415
C	0.147±0.005*	0.446±0.007**	1.053±0.009***	11.100±0.424
D	0.151±0.005*	0.443±0.002**	1.073±0.005***	1.613±0.414

Values = means ± standard deviation. Values with asterisks (*) are significant at P≤0.05.

* =Significant, ** = highly significant, *** = Much more highly significant.

Table 2. The mineral contents (mg/100g) of the samples.

Samples	Calcium	Magnesium	Sodium	Potassium	Phosphorus
A	78.823±1.890*	11.200±1.131**	6.413±0.019	70.133±0.377***	22.533±0.448****
B	82.833±1.890*	18.400±1.131**	6.347±0.019	165.867±0.377***	136.623±0.372****
C	85.507±1.890*	12.800±2.263**	6.413±0.038	153.600±0.653***	92.783±0.377
D	85.507±1.890*	16.000±1.131**	6.393±0.009	143.733±28.097***	114.433±0.377****

Values = means ± standard deviation. Values with asterisks (*) are significant at P≤ 0.05.

* =Significant, ** = highly significant, *** = more highly significant, **** = Much more highly significant.

for phosphorus, followed by potassium, magnesium and calcium. Sodium level was not significantly affected.

These results suggest that the vegetables especially fluted pumpkin could serve as a booster to the mineral and vitamin contents of “Okpa”, therefore, their addition will enhance its nutritional value.

References

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