

Physiochemical Properties of Two Commonly Eaten Nigeria Salads (*Pentaclethra Macrophylla* Benth and *Gnethum Africanum*)

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Abstract

This paper assesses the physiochemical properties of two commonly eaten Nigeria salads. The ingredients were purchase from a local market in Idah, Idah local government of Kogi State, Nigeria, West Africa. The two salads were prepared under good hygienic conditions in an established laboratory and served to a panel of one-hundred untrained judges randomly selected from staff and students of federal polytechnic Idah community were used for the sensory evaluation. Both salads were evaluated for sensory properties, proximate composition, functional, some vitamin and some mineral elements. The result showed that moisture and fat content ranges from 58.7 – 61.4 (48.5% - 51.5%) and 8.4 – 14.4 (36.8% - 63.2%) respectively. Oil and water capacities ranges from 18.4 – 30.4 (37.7% - 63.3%) and 15.6 – 20.3 (43.5% - 56.5%) respectively. whereas zinc and calcium ranges from 0.6 – 0.6 (50% - 50%) and 0.33 – 0.4 (42.9% - 57.1%) respectively. The vitamin content of both dishes with the mean % value of 2.3(59% vit A), 89 (50% vit E), 0.38(50% vit B₁₂), 0.66(58.3% vit D) and 0.57(50% vit K) respectively. The result of the sensory evaluation carried out revealed that there were no significant differences ($P>0.05$) in terms of appearance, flavour, aroma, presentation and creativity. Both dishes were generally acceptable to the panellists/ consumers. The study concludes that both dishes were nutritionally balance indicating that both dishes can be popularized and served in homes and hospitality industries (hotels, restaurants, guest houses, fast food outlets etc.) in and outside Nigeria.

Keywords: salad, dishes, hospitality, nutritionally, Balance.

INTRODUCTION:

The gradual introduction of Nigerian indigenous food items into the hospitality food service is becoming more and more popular, in other to prevent our local dish from going into extinction and to standardize these dishes to acceptable international level. Olaibi (2010).

The development and sustenance of the growth and health of human beings depend essentially on their nutritional level. Food which is vital to life and contains essential nutrients when taken in adequate quantity and quality ensures a balanced nutrition. This is a pre-requisite to health and productive living, in addition, form a basic indicator to good body development (Atinmo, 2001).

Efforts have been geared towards improving and raising the standard of nutrition of the people. Olusanya, (1977) and Smith et al (1995) examined the consumption habit of the people in other to identify how an individual utilizes the available food materials to satisfy his hunger. This utilization of food materials are influenced by many factors such as, social, economic, cultural or educational preferential that is individual awareness of the nutritional composition of the food material he/she consumes.

Salad is a popular ready-to- eat dish made of adverse ingredients, usually served chilled or at moderate temperature. Shapiro (1986). Shapiro (1986) further described it as light, salary leafy vegetable dishes, most often served with a sauce or other dressing sometimes accompanied by meat, fish or other ingredients. Bali,(2010) opined that salad is a composition of ingredients that can be raw, cooked or appetizer or as a main course.

The African oil been (*Pentaclethra macrophylla* benth) popular in Nigeria by its local name *ugba* is a tropical tree plant in the family leguminosae. The tree is found in the southern rain forest zone of West Africa where it is grown wild. This tree produces flowers between March and April and also between June and November. The flower is yellow and pinkish-white in colour, sweet smelling and attractive myriads of insects including honeybee. The fruit is a long green pod which slowly darkens with maturity, 36 – 46cm long and 5cm – 10cm broad. Each pod contains up to ten seeds and at maturity, the pod splits open explosively scattering its seeds up to a distance of 20m from the tree. The seeds are flat in shape, hard but smooth in texture, brown in colour and about 6cm long (Achinewhu 1998).

MATERIAL AND METHODS

All ingredients were purchased at a local market in Idah local government area in kogi-state Nigeria. *Pentaclethra macrophylla* benth (*Ugba*), *Gnethum africanum*(*Okazi*), onions, crayfish, palm oil, potash, salt, maggi cube, African nutmeg, beef, frozen fresh fish(tuna) and dry ground red pepper.

METHOD OF PREPARATION: ugba salad:

The African oil been was boiled for 12 hours to facilitate the removal of the seed coat, the endosperm was sliced into smaller thread-like strands. The sliced seed are washed thoroughly in water with four or five changes of water to reduce or remove bitter taste of the seed. The washed slices are wrapped in blanched banana leaves, packed together in basket and left to ferment for 3 days at room temperature (29^oc - 32^oc). Beef (100g) was seasoned, boiled till tender; the ugba was warmed into beef stock and remove. To the left stock powdered potash was mix in, then to the mixture palm oil added to form a sauce. To the sauce, magi one cube, the boiled beef, crayfish ten grams, ground red pepper, salt to taste. The entire ingredient was stared together and used to coat the warm ugba. It was served and garnished with freshly sliced onion and tomatoes.

Method of preparation: okazi salad:

The Okazi(*Gnethum africanum*) was sealed in vinegar solution for 30 minutes and washed out to drain. Frozen fish(tuna) 200g was cleaned, salted (to taste) and fried lightly with palm oil. The sauce was prepared just like the one for the ugba, the well drained okazi was coated with the sauce and garnished with the fried fish, onion sliced, fresh egg plants and served to the panellists for a sensory evaluation.

SENSORY EVALUATION OF PREPARED SALADS:

Sensory evaluation of both product based on hedonic scale was carried out as describe by AOAC (1990). Acceptability parameter such as appearance, taste and flavour, palatability, aroma, presentation and creativity were evaluated using a questionnaire to score the four point. Hedonic scale given as highest score as 4 and 1 as least score by randomly selected twenty panellists.

TABLE 1: MEANS SENSORY SCORE OF THE TWO SALADS

| SALAD | APD | FLD | PLD | ARD | PRD | CTD |
|-------|-----|-----|-----|-----|-----|-----|
| A | 3.8 | 3.4 | 3.1 | 3.5 | 3.5 | 3.4 |
| B | 3.7 | 3.7 | 3.5 | 3.8 | 3.8 | 3.8 |

N-B: 4-Point Hedonic scale (1 – 4)

Appearance, taste & flavour, palatability, Aroma, Presentation, creativity, Means sensory score was not significantly difference (P>0.5) between attributes assessed.

STATISTICAL ANALYSIS: sensory scores were subjected to analysis of variance (steel and torrie, 1980). Least score were separated by least significant difference (LSD at P=0.05).

CHEMICAL ANALYSIS:

The moisture content of the two was determined by drying in an oven at 100% until constant weight, ash by incineration in a muffle furnace at 550^oc for 48 hours, proximate chemical composition of booth salads was carried out to determine the moisture, ash, fat, crude fibre, protein and carbohydrate content of each salad sample using various techniques.

Protein by nitrogen determination using Kjeidahl micro method and conversion of nitrogen to proteins by the factor 6.25. fat was by Bligh dyer technique, crude fibre by successive digestion of the defatted sample with 0.26N sulphuric acid and 0.23N potassium hydroxide solutions and carbohydrates difference method (AOAC, 1980).

FUNCTION PROPERTIES: water and oil capacity was determined according to the method described by Beuchat (1977). Foam capacity and stability was determined by method described by Onimawo et al (1998).

The minerals and vitamins were determined using the atomic absorption spectrophotometer.

DATA ANALYSIS: the data from chemical analysis were analyzed using means and standard deviation. (Means \pm SD of 3 determinations).

RESULTS AND DISCUSSION:

Sensory evaluation of food products is an important criterion by which its customer acceptability can be assessed, (Samuel et al, 2006). The sensory evaluation test on the two African salads showed that appearance of A & B is 3.8 and 3.7, flavour and taste is 3.4 and 3.7, palatability 3.1 and 3.5, aroma is 3.5 and 3.8, presentation 3.5 and 3.8 while creativity has 3.4 and 3.8 respectively.

Table 2: The result of the proximate composition of two African salad A and B showed a moisture content of (51.5% : 48.5%), ash (53.1% : 46.9%), fibre(55.9% : 44.1%), protein(57.5% : 42.5%), fats (63.2% : 36.8%), CHO(18.5% : 81.5%) respectively.

TABLE 2: MEANS (X) AND STD OF PROXIMATE COMPOSITION PRESENT IN THE SALAD.

| SALADS | MOISTURE % | ASH % | FIBRE % | PROTEIN % | FAT% | CHO% |
|----------------|------------------|-----------------|------------------|------------------|------------------|------------------|
| SALAD A | 61.4±0.003(51.5) | 2.6±0.002(53.1) | 1.89±0.002(55.9) | 15.4±0.004(57.5) | 14.4±0.002(63.2) | 4.3±0.002(18.5) |
| SALAD B | 57.8±0.003(48.5) | 2.3±0.002(46.9) | 3.4 | 26.8 | 22.8 | 18.9±0.002(81.5) |
| TOTAL | 199.2 | 4.9 | | | | 23.2 |

Table3: Gives the result of the functional properties of the two African salad A and B showed that: the oil absorption (62.3%: 37.7%), water absorption (56.5%: 43.5%), emulsion capacity (50.7%: 49.3%), emulsion stability (59.6%: 40.4%), forming capacity (65.7%: 34.3%), forming stability (52.8%: 47.2%) respectively.

TABLE 3: MEANS (X) AND STD OF FUNCTIONAL PROPERTIES OF THE SALAD

| SALAD | OIL ABS% | H2O ABS.% | EMULSIO% | EMULSION ST % | FORM CAP % | FORM ST % |
|----------------|------------------|------------------|------------------|------------------|------------------|-----------------|
| SALAD A | 30.4±0.003(62.3) | 20.3±0.002(56.5) | 55.4±0.002(50.7) | 38.6±0.004(59.6) | 32.4±0.002(65.7) | 6.6±0.002(52.8) |
| SALAD B | 18.4±0.003(37.7) | 15.6±0.002(43.5) | 53.8±0.003(49.3) | 26.2±0.003(40.4) | 16.9±0.002(34.3) | 5.6±0.002(47.2) |
| TOTAL | 48.8 | 35.9 | 109.2 | 64.8 | 49.3 | 12.5 |

TABLE 4: MEAN (X) AND STD OF SOME VITAMIN COMPOSITION OF THE SALAD

| SALAD | VIT. A% | VIT. E% | VIT. B ₁₂ % | VIT. D% | VIT. K% |
|----------------|------------------|------------------|------------------------|------------------|------------------|
| SALAD A | 1.65±0.003(41.0) | 0.86±0.002(50.0) | 0.35±0.003(50.0) | 0.66±0.003(58.3) | 0.56±0.003(50.0) |
| SALAD B | 2.3±0.003(59.0) | 0.89±0.002(50.0) | 0.38±0.003(50) | 0.55±0.003(41.7) | 0.57±0.003(50.0) |
| TOTAL | 3.9 | 1.8 | 0.8 | 1.2 | 1.2 |

TABLE 4: showed the result of some vitamin composition of the two African salads A and B as follows: vitamin A(40.1% : 59.0%), vitamin E (50.0% : 50.0%), vitamin B₁₂(50.0% : 50.0%), vitamin D(58.3% : 41.7%), vitamin K(50.0% : 50.0%) respectively.

TABLE 5: Shows result of some mineral composition of the two salad A and B : sodium content is (59.1% : 40.9%), calcium (57.1% : 42.9%), magnesium (40.0% : 60.0%), potassium (53.8% : 46.2%), iron (51.9% : 48.1%) and zinc (50.0% : 50.0%) respectively.

TABLE 5: MEANS (X) AND STD OF SOME MINERAL COMPOSITION OF THE SALAD

| SALAD | SODIUM % | CALCIUM % | MAGNESSIUM % | POTASSIUM % | IRON % | ZINC % |
|---------------|------------------|------------------|-------------------|------------------|------------------|-----------------|
| SALA A | 1.27±0.002(59.1) | 0.4±0.002(57.1) | 0.236±0.002(40.0) | 0.71±0.003(53.8) | 1.38±0.004(51.9) | 0.6±0.003(50.0) |
| SALA B | 0.87±0.001(40.9) | 0.33±0.002(42.9) | 0.314±0.002(60.0) | 0.59±0.003(46.2) | 1.32±0.003(48.1) | 0.6±0.003(50.0) |
| TOTAL | 2.2 | 0.7 | 0.5 | 1.3 | 2.7 | 1.2 |

CONCLUSSION

It has been reported that protein-calories malnutrition deficiencies is a major factor responsible in malnutrition pathology (Roger et al, 2005). The result of this work showed that adequate protein is present in both salad A and B. There was no difference in the mean value of vitamin E, B₁₂ and K of both salads. This could lead to a conclusive evidence that salad A (*Pentaclethra macrophylla* benth) and salad B (*Gnethum africanum*) are both suitable as snacks and main dish. The two salads have high water and oil absorption which lead to that they are easily digestible and absorbable for normal function of the body.

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