Proximate Analysis of Fermented and Unfermented African Locust Beans (*Parkia Biglobosa)*, Found in Lafia, Nasarawa State, Nigeria

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Abstract: **The work is aimed at comparing nutritional content of unfermented (boiled) and fermented African Locust Beans (Daddawa). The African locust beans (Parkia Biglobosa) were purchased from Alhamis Market, Tudun Gwandara, Lafia, Nasarawa State and were transported to the Hospitality Department of Nasarawa State Polytechnic, Lafia for proximate analysis. The sample was divided into two equal parts (boiled and fermented African Locust beans). The following parameters were analysed: moisture content, ash content, crude fiber content, protein content, lipid (fat) content and carbohydrate content. Unfermented (boiled) African locust beans showed higher carbohydrate, crude fiber and ash content (36.4% - 21.9%, 4.50% - 3.50%, and 2.5% - 2.00%) respectively. While the fermented African locust beans (Daddawa) showed higher protein, fat and moisture content (36.50% - 30.00%, 10.50% - 8.50% and 26.1% - 18.1%) respectively. The significant differences noticed in all the samples (boiled and fermented African locust beans) could be due to the processing activities and subsequent fermentation process to produce Daddawa. Both samples are good sources of nutrient for human consumption. Local condiment should be encouraged because is natural.**

***Keywords*: African Locust Beans, proximate analysis, fermented and unfermented.**

I. INTRODUCTION

African Locust bean tree (*Parkia Biglobosa*) is widely recognized as an important indigenous multipurpose fruit tree in many countries of the Sub-Sahara African, it is a perennial tree which belongs to sub-family *Mimosodee* and family *Leguminosae* (now *Fabaciae*) (Akande *et'al*., 2010).

The locust bean tree grows in Savannah region of West African upto edge of Sahel Zone (Campbell-Platt, 1980). In Nigeria, it is mostly grown in Savannah lands of central Nigeria (Tee *et'al*., 2009). Nigeria and other West African countries, used the seed from the tree when boiled or processed can be used as condiment in many food dishes (Hopkins and Whiti, 1984, Dike and Odunpa, 2003).

The Method of its processing is still largely traditional and labourious. It is usually carried out in a moist solid state and dried in the sun. When processed, (boiled or fermented), the African locust bean seeds constitutes a significant condiment that adds taste and flavor to soup and stew (Oje, 1993). The seeds called Karwa in Hausa and Iyen in Yoruba are traditionally used as food condiment (Daddawa - Hausa and Iru - Yoruba).

It is interested to know that some used the boiled seed while others used the fermented seed as condiments in their food dishes; preparation of the seed has a good benefits such as destruction of odours and undesirable flavor and production of good flavours, change in desire constitute and physical state and destruction of inhibitors by increasing the shelve life (Omafuvbe *et'al*., 2000).

The nutritive important of eating food is to gets appropriate amount of nutrient for body growth and normal functioning. In Nigeria especially Nasarawa State the prevalence of malnutrition and obesity demands that particular attention should continuously be paid to nutritive value of food especially to that of local food (organic plant).

Several researches have been carried out both in microbiology, biochemically and chemically on the processing of African locust beans (Ououba, *et al*., 2003, Eka, 1984). But because of the important of food especially local food to human and little or no research done on plants grown in Nasarawa State, there is the need for continuous research on the nutritive content of plants.

II. MATERIALS AND METHODS

Experimental

Raw locust beans were purchased from Alhamis Market Tudun Gwandara, Lafia, Nasarawa State and were processed at the Hospitality Department of Nasarawa State Polytechnic, Lafia, Nasarawa State using the traditional method; the African locust beans were soaked in water for 2hrs to depulp the seed and boiled for 10hrs. After the boiling, the water was sieved to obtained pure substrate (seed), the seeds were dehulled by rubbing in between the palms. To obtain a cotyledon, the chaffs were removed from the cotyledon by the use of sieve and washed with excess water. The cotyledons were divided into two equal parts and one was preserved in fridge and the other part was kept for fermentation process. The cotyledons for fermentation process were immediately further heated for 30mins. The hot water was sieved and the obtained cotyledons were put in a calabash, covered and wrapped with sack and left to ferment for 48hrs.

Proximate Composition

The proximate analysis of the samples (boiled African locust beans and African fermented locust beans) were determined according to AOAC (2005) method. The moisture content was determined by drying samples overnight at 100^0c for 24hrs 30min. The crude protein content was determined using Kjeldahl Technique. Fat content was determined using the Soxhlet method. The ash content was also determined by ashing at 550^0c until fully ashed. The carbohydrate content was determined by calculating the difference i.e. the sum of moisture; protein, fat and ash content were subtracted from 100%.

III. RESULTS AND DISCUSSIONS

Results

Table 3.1: Proximate Analysis of fermented and unfermented African Locust beans

S/No	Parameters	Unfermented Locust	Fermented Locust Bean (Daddawa)
1.	Moisture Contents (%)	18.10	26.10
2.	Ash Content (%)	2.50	2.00
3.	Fat Content (%)	8.50	10.50
4.	Protein Content (%)	30.00	36.50
5.	Crude Fiber Content (%)	4.50	3.50
6.	Cho Content (%)	36.40	21.90

Discussion

Table 3.1, above presented the result of proximate analysis of fermented (Daddawa) and unfermented locust beans. From the above table, it showed that there was a significance difference in proximate of fermented (Daddawa) and unfermented African locust beans. The significant differences could be attributed to the processing activities and subsequent fermentation process to produce Daddawa. The moisture contents of fermented (Daddawa) and unfermented African Locust beans were 26.1% and 18.1% respectively. The increase in moisture content for Daddawa may be as a result of boiling and subsequent soaking of water. It may also be due to metabolic activities of micro-organisms during fermentation period which gave out moisture as one of the end products. (Ezenwah, 2008).

As seen in the table above, the ash content decreased from 2.50% to 2.00%. While the fat content increased from 8.50% - 10.5% boiling. This is because of soaking and boiling. During soaking and boiling, soluble inorganic matters leached into processing water and washed away. (Ezenwah and Ikemebomeh, 2008).

There was also significance increase of protein content from 30.00% to 36.50% and fat content from 8.50% - 10.50%. The increase recorded in both fat and protein content may be as a result of reduction in carbohydrate content. The decrease in carbohydrate content from 36.4% to 21.9% could be attributed to utilization of some sugars used by micro-organism for growth and metabolic activities (Aremu, 2006).

Crude fiber, does not contributes nutrients or energy to human, it is a source of dietary fiber which is essential for good bowels movement and helps in preventing obesity, diabetes, cancer of the colon and other gastro intestinal tract of human. The crude fiber recorded in unfermented 4.5% and fermented 3.5% showed that it has higher value than most of food legumes, which range from 2.10% in groundnuts to 7.60% in kidney beans (Ihekoronge and Ngoddy, 1985).

REFERENCES

[1] Akande, F.B., Adejumo O.A., Adamade, C.A and Bodunde J. (2010). Processing of locust bean fruits: challenges and prospects. African journals of Agricultural Research. Vol. 5 (17): 2268 – 2271. http://www.academicjournal.org/AJAR

[2] AOAC. (2005) Official Method of Analysis. Association of Official Analytical Chemistry Washington DC pp 205-610.

[3] Campbell – Platt, G. (1988) African Locust Bean (Parkia Species) and its West African Fermented Food Product, Dawadawa. Ecology of food and Nutrition 9: 123-132.

[4] Dike, E.N. and Odunfa, S.A 2003. Microbiological and Biological Evaluation of a fermented seed soybean product. Soya dawadawa. J. food SciTech. 40: 606 – 610.

[5] Eka, O.U (1984). Review of studies on changes in nutrient composition during fermentation of foods. Nigeria journal of nutritional science 5(1): 9-13.

[6] Hopkins, H.C and White, F. 1984. The Ecology and Chronology of Parkia bioglobosa in African Bulletin du Jardin Botanique National de Belgique National plantetuin Belgique, 54: 225-226.

[7] Ihekoronye, A.I and Ngoddy, P.O (1985). Integrated food science and Technology for the tropics. Macmillan publishers Ltd. Pp 65-193, 283-294.

[8] Oje, K. (1993). Locust beans pods and seed: some physical properties of relevance to dehulhing and seed processing. J. food ScienTechnol. Vol. 30 No. 4:253-255.

[9] Omafurbe, B.O., Shuhukan, C.O & Aboise, S.H. (2000). Microbiological and biochemical changes in the traditional fermentation of soybean for soy-daddawa, Nigeria food condiment. Food microbiology 17:469-474.

[10] Ououba, L.I.I; Rechinger, K.B., Barkholt, V., Diauarva B., Traore, A.S., & Jackson, M. (2003), Degradation of proteins during the fermentation of African locust bean (Parkia bigbobosa) by strains of bacillus sub-stills and bacillus pumilus for production of soumba. African journal of applied microbiology 94:396-402.