Preliminary Study on Proximate Evaluation of Wildfruit and Seed of African Bush Pear

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Abstract: **- Fleshy fruit and seeds of African bush pear were subjected to proximate and mineral analysis using the standard methods of AOAC .Themineral was analyzed using Atomic Absorption Photospectrometer (AAS). Result shows that the seedswas significantly higher in protein (4.03%) and carbohydrate (74.71%) compare to fruit sample of protein (1.75%) and Carbohydrate (27.37%). In addition, the fruit sample was significantly (P< 0.05) higher in Ash (3.92%), Fibre (8.10%) and Fat (56. 64%) respectively. It was also discovered that fruit sample was significantly (P< 0.05) higher in magnesium, potassium, sodium and iron. African bush pear is a rich source of both macro, micronutrient but further studies are recommended to assess antinutrient, and people do not consume toxicological level of the seed since it.**

***Keywords*: African Bush Pear, Proximate, Mineral**

I. INTRODUCTION

African pear (*Dacryodesedulis*) known as Ube among the Ibo-speaking people of south-eastern Nigeria is a member of the family Burseraceae. It is an ever green tropical fruit tree which grows in the humidand sub-humid climate of the West-African countries[1]. The African pears (*Dacryodesedulis*) Fruit pulp is known for its richness in protein, fat, fibre, minerals and essential amino acids. They are consumed during the months of April to September.They are often softened by heating in hot water or ash and eaten as an accomplishment to roasted or boiled maize. However, the seeds are not eaten and are often discarded as waste or sometimes consume by domestic animals if discovered before they are rotten. Previous research[2] has revealed that the seed contains 18-34% oil, making it comparable with other oil bearing seeds such as palm kernel been done on the characterization of the oil, as well as utilization of the cake in feedstuffs.

African pear (*D. edulis*) is a well-known plant in West-African. The fruits are edible and the bark leaves, stem and roots are employed for a variety of purpose[3,4,5] in Nigeria the main use of D-edulis is for its fruit which can be eaten raw, cooked boiled or roosted, cooked flesh of the fruit has a texture similar to butter. Oil from the fruit of *D. edulis* (bush pear) rich in amino acids and triglycerides and they yield is considerable to augment present oil sources for humans[6,7,8]. The seed is containing oil with considerable nutritional value that can be harnessed to supplement feed for household ruminants[9,10,11,12]. The fruit are gathered for household use as well as for sale in local markets and to some level, the international market[13,14].

Several studies have shown that *D. edulis (*bush pear) flesh is most commonly consumed for its taste and particularly eaten together with fresh cook or roasted maize when they are in season. However, the consumption of the fruit is rare among the population, therefore, this research focus on determination of proximate composition of fruits and seeds of *D. edulis* (Bush pear) with a view to compare these nutrients.

II. MATERIALS AND METHODS

Collection of Samples: Africa bush pear (*Dacryodesedulis*) was brought from Oja Oba in Owo town, Owo Local Government Area, Ondo State.

Preparation of African Bush Pear: African bush pear (*Dacryodesedulis*) were sun dried (the fruit was removed and the seed was removed and it was dried separately), they were manually grinded into fine powder using mortar and pestle. The milled powder samples were collected and stored in glass jars, tightly covered and kept for analysis.

Determination of Proximate Composition: This includes moisture, fat, total ash, crude fibre and crude protein determination using the standardized method of AOAC[15].

Determination of Mineral Content: The mineral content of the samples was determined after acid digestion of the ashed samples as follows: 2ml of aguaregia (mixture of HCL and HNO_3 in ratio 3:1) was added to each ashed sample in 100ml flask and made up to the mark with distilled water. The solution was then filtered through NO_4 what man filter paper and the clear solution was kept in plastic bottle with lid. Calcium, zinc and iron were determined using atomic absorption spectrophotometer (210 VGP Buck Atomic Absorption Spectrophotometer) while sodium and potassium were determined using flame photometer.

III. RESULTS AND DISCUSSION

Table 1: Proximate Composition of Samples A And B (%)

Sample (%)	Mc Mean ± SD	Ash Mean ± SD	Protein Mean ± SD	Fiber Mean ± SD	Fat Mean ± SD	CHO Mean ± SD
Fruit Sample	2.22 ± 0.120[a]	3.92 ± 0.20[a]	1.75 ± 0.50[b]	8.10 ± 1.00[a]	56.64 ± 0.40[a]	27.37 ± 0.500[b]
Seed Sample	1.87 ± 0.700[a]	1.68 ± 0.20[b]	4.03 ± 0.30[a]	5.46 ± 0.60[b]	12.25 ± 0.50[b]	74.71 ± 0.10[a]

Value represent mean± standard deviation of triplicate determination and value with same superscript along the calcium are not significantly different ($p \leq 0.05$)

keys: MC= moisture content , CHO= carbohydrates (calculated by difference)

The proximate composition is shown in Table 1. The moisture content of the fruits sample is 2.22% which make it higher than seed sample (1.8%). There is not much significant difference. This suggests a nutrient dense food material that can actually be utilized in many ways such as in feed supplementation.The protein content is higher in seed sample (4.03%) while compared with fruit sample (1.75%). The result may be due to epidermis that store more protein molecule because of atmospheric nitrogen that escape into the root. Due to high protein content of the seed sample, it could be used for animal feed.The crude fibre content in fruits sample (8.10%) is much richer than seed sample (5.46%). Crude fibre has been known to promote health as it aids digestion in human. Crude fibre clear buildup of runks in the intestine and regulates bowed movement in human. The fat content of Fruit sample (56.64%) is significantly difference from seed sample (12.25%). The increase is due to the ability of fruit to store fat. The fat contained polyunsaturated and monounsaturated that promote healthy body system.

The carbohydrates content ranged from 27.37%-74.71% with the highest value is (seed sample): 74.71% and the lowest value fruit sample (27.37%). The results that starch are majorly stored in the root of trees, hence the seed can be used to supplement confectionaries flour or as a complete meal for animals and human.The ash proportion varies from 3.92% of (fruit) to (seed) 1.68%. The amount of minerals is higher at the fruits compared to the seed.A lipid content of 56.64% (fruit) shows that the fruit can be good source of oil.

Table 2: MINERAL COMPOSITION (mg/100g)

Sample	Magnesium Mg/100g	Potassium Mg/100g	Sodium Mg/100g	Iron Mg/100g	Phosphorus Mg/100g
Fruit Sample	31.21 ± 2.667[a]	166.24 ± 0.40[a]	42.03 ± 0.30[a]	72.10 ± 0.010[a]	17.143 ± 0.050[b]
Seed Sample	13.18 ± 0.020[b]	140.12 ± 0.20[b]	28.13 ± 0.30[b]	1.31 ± 0.10[b]	19.185 ± 0.050[a]

Means ± standard deviation on same column with same superscript are not significant different ($P<0.05$)

The fruit sample had value like 31.21%, 166.24%, 42.03%, 72.10%, for magnesium, potassium, sodium and iron respectively. While higher than the seed sample values, 13.18%, 140.12%, 28.13% and 1.31% respectively for the same parameter.The phosphorus content in seed sample is higher than fruit sample. The value is at highest 19.185% and at lowest in (Fruit sample = 17.143%) fruit seed.The results above show that fruit sample had highest mineral compositions than seed sample which allow it for baby complementary feeding formulation as well as blead flour for snack making.

However, minerals element in the body helps to maintain and regulate several metabolic reactions as a co – enzymes in the body. It's aid bone and tooth formation including production of red blood cell in the bone marrow. This research is designed to compare the proximate and mineral content of the seed and fruit of African bush peer. From the result of the proximate analysis of the fruit sample and seed sample of African bush, the result reveals that the moisture content of both the fruit (2.22%) and seed (1.87%) of the African bush pear is low although the fruit has higher moisture content than seed. Moisture content of any food is an index of its water activity and is used as a measure of stability and the susceptible of microbial contamination[16]. Since the moisture content in both the fruit and seed is low, it implies that African bush pear is likely to have a long shelf life and the seed has a higher capacity to last longer than the fruits because of its lower shelf life. This result is however in contrast with the result presented by Onuegbu, and Ihediohan[17] who reported the mean moisture content of different species of African bush peer pulp to be between 36.56% and 52.82%. The result also reveals a higher value of ash content shows that the fruit has a higher ash content (3.92 %) than the seed (1.68%). This is in line with the result of Onuegbu, and Ihediohan[17] who reported that the average of 0.6% - 3.88% ash content for the pulp of the various specie tested. On the fibre content of the samples, the fruit has a higher fibre content of 8.1% than that of the seed (5.46%). The result on the fat content also shows higher fat in the fruit 56.64% compared to the seed (12.25%). This is in however against the report of Onuegbu, and Ihediohan[17]as the fat content in the fruit (56.64%) is higher than that obtained in the literature (18.82% to 32.64%) and the one obtained from the seed is lower than that found in literature. The result also shows a very low protein content in both the fruit (8.1%) and seed (5.46%) of African bush peer. The low protein content suggests that African bush pear cannot be used as protein source for human consumption since it cannot supply enough protein to meet recommended. The result on the carbohydrate content shows that the seed of African bush peer is higher in

carbohydrate (74.71%) than the fruit (27.37%). Literature suggest that African bush peer seeds are good source of carbohydrate with content[18,17].

The result of the mineral content of the fruit and seed of African bush peer revealed that the fruit of African bush peer have higher value of magnesium (31.21mg/100g) than that of the seed (13.18mg/100g) the result of both the fruit and seed is however lower than what was obtained in the result Ebana et al.[19] who reported a value of (170mg/100g) in his work. It also reveals that the fruit of African bush peer has higher potassium content of 166.24mg/100g than that obtained in the seed (140.12mg/100g) this is also lower than that obtained from the work of Ebanaet al.[19] who reported a value of about (730mg/100g) of potassium. The result also revealed that the fruit has higher value of sodium (42.03mg/100g) than the seed (28.13mg/100g). The result however revealed that the seed has a higher value of phosphorus (19.185 mg/100g) than that found in the fruits (17.143mg/100g). Several literatures had however revealed that the presence ofcalcium, phosphorus, potassium, magnesium,sodium, iron, manganese, zinc, copper, seleniumand iodine[17,19].

IV. CONCLUSION

Findings from the study shows that the fruit of African Bush pear contain significantly high amount of Ash, Fibre, and Fat while the seed contain high amount of Protein and Carbohydrate. It also shows that the fruit sample contain high amount of Magnesium, Potassium, Sodium and Iron. However, Phosphorus was higher in the seed. Therefore, African Bush Pear is a rich source of both macro and micronutrient but further studies is recommended to assess antinutrient and toxicological level of the seed since it is not consumed by the people.

REFERENCES

[1] Kengue J. (2001): African pear fruits. International center for underutilized crops south ampton, UK: 15-20.

[2] Gunston F.D, Norris FA (1982): Lipids in food chemistry Biochemistry and Technology publications. Robert Maxwell: pp: 95-139.

[3] Jirovetz, L., Buchbauer, G., Stoyanova, A.S., Georgive, E.V., Damianova, S.T. (2003): Composition, quality control and antimicrobial activity of the essential oil of longtime stored dill (*Anethumgraveolens*L.) seeds from Bulgaria. *Journal of Agricultural and Food Chemistry* 18 (51):3854

[4] Neuwinger, H.D. (2000): African traditional medicine in a Dictionary of plant use and Applications. Medpharm Scientific publishers, Stuttgart, Germany PP. 406-408.

[5] Waruhiu, A.N., J. Kengue, A.R. A Tangana, Z. TchoundJeu and R.R.B. Leakey. (2004): Domestication of Dacryodesedulis: 2. Phenotypic variation of fruits traits in 200 trees from four populations in the humid low lands of Cameroon. *Journal of food, Agriculture and Environment* 2(1): 340- 346.

[6] Ikhuoria, E. U. and Maliki, M. (2007): Characterization of avocado pear (Perseaamericana) and African pear extracts. *African Journal of Biotechnology*, Vol. 6 (7) Pp. 950 – 952.

[7] Kaspseu, C. and C. Tchiegang, (1996): Composition de I 'huile des fruits de deux cultivars de safovaucameroun. Fruits, 51:185-191.

[8] Kinkela, T.R. Kama – Niamayoua – D. Mampouya and T. Silou. (2006): Variations in morphological characteristics, lipid content and chemical composition of safou (Dacryodesedulis) (G.Don) J. Lam according to fruit distribution: A case study African *Journal of Biotechnology* 5 (12): 1233-1238.

[9] Ajiwe V.I.E., C.A. Okeke, B. Nnabuke, G.A. Ogunleye and E Flebo (1997): Application of oils extracted from African stare apple (chrysophyllum a fricanus), horse eye bean (mucunasloans) and African pear (Dacryodesedulis) seeds. Bio resources Technology 59(2-3):259-261.

[10] Leakey, R.R.B (1999): Potential for novel food products from agro forestry trees: A review. Food chem., 66:1-14.

[11] Obasi, N.B. and N.P. Okolie, (1993): Nutritional constituents of the seeds of the African pear Dacryodesedulis. Food chem., 46:297-299.

[12] Omoti, U. and D.A. Okiy, (1997): Characteristic and composition of oil and cake of African pear. *J.Sci. Food. Agric*., 38:67-72.

[13] Ajibesin K.K. (2011): Dacryodesedulis (G.Don) H.J Lam: A review on its medicinal, phyto chemical and economic properties. *Research journal of medicinal plant* 5(1):32-41.

[14] Awono, A., O. Ndoye, K. Schreckenberg, H. Tabuna, F. Isseiand L. Temple. (2002): production and marketing of safou (Dacryodesedulis) in Cameroon and internationally: Market development issues. Forest, Trees and livelihoods 12:125-147

[15] AOAC (2005). Official Methods of Analysis (22nd Edition). Association of Official analytical Chemists. Washington USA.

[16] Scott, L.A., (1980): Medicinal plants and Traditional Medicine in Africa-2nd Edn., spectrum Books Ltd., Ibadan, Nigeria, ISBN:9789780298814, pages: 289.

[17] Onuegbu, U. and D.A. Ihediohan, (2008): Characteristic and composition of oil and cake of African pear. *J. Sci. Food. Agric*., 38:67-72.

[18] Mbofung, L.G. Buchbavera, M. Geissier, M.B. Ngassoum and M. Parmentier, (2002): Analysis of aroma compounds of African pears via differently coated solid- phase micro-extraction fibre (SPME) using GC-FID and GCMS. Eur. *Food Res. Technol*., 218:40-43.

[19] Ebana, E. T., Duguma, B., Franzel, S., Kengue, J., Mollet, M., Tiki-Manga, T., and Zekeng, P. (2007): Uses, Management and Economic Potential of Dacryodesedulis (Burseraceae) in the Humid Lowlands of Cameroon. *Economic Botany* 53 (3), 292-301.

[20] Ibanga, D.E. and F.U. Ekpa, (2009): Evaluation of the chemical composition of *Dacryodesedulis*sp. Check for this species in other resources and raphiahookerimann and wendl exudates used in herbal medicine in South Eastern Nigeria. *AFr. J. Tradit. Compl.Altern. Med*., 5:194-200.