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Some Proximate Analysis of African Pear (*Dacryodes Edulis*)

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ABSTRACT: Some physical and chemical properties of African pear (*Dacryodes edulis*) samples from nine different trees were analysed in order to determine the level of differences that exist between trees. The length of the individual fruits ranged from 39.86 mm to 80.76 mm while the weight ranged from 15.97 g to 39.36 g. Significant differences ($p \geq 0.05$) were observed between the samples for all the parameters measured. Fruit density showed a negative correlation ($r = -0.86$) with the pulp/seed ratio. Significant differences were also observed in the proximate composition of the African pear pulp. The major components of the pulp were moisture (36.5% to 53.82%), oil (18.81% to 38.36%) and protein (11.09% to 19.19%). The pulp acidity ranged from 0.92% to 1.69% expressed as citric acid. @ JASEM

The pulp of the African pear plays a very important role in the nutrition of people living in the forest zone of South-eastern Nigeria. It is usually consumed as an accompaniment to fresh maize during the months of April to September. The African pear pulp is first softened in hot water, steam or hot ash before consumption. As at now, there are no preservation methods for the African pear, which is highly perishable, and no processed products have been made from them (Emebiri and Nwufo, 1990). Some attempts have been made to produce the fried pulp while other researchers have surveyed the possibility of using the extracted pear pulp oil in some products (Mbofung et al., 2002). A major set back in the commercial utilization of this fruit is the lack of adequate and consistent data on the fruit. Most of the published data on the characteristics of the fruit are at variant from each other. A study in Cameroun has identified two varieties (the short and the large fruit types) which show differences in chemical composition (Mbofung et al., 2002). The aim of this work is therefore to analyze African pear fruit from different trees in order to ascertain the extent of the difference in their physical, chemical and organoleptic properties. This will provide data for the commercial/industrial utilization of this fruit.

MATERIALS AND METHODS

Nine different African pear samples were obtained from separate trees. The weight of the whole fruit, separated pulp and seed were measured using a weighing balance. The fruit length, thickness as well as pulp thickness were measured using a vernier calipers. The volume of the fruit was measured by water displacement in a measuring cylinder. The proximate composition and titratable acidity were measured using AOAC (1990) methods. Sensory evaluation was also carried out after softening the pear pulp in hot water. A ten-man panel was used which scored the samples on a nine-point hedonic scale (Ihekoronye and Ngoddy, 1985). Statistical analysis was done to determine significant differences between samples.

RESULTS AND DISCUSSION

The physical properties of the African pear fruits are shown in table 1. A lot of variation was found in the size of the fruit. It may be convenient to group the African pear sample into three based on their sizes. The small size (samples A and B) with mean values for fruit length ranging from 39.89 mm to 43.40 mm and weighed between 15.97g and 17.85g. The medium sized fruit (sample C, D, E and F) had mean values for length ranging from 48.9 mm to 54.83 mm in length and 20.98g to 31.84 g in weight. The large sized varieties (sample G and H) had mean fruit length values of 60.50 mm to 80.79 mm and weighed between 25.88 g and 39.36g. The measurement of the fruit width revealed that the transverse section of African pear fruit does not produce a perfect circle as previously thought by some earlier researchers (Omoti ad Okiy, 1987). The section revealed a rectangular/oblong shape which gave two different measurements from opposite sides. This trend was consistent in all the fruits measured as can be seen in table 1. The wider side was labeled width (side A) while the smaller side was labeled width (side B). This observation is relevant in equipment design for industrial utilization of the African pear. Significant difference ($P \geq 0.05$) were observed in the values for the pulp weight and seed weight. The mean pulp weight ranged from 10.02 g to 31.52 g which comprised 56.37% to 80.08% of the fruit, while the seed weight ranged from 5.96 g to 13.73 g which comprised 36.97% to 43.53% of the entire fruit. The mean values for density of the African pear fruits ranged from 0.78 g/cm^3 to 1.09 g/cm^3 which explained why some of the fruits may float on water while others do not. However, this observation was not related to size of fruit rather the density had a negative correlation ($r = -0.86$) with the pulp/seed ratios. It was observed that fruit with larger pulp/seed ratios had smaller seed weight in relation to fruit size since a larger air space was enclosed between the fruit pulp and the seed. This resulted to the low density values for such fruits, and they floated on water.

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TABLE 1: MEAN VALUES FOR SOME PHYSICAL PROPERTIES OF THE AFRICAN PEAR

Samples	Length (mm)	Width Side A (mm)	Width Side B (mm)	Pulp Thick-ness (mm)	Single fruit wt (g)	Single fruit vol (ml)	Pulp weight (g)	Seed weight (g)	Percent-age Pulp	Percent-age Seed	Pulp/ seed Ratio	Fruit density g/cm^3
A	39.86^{a}	25.56^{ab}	26.66^{bc}	3.33^{a}	15.97^{a}	18.33^{a}	10.02^{a}	5.96^{a}	62.74^{b}	37.31^{b}	1.66^{a}	0.86^{abc}
B	43.40^{ab}	23.90^{a}	26.03^{a}	3.86^{a}	17.85^{ab}	18.33^{a}	11.27^{ab}	6.60^{ab}	63.13^{b}	36.97^{b}	1.72^{a}	0.98^{bcd}
C	48.90^{cd}	26.30^{bc}	27.33^{ab}	3.33^{a}	20.98^{bc}	20.00^{ab}	12.23^{abc}	8.88^{c}	58.29^{a}	42.32^{c}	1.38^{a}	1.09^{d}
D	54.83^{e}	26.83^{bc}	29.70^{bc}	3.93^{a}	24.24^{cd}	26.00^{bcd}	15.05^{cde}	9.18^{c}	62.08^{b}	37.87^{b}	1.66^{a}	0.93^{abcd}
E	47.36^{bc}	29.10^{a}	32.26^{d}	5.63^{a}	28.00^{de}	27.66^{cde}	6.19^{de}	11.55^{d}	57.82^{a}	41.25^{c}	1.43^{a}	1.01^{cd}
F	54.oo^{de}	26.60^{bc}	28.40^{abc}	4.03^{a}	22.01^{bc}	21.66^{abc}	13.76^{bcd}	8.28^{bc}	62.51^{b}	37.61^{b}	1.66^{a}	1.02^{cd}
G	52.80^{de}	33.56^{e}	34.10^{d}	4.63^{a}	31.54^{e}	32.66^{de}	17.78^{e}	13.73^{e}	56.37^{a}	43.53^{c}	1.30^{a}	0.96^{abcd}
H	60.53^{f}	28.50^{cd}	29.80^{c}	3.90^{a}	25.88^{cd}	33.33^{e}	17.99^{e}	7.86^{bc}	69.51^{b}	30.37^{b}	2.34^{b}	0.78^{a}
I	80.76^{g}	33.43^{e}	33.63^{d}	5.40^{a}	39.36^{f}	50.00^{f}	31.52^{f}	8.84^{c}	80.08^{c}	20.45^{a}	3.60^{c}	0.78^{a}

Note: Means on the same column with different superscripts are significantly different ($p \geq 0.05$)

TABLE 2 MEAN VALUES FOR PROXIMATE COMPOSITION, TITRARABLE ACIDITY AND ACCEPTABILITY SCORE OF THE AFRICAN PEAR PULP

Samples	Pulp Protein (%)	Pulp Oil (%)	Pulp Carbohydrate (%)	Pulp MC (%)	Pulp Ash (%)	Pulp Acidity (% citric acid)	Acceptability
A	15.66^{c}	30.38^{c}	6.25^{d}	45.29^{bc}	0.71^{b}	0.92^{h}	6.3^{b}
B	14.93^{cd}	32.64^{b}	4.65^{e}	46.54^{b}	0.99^{ab}	1.06^{gh}	7.9^{a}
C	11.09^{e}	29.66^{cd}	4.30^{e}	52.32^{a}	1.40^{ab}	1.17^{fg}	6.6^{b}
D	17.91^{b}	29.03^{d}	7.34^{c}	44.22^{cd}	0.26^{b}	1.69^{a}	6.4^{b}
E	14.82^{cd}	18.81^{f}	10.68^{a}	52.82^{a}	3.88^{a}	1.22^{ef}	5.5^{c}
F	19.19^{a}	25.52^{e}	6.35^{d}	46.27^{bc}	1.17^{ab}	1.32^{de}	5.8^{c}
G	15.63^{c}	33.36^{b}	6.29^{d}	42.51^{d}	1.11^{ab}	1.55^{b}	6.3^{b}
H	15.75^{c}	33.55^{b}	1.36^{f}	47.10^{b}	0.60^{b}	1.41^{cd}	7.8^{a}
I	14.42^{d}	38.64^{a}	8.41^{b}	36.56^{e}	0.75^{b}	1.47^{bc}	6.2^{b}

Note: Means on the same column with different superscripts are significantly different ($P \geq 0.05$)

The mean values for proximate composition of the African pear samples are shown in table 2. Sample C had a significantly ($P \geq 0.05$) lower value for the protein (11.09%) while the highest value (19.19%) was recorded in sample F. The mean values for pulp oil ranged from 18.99% to 38.10%. This is similar to the amount (15 to 25%), reported for avocado and olives (Gaillard and Godefrey, 1995). The mean values for titratable acidity ranged from 0.98% to 1.54% expressed as citric acid. This was confirmed organoleptically in the sour/tart taste reported by the test panel. Generally, fruits with moderate sourness were preferred. The mean acceptability scores ranged from 5.5 to 7.9 on a nine point hedonic scale. However, there was no correlation between acceptability scores and any of the parameters studied. This suggests that the acceptability of African pear fruits may be dependent on an interplay of several factors. These include physico-chemical characteristics (such as pulp thickness, texture and mouth feel (when softened), oil content, acidity, moisture content etc) on one hand and on the other hand, a combination of several minute flavour compounds contained in the fruit pulp (Flath, 1980).

Conclusion: It can be observed from the results that a great deal of variation occur in both physical chemical and organoleptic properties of the African pear samples. Preference towards any of the fruit varieties therefore is based on the intended function of such a fruit in the overall process. The high oil varieties will be best for oil extraction purposes. Others with low oil content but high protein content may be best for food supplementation.

REFERENCES

AOAC (1990) Official Methods of Analysis 15th edition. Association of Official Agricultural Chemists Washington D.C.

* Corresponding author: Onuegbu, N. C.

Emebiri, L C; Nwufo, M I (1990). Effects of fruit types and storage treatments on the biodeterioration of African pear (*Dacryodes edulis*) (G. Don) H. J. Lam). International Biodeterioration, 26 (1): 43 – 50

Flath, R A (1980). Pineapple in Tropical and Subtropical Fruits. edts: Nagy, S and Shaw, P E; Avi Publ. Westport Connecticut. pp 170 – 172.

Gaillard, J P; Godefroy, J (1995). Avocado. Macmillan Education Ltd. P 101

Ihekoronye, A I; Ngoddy, P O (1985). Integrated Food Science and Technology for the Tropics Macmillan Publ London. pp 77 – 85

Mbofung, C M F; Silou, T; Mouragadia, I (2002). Chemical characterization of safou (*Dacryodes edulis*) and evaluation of its potential as ingredient in nutritious biscuits. Forests Trees and Livelihoods 12:105 – 107

Omoti, U; Okiy, D A (1987). Characteristics and composition of the pulp oil and cake of the African pear (*Dacryodes edulis*) (G. Don) H. J. Lam. J. Sci. Food Agric. 38(1): 805 – 809.

* Corresponding author: Onuegbu, N. C.