Proximate and Phytochemical Constituents of *Parkia biglobosa* (Jacq.) Fruit

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ABSTRACT

The most logical approach towards the improvement and efficient use of indigenous fruits to supply nutritional requirements for human diet is through the investigation of their nutritional values. This study was carried out to investigate the nutritional value of African locust bean (*Parkia biglobosa*) powdered fruit pulp and seeds purchased at Sokoto central market, Sokoto State Nigeria. The seeds and fruit pulp were analyzed for proximate, Phytochemical, antinutritional and mineral contents. Results of the qualitative phytochemical analysis showed the presence of saponin, glycosides, flavonoids, steroids, volatile oils and cardiac glycosides in both extracts. Result of the proximate analysis showed protein with the highest percentage dry weight (62.56%) followed by crude lipid (23.59%), moisture (9.33%), ash (2.33%) and carbohydrate (2.19) in seeds of *P. biglobosa*. Carbohydrate had the highest percentage (69.9%) followed by moisture (16.33%), Crude protein (6.56%), crude lipid (3.81%) and then ash (3.33%) in the analyzed fruit pulp, thus indicating that locust bean fruit pulp had higher Carbohydrate content, thus a better source of energy. Result of mineral test indicated both the seeds and fruit pulp were rich sources of Potassium 2850 mg/kg and 750 mg/kg respectively followed by sodium with 142.50 mg/kg and 62.50 mg/kg respectively. Results of antinutritional analysis showed that the seeds contained Nitrates (18.71 mg/dl), Tannin (9.18 mg/dl) and Cyanides (6.51 mg/dl) while the analyzed Fruit pulp contains Nitrate (22.65 mg/dl), Tannin (17.10 mg/dl) and Cyanides (7.13 mg/dl), indicating higher amounts of Nitrates, Tannin and Cyanides in the pulp compared to the analyzed seeds. Taking into considerations the Crude Protein, Crude lipid, Carbohydrate as well as the Mineral composition of both the seeds and fruit pulp of the analyzed samples, it could be suggested that harnessing the plant’s products in our diet preparations could enhance nutrition especially in the wake of high cost of normal food materials and could also reduce malnutrition especially amongst low income earners.

Keywords: *Parkia biglobosa*, Fruit pulp, Seed, Minerals, Anti-nutritional, Phytochemical

INTRODUCTION

*Parkia biglobosa* (Jacq.) is a perennial tropical plant that belongs to the family Leguminosae (Order Fabaceae) and the subfamily Mimosoideae. *Parkia biglobosa* also known as “Dorowa” in Hausa, “African Locust Beans” in English (Udobi and Onaolapo, 2009), is a native of Africa and important multipurpose tree of West African Savanna land that grows up to 10-15m in height. It has a rounded or umbrella shaped spreading crown, and a drooping leaf without spines. The thick bark is grey with a scaly texture, and has an orange coloured slash. The dark green leaves are alternate, bi-pinnate and 20-40 cm in length, with 8-30 pairs of alternate pinnae, and 14-65 pairs of leaflets per pinnate. They are 4-5 cm in diameter, and composed of 1500-2000 flowers. The tree is thought to be able to grow as old as 250 years. The locust bean fruit is a slightly curved indehiscent pod of 30-40 cm long and 2-3 cm wide. Each pod contains up to 20 seeds, which are embedded in a sweet, yellow, floury pulp (Salim et al., 2002).

Dawadawa is a typical condiment for flavouring of meals such as stew, and soup made from soybean by the Hausa tribe in Nigeria that is similar to fermented locust beans (*Parkia biglobosa*). These nutrients are essential for the physiological functions of human body. Such nutrients like carbohydrates, fats and proteins play an important role in satisfying human needs for energy and other life processes (Latif et al., 2003). The African locust bean (*Parkia biglobosa*) is medicinal plant used by marginal communities either in the form of extract or decoction to cure various diseases (Adhan and Holscher, 2010; Trease and Evans, 1989). There is the need for more plentiful output on nutrients composition of any potential plant materials with the view to unravelling the nutrients composition available in the plants such as *Parkia biglobosa*. This is to provide succour to problem of food scarcity being faced by sizeable segment of the teeming populace especially the rural dwellers. This study evaluated the proximate, minerals and phytochemical composition of the seeds and fruit pulp of *Parkia biglobosa* (Jacq.).

MATERIALS AND METHODS

*Parkia biglobosa* seeds and powdered fruit pulp were purchased from retailers in Sokoto central market, Sokoto state. The seeds were dehulled manually and blended into fine powder using 0.2 um sieve. Both powdered plant materials were labelled and stored in an air tight container for laboratory analysis. The extracts were evaluated qualitatively for the presence of phytochemicals tests for saponin, tannins, alkaloids, glycosides, cardiac glycosides, balsams, steroids anthraquinone and test for volatile oil were all

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Results on proximate Composition of the seed and fruit pulp of *P. biglobosa* have been presented in Table 2. From the Table, moisture composition of the seeds and fruit pulp of *Parkia biglobosa* ranged from 9.33±0.58 and 16.33±0.57 for both the seeds and fruit pulp respectively. Ash content of the seeds was 2.33±0.58 while it was 3.33±0.57. Crude fibre was however, 1.67±0.58 and 2.67±0.78 for both the seeds and fruit pulp. Similarly, an appreciable amount of crude protein obtained in the study was 62.56±0.22 and 6.56±0.21 for the seeds and fruit pulp respectively. More so, crude carbohydrates ranged from 21.19±0.41 to 69.97±0.32 in both the seeds and fruit pulp respectively. Crude lipid obtained from the study was 23.59±1.21 and 3.81±0.45 for both the seeds and fruit pulp. Finally, available energy in kilo calorie obtained was 339.31±1.21 and 711.21±2.67 for the seeds and fruit pulp respectively. Result of the proximate analysis in Table 2 shows that protein has the highest percentage (62.56%) followed by crude lipid (23.59%), moisture (9.33%), ash (2.33%) and then Carbohydrate (2.19) in the analyzed seeds of *P. biglobosa* and carbohydrate had the highest percentage (69.97%) followed by moisture (16.33%), Crude protein (6.56%), crude lipid (3.81%) and then ash (3.33%) in the analyzed fruit pulp. Carbohydrate content of the fruit pulp was found to be 69.97%, which is slightly higher than 66.39% by Gernah *et al.* (2015) and is in agreement with the findings of Aja *et al.* (2015). Generally, there was a significant difference (p≤0.05 in the compositions of crude lipid, crude carbohydrate, crude proteins and available energy (in K/Cal.) between the seeds and the fruit pulp. This indicates that *P. biglobosa* fruit pulp is a good source of energy compared to the seeds due to high content of Carbohydrate in the fruit pulp. With this content of carbohydrate, the African locust bean fruit pulp is a potential source of energy given the recommended daily energy intake. Crude fibre was found of the fruit pulp was found to be 2.67%, which is much lower than that (7.7±0.18) and 5.51±0.64) as reported by Obasi *et al.* (2012). The proximate values of the seeds were; 9.33% Moisture, 2.33% Ash, 1.67% crude fibre, 62.56% Crude protein mg/dl, 3.81% Crude lipid and 2.67% Carbohydrate and 23.59% Crude lipid. This is not in agreement with the values reported as 30% by Lucas *et al.* (1989), with 4.81% Moisture, 4.81% Ash, and 4.66% crude fibre, 33.50% Crude protein and 49.2% Crude lipid. Also, reported range of protein from the seed of *Lagenaria siceraria* by Mercy *et al.* (2015). Less carbohydrates and proteins were reported by Uzuazokaro *et al.* (2018) on *Cucumis sativus*, as well as the report of Stanley *et al.* (2020), who reported lower protein contents of 37.50% on *Citrullus lanatus*. Such differences could be attributed to species variability.
The fruit pulp contained higher amounts of Phytate content was found to be 5.49 mg/dl in Balanites aegyptiaca. Table 4 indicates means at p≤0.05.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Seeds (mg/dl)</th>
<th>Fruit Pulp (mg/dl)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrate</td>
<td>18.71 ± 0.43a</td>
<td>22.65 ± 0.45a</td>
</tr>
<tr>
<td>Tannin</td>
<td>9.18 ± 0.07a</td>
<td>17.10 ± 0.18a</td>
</tr>
<tr>
<td>Phytate</td>
<td>5.49 ± 2.42a</td>
<td>1.27 ± 0.42b</td>
</tr>
<tr>
<td>Cyanide</td>
<td>6.51 ± 0.21a</td>
<td>7.13 ± 0.23b</td>
</tr>
<tr>
<td>Oxalate</td>
<td>0.54 ± 0.09a</td>
<td>0.09 ± 0.20b</td>
</tr>
</tbody>
</table>

Results are presented as means ± SD (means of three replications). Different superscripts indicate significant difference in means at p≤0.05.
CONCLUSION
This work has shown that both the African locust bean seeds and fruit pulp are a potentially good source of food which can compete favourably with most cereals and legumes. The chemical composition indicates that it is a good Source of macro and micro-nutrients that if exploited could help the low income earners immensely. Thus, exploring the sampled plant parts could help greatly towards fighting malnutrition and hunger among the teeming populace.

REFERENCES


