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Proximate and Quantitative Phytochemical Analysis of Detarium microcarpum (Sweet Detar) Fruit Pulp

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Abstract
The study was carried out to determine the proximate and quantitative phytochemical analysis of two species of *Detarium microcarpum* from Kano state, north-western Nigeria. Proximate composition of sample A shows a moisture content of 13.86±0.002, Ash content 3.73±0.030, lipid content 9.40±0.059, crude protein 21.20±0.360, crude fiber 4.52±0.038 and carbohydrate 47.50±1.06, while sample B shows a moisture content of 14.32±0.082, Ash content 2.27±0.360, lipid content 4.72±0.372, crude protein 17.88±0.102, crude fiber 4.46±0.062 and carbohydrate 5.48±0.338. Quantitative phytochemical screening of the fruit A shows 3.16% tannin, 10.73% saponin, 7.27% alkaloid and 8.56% flavonoid for sample while sample B contains 2.39% tannin, 11.2% saponin, 7.41% alkaloid and 7.63% flavonoid. Comparism between the samples shows specie A to be nutritionally rich compared specie B.
Keywords: *Detarium microcarpum;* Fruit; Proximate; Phytochemical and Pulp.
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1.0 Introduction

Detarium microcarpum is an African tree belonging to the family *Casalpiniaceae*. The three height reaches up to 15cm and it can reach 25mm in most areas. The tree can be easily distinguished by its broken grey bark, with dark green, 8-12cm leaves (Taita, 2003). The tree is widely distributed in dry savannah area of Africa and mostly in Northern Nigeria. The fruit is enable and rich in vitamin C and the leaves and seeds are also used in cooking the pulverized seeds cotyledons are used in some Africa Countries a compositional studies of the legumes revealed that it is a rich source of polysaccharide gum (Kouyaté and Lamien, 2012). In most developing countries food shortage is becoming evident as a result of population growth competition for fertilize land and poverty. The diet of many rural and urban dweller is deficient in protein and high in Carbohydrate (Vautier *et al*., 2007). The implication is high incidence of malnutrition and increased dietary disease, a situation in which children and lactating women are most vulnerable, while every measure is being taken by various level of government to boost food production by conventional of agriculture, a lot of interest is currently being focused on the possibilities of exploiting the most Number of less Familiar plant result source of the wild (Kouyaté and Lamien, 2012).

Many of such wild plant have been identified but lack of data on their chemical composition has limited the prospect of their utilization known seeds (Vautier *et al*., 2007). Many report on *Detarium microcarpum* seeds indicate that they could be good sources of Nutrients for both man and livestock. It is widely distributed in semi-arid sub-saharan African which include Benin, Burkina Faso, Cameroon, Central Africa, Republic, Ghana, Guinea, Bissau, Niger, Nigeria, Senegal and Togo (Abdalbasit *et al*., 2009).

The leaves and seeds are used for cooking the roots, stem bark and stems are also used to treat ailment like meningitis, tuberculosis, itches and diarrhea (Abdalbasit *et al*., 2009) The seed coat of the fruit has also been shown to possess antimicrobial activities due to presence on sleroidal, saponin and flavoniods (Barminas *et al*., 2012). Obun *et al* (2011) reported that when fruit pulp of *Deterium microcarpum* is included in the diet of rat, hematological parameters and body weight of rat changes, they concluded that prolonged consumption of the fruit by human affect hematological parameters and body weight. The seed flour is a traditional emulsifying, flavoring and thickening agent used to prepare cakes, bread, couscous, body food and local beer (Olugbuyiro *et al*., 2009).

2.0 Materials and Methods

2.1 Sample Collection and Preparation

The fruits of *Detarium Microcarpum* was collected from Rimi Market Nassarawa Local government Kano State, Nigeria. The pulp of the fruit was extracted by removing the thick bark of the fruit and scrapping the pulp off using a spatula. The pulp was blended into the fine powder using a blender and stored in an air tight container for analysis.

2.2 Proximate Analysis

Ten gram (10g) of the powder was soaked in 100 ml of pre-boiled distilled water. The solution was shaken vigorously and allowed to stand for 24 hours. It was then filtered using Whatman's No. 1 filter paper and concentrated by freeze-drying to solvent free extract. The proximate analysis of the fruit extract for moisture, ash, crude lipid, crude fiber, crude protein and available carbohydrate contents were determined as described by AOAC standard assay method (AOAC, 2005).

2.3 Phytochemical screening

Phytochemical tests were carried out by using the standard methods as reported by Harborne (1973), Sofowora (1993), Trease and Evans (1989), Rasal (2005) and Savithramma *et al*., (2011).

3.0 Results and Discussion

3.1 Results

Table 1: proximate composition of different species of *Detarium Microcarpum*

Parameters	Sample A (%)	Sample B (%)
Moisture content	13.86 + 0.002	14.23 + 0.082
Ash content	3.73 + 0.030	2.27+0.036
Lipid content	9.40+ 0.059	4.72+0.372
Crude protein	21.20+0.361	17.88+0.102
Crud fiber	4.32+0.038	4.46+0.062
Carbohydrate	47.50+ 1.060	56.45+0.338

Table 2: Quantitative Phytochemical Analysis of *Detarium microcarpum* Species

Sample	Tannin%	Alkaloids%	Saponin%	Flavonoid%
Sample A	3.16%	7.21%	10.73%	8.56%
Sample B	3.52%	7.41%	11.46%	7.62%

3.2 Discussion

Proximate analysis is used to assess the nutritional quality of samples, among the two samples of *Detarium merocarpum*, sample A has the highest content of lipid and protein, which are important nutrients for growth and development needed by young children. Lipid content in sample A is remarkable, it could be a good source of edible vegetable oil if well utilized, and could supplement conventional sources. Lipids supply the body with more energy; approximately twice that of carbohydrate and protein and eases intestinal absorption and transfer (Dreon *et al*., 1990).

However, Sample B contains higher moisture content and carbohydrate compared to sample A. Moisture content affects the physical and chemical properties of food and is accountable for their vulnerability to microbial attack during storage (Hassan *et al.,* 2008). The higher moisture content might be due to storage methods used after harvest of the sample. The moisture content in both samples is close to that reported by Kini *et al* (2010). The Ash content which is an indication of mineral content according to Aberoumand and Deokule (2009) was found to be higher in sample A compared to sample B, thus sample A may be used in supplementing mineral deficiency especially in growing children. No remarkable difference was observed in crude fiber contents between the species. Fiber in the diet lessens serum cholesterol level (Abolaji, 2007). And if in very high amount assimilates essential trace elements in the gut. Fiber aids bowel regularity, assists maintain blood sugar levels, decreases constipation, and also averts heart diseases (Wasagu *et al*., 2013).

Quantitative phytochemical analysis shows no remarkable difference between the species. Phytochemical have been reported to have medicinal uses, phytochemical components such as Flavonoids, tannins, alkaloids and terpenoids are responsible for various pharmacological activities of the plants (Kakudidi, 2004). These phytochemical compounds are synthesized by primary or secondary metabolism of living organisms. Secondary metabolites are taxonomically and chemically diverse compounds with huge function which are extensively used in agriculture, human therapy, veterinary and related scientific research (Kakudidi, 2004).

4.0 Conclusion

The findings of this study showed that *Detarium merocarpum* fruit pulp is rich in various phytochemicals and nutritional parameters which may be responsible for the reported pharmacological activities of the plant.

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