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COMPARISON OF DIETARY PROXIMATE AND MINERAL VALUES OF TWO VARIETIES OF BEAN

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ABSTRACT

The proximate and the mineral analysis of the locust bean and pigeon pea were determined. In the proximate composition, the ash content, moisture content fat content, crude fibre, protein and carbohydrate of locust bean were found to be (%) 3.07, 1.32, 8.06, 0.39, 33.89, and 53.27 respectively while in pigeon pea this composition was found to be (%) 9.93, 0.24, 3.68, 5.54, 30.53 and 50.08 respectively. This result revealed that both samples had relatively high content of protein and carbohydrate. The result of mineral analysis showed that both samples contain very low level of minerals, ranged between (mg/kg) 0.21 and 0.39, while Mn and Cu were not detected in pigeon pea likewise Cu was not detected in locust bean.

Keywords: Proximate, mineral, locust bean, pigeon pea

INTRODUCTION

Beans, peans, lentils and groundnuts are food legumes; they belong to the family *Legumeminosa*, also called *Fabaceae*. Legumes are excellent source of protein, carbohydrate, fibre, minerals (Ruiz, et. al., 1996), also rich in calories, certain minerals and vitamins (Rabidullah, et al., 2007). Legumes are also a nutritious and economical source for population of developing countries and play an important role in their diets (Gavcia, et. al., 2009).

The dehulled seeds of legumes used as human food are known as pulses since animal protein are more expensive and scarce than protein from plant sources, so pulses are commonly used by vegetarians as a substitute for meat (Habidullah, et. al., 2007).

African locust bean tree, *Parkia biglobosa* are perennial trees legumes which belongs to the sub – family *mimosoideae* and family leguminosae (*fabaceae*) (Akande, et al., 2010). They grow mainly in the savannah region of West Africa (Campell, 1980). The most important use of African locust bean is found in its seed, although it has other food and non – food uses, especially the seeds which serves as a source of useful ingredients for consumption (Campbell, 1980). It has also been reported that the husks and pods are good food for livestock (Douglass, 1996; Obiazoba, 1998). The seeds (*Iyere* in Yoruba) which tradition is used as food condiment (*Iru* in Yoruba) are known to be rich in protein and certain easily digestible calcium (Akande, et al., 2010). It is also generally added to soups as low cost meat substitute by low income families in part of Nigeria (Odebunmi, et al., 2009).

The pigeon pea, *Cajanus cajan, (Feregede* – Yoruba) is a leguminous shrub that can attain height of 5m, West Africa is considered a seasonal major centre of its origin (NFT, 1988). The high nutritious value of pigeon pea is perhaps the most important reason why it should find an important place among the smallholder poor farmers in Africa (Damaris, 2007). Pigeon pea is wonderfully abundant in protein, making it an ideal supplement to traditional cereal, banana or tuber-based diets of most Africans which are generally protein deficient

(Damaris, 2007). The green pods and seeds are the most utilized form in Africa though dry seeds are increasingly gaining popularity (Damaris, A. 2007). In Nigeria, the dry seeds are cooked whole until tender then mixed with cooked yam, maize, dried cocoyam grits or freshly cooked cocoyam, sweet potatoes in addition to vegetables, palm oil, salt, pepper and other spices (Enwere, 1998).

MATERIAL AND METHOD

The locust bean and the pigeon pea were bought from *Oba's* market at *Ikere, Ekiti State*, Nigeria. The two samples were analysed for their proximate and mineral contents. The sample preparations and the proximate analysis were done in the Chemistry laboratory of College of Education, Ikere, *and Ekiti State*, Nigeria while the mineral analysis was carried out at Federal University of Technology, *Akure*, *Ondo State*, Nigeria using Atomic Absorption Spectrophotometer (AOAC, 1990).

Proximate Analysis

The samples were turned to powder by grounding machine (Tecator, Sweden) and sieved through 1mm screen mesh before the analysis. The nitrogen content of the samples was determined according to the kjeldahl method and the percentage of crude protein was calculated using factor 6.25. The moisture, crude lipid and ash content of the samples were determined in accordance with the standard method (AOAC, 1990). The carbohydrate contents were obtained by difference.

Mineral Analysis

Wet ashing method was employed. 1g of dried powdered samples were digested with 10ml nitric acid and 5ml perchloric acid in 100ml digestion flask and allowed to stand overnight in a fume cupboard. The mixture was heated until, the yellowish fume and white dense fume of nitric and perchloric acid respectively ceased. The contents were cooled and filtered through watman filter paper, transferred into sample bottles and made up to 100ml with deionized water. The sample solutions were taken to Federal University of Technology, Akure for determination of Iron, Zinc, Calcium, Magnesium, Manganese and Copper using Atomic Absorption Spectrophotometer (AAS).

RESULTS AND DISCUSSION

The results of proximate composition of the two sample beans are depicted in Table 1.

Table 1: Proximate Composition of the Samples

	Sample	
Parameter (%)	*Locust Beans*	*Pigeon Pea*
Ash Content	3.07	9.93
Moisture Content	1.32	0.24
Fat Content	8.06	3.68
Crude Fibre	0.39	5.54
Protein	33.89	30.53
Carbohydrate	53.27	50.08

It was found that the parameters of the two samples (beans) ranged in percentage as follows: Ash content (3.07 – 9.93); Moisture content (0.24 – 1.32); Fat content (3.68 – 8.06); Crude fibre (0.39 – 5.54); Protein (30.53 – 33.89) and Carbohydrate (50.08 – 53.27). It was observed that both are highly rich in protein with 33.89% and 30.53% for locust bean and pigeon pea respectively and up to 30% had been reported in other closely related *Cajanus spp*. (Jones, et al., 2007). Pigeon pea flour has been tested and found to be suitable as protein source for supplementing baked products such as bread, cookies and chapattis due to it high level of protein, iron and phosphorus (Harinder et al., 1999), the seeds have also been incorporated into cassava flour to produce acceptable extruded products (Rampersal et. al, 2003). Locust bean, apart from it richness in protein contain 20% edible oil (Musa, 1991) though higher than about 10% which was observed in this present research but higher that what had been observed in other beans. Compared with other commonly consumed pulses such as black gram, click pea and mung bean. The protein content of locust bean and pigeon pea investigated in the present study appear to be higher.

Table 2: Mineral Composition of the Samples

	Sample	
Parameter (%)	*Locust Beans*	*Pigeon Pea*
Fe	0.06	0.12
Zn	0.02	0.01
Ca	0.27	0.23
Mg	0.39	0.32
Mn	0.01	ND
Cu	ND	ND

ND = Not detected

In Table 2, both samples contain non – appreciable content of minerals, it was found that Mn and Cu were not even detected in pigeon pea likewise Cu in locust bean. This low content must have due to the fact that mature seeds were used in this present research, because it had been reported that in Africa pigeon pea seeds are mainly eaten green unlike in India where dry dehulled split-pea is most popular and such green seed are a richer source of Fe, Cu and Zn than the mature seed (Singh, et al., 1984). The same reason might also responsible for the low content of minerals observed in locust bean and pigeon pea.

CONCLUSION AND RECOMMENDATIONS

It was concluded that the locust bean and the pigeon pea contain an appreciable amount of macro-nutrient, especially protein and carbohydrate which is advised to be included in daily dietary pattern of every household. This will reduce the risk of nutrients deficiency in the consumers. Moreover, the beans should also be eaten green since it is richer in micro-nutrient than the mature seed.

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