

CHEMICAL EVALUATION OF THE NUTRITIVE VALUE OF THE SEED KERNEL OF CANARIUM SCHWEINFURTHII

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ABSTRACT

The nutritive value of seed kernel of *Canarium schweinfurthii* was evaluated chemically. The result showed that the seed kernel contains moisture, crude protein, crude fat, crude fibre and carbohydrate of the seed kernel contains $8.70 \pm 0.20g$, $29.09 \pm 0.40g$, $51.49 \pm 0.20g$, $7.56 \pm 1.10g$, $5.44 \pm 1.26g$ per 100g of the dry matter, respectively. Analysis of mineral elements showed that the seed kernel is very rich in calcium and potassium and moderately rich in phosphorus and iron.

The anti-nutrient composition was also determined and the result showed the presence of phytate, tannins and oxalate.

All the essential amino acids were found to be present at the level quoted for these amino acids by FAO.

KEY WORDS: *Canarium schweinfurthii*, Seed Kernel, Amino Acid.

INTRODUCTION

There is a great challenge as regard to the poor state of economy in the Third World countries, especially in Nigeria. Poor economic conditions has contributed to inadequate consumption of food deficient in protein and this has caused malnutrition (Olusola et al, 1996). Hence the need for a search for cheaper, lesser known alternative sources.

Canarium schweinfurthii is large tropical tree of the family Invingiaceas, common names include Atili, Atilis, Agbabubu in Yoruba. It is found in tropical Africa predominantly in West Africa (Keay et al, 1989).

In Nigeria it is referred to as African olive, though its morphology is quite different from the olive tree that is widespread in the Mediterranean countries. It is grown in Plateau State mainly for its fruit and oil.

The seed kernel is oily and edible. Fatty acid present are oleic acid, linoleic, stearic and traces of others (Burkill, 1985). The purpose of this study was to evaluate the nutritive value of

the kernel *Canarium schweinfurthii* and the possibility of incorporating the seed in livestock feed as a source protein.

MATERIALS AND METHODS

The samples of fruit bought from local market in Pankshin Local Government Area, Plateau State during the months of June and July Identified at Federal School of Forestry, Jos.

The seed kernels were obtained from the fruit by breaking the fruits with stone. They were sun dried and pounded into powder with pestle and mortar and packed in air tight container, stored at room temperature until required.

The proximate composition of the seed kernel of *Canarium* was determined according to the procedure of the AOAC (1990). Crude fibre determination was done according to the method of Joslyn (1970).

The amino acid profile was determined by the method of Spackman and Moore (1958) using norleucine as an internal standard. Elemental composition was determined using atomic absorption spectrophotometer (AAS), Perkin-Elmer, model 2380).

Phytate was determined by the McCance and Widdowson method (1935), soluble oxalate by the method of Abeza et al (1968) and tannin by the AOAC (1983) procedure.

RESULTS AND DISCUSSION

The results of the proximate analysis of the seed kernel *Canarium schweinfurthii* are summarized on Table 1, the amino acid composition is given in Table 2, elemental composition in Table 3 and contents and selected anti-nutritional factors in Table 4.

The low moisture content (8.70g) would be an advantage in terms of the keeping quality of the seed. The high level of crude lipid would provide enough calories if incorporated into livestock feed and the high crude protein would make the seed a good source of cheap protein (Samuel et al, 1997).

All the essential amino acids are present in the seed kernel and they compare very well above the FAO (1970) standard for these essential amino acids. With the profile of essential amino acids in the required proportion consumption of the seed kernel will improve protein nutrition.

Elemental composition of the seed kernel shows it is a rich source of Calcium and Potassium but low Zinc, Phosphorus and Iron. The values are higher than those for some tree seeds (Marangoni and Alli, 1987).

The anti-nutrients of the seed kernel showed that phytate, oxalate and tannin of the dry matter are comparatively lower than reported for seeds of *Lupinus* species (Morcedes et al. 1989). The oxalate content of the seed kernel obtained in this study was 15.02/100g dry

sample. This value is much lower than the 3g/100g reported as fatal dose (Munro and Basir, 1973). Phytate level is usually higher in plant tissues because it is wide spread as a cellular constituent of many plant materials. The value 1.04/100g dry matter obtained in the seed kernel is lower than those reported for some seeds (Apata and Ologhobo, 1989). This results in an increased bioavailability of mineral elements in the diet.

Table 1: Proximate composition of the seed kernel of *Canarium schweinfurthii*

Component	Composition(g/100g of Dry matter)
Moisture	8.70 ± 0.20
Crude protein	29.09 ± 0.40
Crude lipid	51.49 ± 0.2
Crude fibre	7.56 ± 1.1000
Nitrogen Free extract	5.44 ± 1.26
Total Ash	6.42 ± 0.53.

Values are Means of three determinations ± SD

Table 2: Amino acid composition of seed kernel of canarium schweinfurthii

Amino acid	Concentration (g/100g protein) ^a	FAO protein ^b	Reference	Amino acid score
Isoleucine	8.73 ± 0.20	4.2		207.8
Leucine	7.47 ± 0.06	4.2		177.86
Lysine	6.47 ± 0.08	4.2		154.05
Methionine	9.93 ± 0.11	2.2		451.05
Phenylalanine	10.75 ± 0.12	4.2		255.95
Valine	9.35 ± 0.02	2.8		333.93
Threonine	3.84 ± 0.04	2.8		137.14
Cysteine	9.09 ± 0.30	2.0		454.50
Arginine	4.47 ± 0.03			
Histidine	7.54 ± 0.02			
Alanine	9.34 ± 0.50			
Serine	7.47 ± 0.50			
Proline	14.51 ± 0.12			
Glycine	5.45 ± 0.01			
Glutamine	11.84 ± 0.32			
Aspartic acid	8.60 ± 0.23			

^aValues are means of three determinations (± SD)

^bFAO (1970).

Table 3: Elemental composition of the seed kernel of Canarium schweinfurthii

Element	Concentration (mg/100g Dry matter)
Calcium	282.30 ± 0.08
Potassium	630.10 ± 0.02
Iron	5.80 ± 0.71
Zinc	0.50 ± 0.10
Phosphorus	5.44 ± 1.26

Values are means of three determinations(±SD)

Table 4: Anti-nutritional factors in the seed kernel of *Canarium schweinfurthii*

Anti-nutritional factor	Concentration (mg/100gDry matter)
Tannins	20.00 ± 0.05
Oxalate	15.02 ± 1.50
Phytate	1.04 ± 0.01

Values are means of three determinations (± SD)

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