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PROXIMATE AND SELECTED MINERALS COMPOSITION OF SEED AND LEAF OF COTTON PLANT (*Gossypium hirsutum*).

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ABSTRACTS

Proximate and some selected mineral composition of cotton seed, and leave were determined using standard methods. AOAC (2012) method. the result of the seed revealed the presence of 23.18% crude protein, 9.85% moisture content, 21.91% carbohydrate content, 19.01% crude fibre, 5.55% crude ash and 21.91% crude lipid. The proximate composition of the leaf showed the presence of 48.49% of carbohydrate, 19.68% crude protein, 3.40% ash content, 10.04% moisture content, 5.66% lipid and 12.73% crude fibre. Minerals analysis revealed that the seed and leaf contained iron (Fe) 2.34 mg/100g and 1.68mg/100g, calcium (Ca) 61.64mg/100g and 410.89mg/100g, sodium (Na) 2.17mg/100g and 2.94mg/100g potassium (K) 308,24mg/100g and 289.45mg/100g. The results of proximate and mineral analysis obtained confirms that cotton seed and leaf contains essential nutrients needed by both humans and animals.

Keyword: *Cotton leaf and seed, Proximate composition, Mineral analysis.*

INTRODUCTION

Cotton is a crop that belongs to the natives of Americas, China, Africa and India. It is grown in tropical and subtropical warm humid climate. The plant belong to the *Malvaceae* family and the genus *Gossypium*. It is a shrub that grows to about 40 cm high with flowers either yellow or red. [2]. In addition to the fiber, cotton seeds give a supplemental income and a wonderful source of protein for animal and human nutrition [3,4]. Since the 1950s, cotton growing areas has relatively been constant with growth ranging between 30 and 36 million hectares. But in recent times cotton production has increased globally by 400% from 6.67 million metric tons in 1950/1951 to 26.84 million metric tons in 2012/2013 [2,5].

Cotton seeds are ovoid, 3.5-10mm long. They are thickly covered with white, long and woolly hairs, called the lint, thus are the

main actives used to make cotton textiles and shorter hairs (linters). Stipules are present at the leaf base and they are linear to lanceolate in conformation and sometimes falcate (i.e. sickle-shaped). Leaves are attached to the stem by a 1.5 to 10cm petiole.[5].

Cotton seed is used as a dry organic fertilizer owing to the presence of 45% protein and many natural nutrients. Quality oil extracted from cotton seed is used as a lubricant, paint moisturizing lotion and bathing soaps [6]. Cotton seed outer cover is very rich in protein and cellulose making it a cost effective animal feed.

Materials and Methods

Sample collection

The fresh seed and leaves of cotton (*gossypium hirsutum)*, were colleted from a garden in Gboko, Benue state. The leaves were plugged fresh from the tree, while the fruits from which the seeds was gotten were picked from the ground or hand plucked from the tree into a polythene bag. The cotton plant seeds and leaves were then taken for identification by Prof.J.C Onovo of the Department of Natural products and Biotechnology, Faculty of Natural and Applied Sciences, Nasarawa State University, Keffi, Nasarawa State. It was then transported to the HND Chemistry laboratory for drying, pulverizing and analyses. All reagents and chemical used were of analytical grades.

Sample Preparation

The cotton seeds and leaves where washed with running tap water. Seeds were obtained by breaking the pulp open with the use of a fine stone and wood. The leaves and seeds were air dried on an aluminum foil paper for (21) days at room temperature. Dried samples were pulverized using a Kenwood blender to homogenous state before analysis.

Proximate Analysis

Proximate composition of seed and leaves of cotton seed were analyzed according to AOAC (2012) method.

Mineral Analysis

Mineral analyses were determined using the method of AOAC (2012). Calcium, Potassium, Iron and Sodium were determined by Atomic Absorption Spectrophotometry Method. 1.0g of each sample (Cotton seed and Cotton leaves) were digested first with 20ml of acid mixture (80ml Perchloric acid, 650ml Conc.$HN0_3$, 20ml $H2S0_4$) by weighing the sample into a digestion flask, followed by the addition of the 20ml acid mixture. The digestion flasks with the sample plus the digestion acid mixture were heated until a clear digest was obtained. The digest was diluted later with distilled water to 500ml mark. Aliquot of the clear digests were used for atomic absorption spectrophotometry using filter that matched the different elements. The concentration of each element was determined with their calibration curves prepared with their standard solutions. The percentage values were calculated by multiplying their concentration by 100.

RESULTS AND DISCUSSION

RESULTS

Table 1: Proximate Composition of Cotton (*gossypium hirsutum)* Seeds and leaves in Percentage.

Sample	Cotton seeds	Cotton Leaves
Crude Protein Content	23.18±0.01	19.68±0.01
Moisture Content	9.85±0.12	10.04±0.03
Percentage Carbohydrate	21.91±0.01	48.49±0.10
Crude Fibre Content	19.01±0.03	12.73±0.02
Crude Ash Content	5.66±0.21	3.40±0.14
Crude Lipid	21.90±0.03	5.66±0.02

Values are means ± standard deviation of triplicate determinations.

Table 2: Selected Mineral Present in Cotton seed and leaves in Percentage.

Minerals		Cotton Seed	Cotton Leaves
Iron (Fe)	Mg/100g	2.34±0.10	1.68±0.01
Calcium (Ca)	Mg/100g	61.64±0.13	410.80±0.02
Sodium (Na)	Mg/100g	2.17±0.02	4.17±0.10
Potassium (K)	Mg/100g	308.24±0.23	289.45±0.31

Values are means ± standard deviation of triplicate determinations.

DISCUSSION

Proximate composition of cotton seed and leaves shown in Table 1 revealed that the moisture content of both the seed and leaves were low (9.85% and 10.04%) this makes it not to be susceptible to microbial spoilage [7]. Protein content of the seed and leaf is high (23.18% and 19.68%) and hence ***Gossypium hirsutum*** is a rich source of protein and can therefore be utilized as feeds for animals [8]. Crude fibre of the seed and leaves were high as shown (19.01% and 12.73), and this makes the cotton plants a highly significant component of the human diet, by increasing stool bulk and decreasing the time that waste spend in the gastrointestinal tract [9]. Carbohydrate content for both the seed and leaves (21.91% and 48.49%) were high and this support that the cake and leaves are good source of energy [10]. Lipid content of 21.90% and 5.66% were observed for the seed and leaves signifying cotton seed as a good energy source. The ash content obtained for cotton seed (5.66%) is higher than that of the leave (3.40%).this support the presence of trace element in the plant [11].

Selected mineral contents of both the seed and leaves of Gossypium ***hirsutum*** are shown in Table 2. From the table, 61.64mg/100g and 410.80mg/100g calcium were present in the seeds and leaves of cotton. Calcium keeps the bone and teeth strong and also plays a key role in maintaining regular heart beat [12]. Potassium level was high both in the cotton seeds and leaves (308.24mg/100g in seed and 289.45mg/100g in leaves). Potassium is an important mineral for both cellular and electrical function in the body. Iron is an important element essential in pregnant women, nursing mothers, infants, convulsing patients and elderly people diet to prevent anemia and other related diseases [13]. Iron content of 2.34mg/100g and 1.68mg/100g were gotten for both cotton seeds and leaves respectively. Sodium is higher in cotton leaves (4.17mg/g) and low in the seed (2.17mg/100g). The values obtained supports that cotton leaves can be used in the formulation of animal feeds and fertilizer [14]

CONCLUSION

From this study, it is evident that cotton seeds and leaves serves as a good source for nutritional supplements for both humans and animals.

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