



## Phytochemical Screening, Proximate Analysis and Mineral Composition of *Cassia occidentalis* Seed Extract

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### ABSTRACT

Qualitative determination of chemical and nutritional composition of *Cassia occidentalis*, an underexploited crop seed in Nigeria, was carried out. Seeds of *C. occidentalis* were found to be rich in crude protein, carbohydrate, and mineral elements. Mineral analysis of *C. occidentalis* showed the seed as good source of antioxidant micronutrients such as iron, calcium, potassium, sodium and magnesium. The phytochemical screening of the seed showed the presence of carbohydrate, terpene, steroid, sugar and tannins. Alkaloids, saponins and glycosides were absent. Although the oil has a very low peroxide value and high iodine value, it cannot be recommended for consumption because of the low yield as well as its repulsive odour. The seed, however, can serve as a cheap source of protein, energy, as well as antioxidant micronutrients supplements in both man and animal.

## INTRODUCTION

*Cassia occidentalis* also known as Fedegoso is a leguminous plant belonging to the family leguminosae. It is a small tree that grows 5-8m high and is found in many tropical areas of South American, including the amazone and West Africa. The *Cassia* genus comprises some 600 species of trees, shrubs, vine and herbs, with numerous species growing in the South American rainforests and tropics. Many species have been used medicinally, and these tropical plants have a rich history in natural medicine. Various *Cassia* plants have been since the ninth or tenth centuries as purgatives and laxatives, including *Cassia angustifolia* and *Cassia senna*. In Cuba, *Cassia occidentalis* is said to be most common in fertile cultivated areas[1] and in Nicaragua, it also grows in disturbed sites (particularly fertile ones), river overflow areas, meadows and forest from near sea level to 900m in elevation. The species occurs on pinelands in Florida and grows better on near-neutral soil than acid (pH 4.7) soils[2].

Locally, the seed is called Rere in the Yoruba land (Nigeria). Other name include Tafasar masar, kwarkwati(Hausa), Akede agbara, Okamo (Igbo) and Gaya (Nupe) [3].

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grows better on near-neutral soil than acid (pH 4.7) soils [2]

## MATERIALS AND METHODS

Fresh seeds of *Cassia occidentalis* were collected from the environs of the Federal University of Technology, Minna, Niger State. Authentication of the seeds was done at the Department of Medicinal Plant and Traditional Medicine National Institute of Pharmaceutical Research and Development (NIPRD), Abuja.

### Preparation of Extract

The soxhlet extraction technique was used. Exactly 30g of the powdered seed sample was extracted using 300ml of 90% hexane and 10% acetone. The extract was placed on a water bath for all the solvent to evaporate and oil retained. The oil produced was stored in a refrigerator at 40c in dark tightly stoppered glass until analysis.

The defatted extract was air-dried at room temperature, weighed and further extraction was done using soxhlet technique and ethanol (300ml) as a solvent. This was placed in an air tight stoppered glass ware before analysis.

### Processing and Phytochemical Screening

The seed was air dried in MPR Department at NIPRD, Idu, Abuja. For three weeks, it was then grounded to a powdered form using sterile mortar and pestle. Then the screening of the seed extract was carried out according to the method described by Sofowora [4] for the detection of active components like saponins, tannin, alkaloid, glycosidas, terpare, steroids, phenol, anthraquinone, carbohydrate, volatile oil and flavonoids.

## Proximate analysis

Chemical composition of *Cassia occidentalis* seed was determined using the AOAC methods [5] Moisture, total ash, crude fibre, total fat and protein were analysed and carbohydrate was obtained by difference.

## Mineral content of defatted flour

Samples of defatted flour were digested by concentrated nitric acid and perchloric acid. K<sup>+</sup>, Na<sup>+</sup> and Ca<sup>+</sup> were estimated using emission flame photometer, while Fe<sup>+</sup>, Mg<sup>+</sup> were determined

**Table No.1:** Proximate composition of *Cassia occidentalis*

Component	Value (% composition)
Moisture content	8.0
Ash	5.9
Crude protein	2.3
Crude fibre	20.8
Lipid	14.9
CHO	48.1

using atomic absorption spectrophotometer using standard method.

## RESULTS

Seeds of *C. occidentalis* were found to be rich in crude protein, carbohydrate, and mineral elements (Table No.1). Mineral analysis of *C. occidentalis* showed the seed as good source of antioxidant micronutrients such as iron, calcium, potassium, sodium and magnesium (Table No.2). Results of Phytochemical screening of *Cassia occidentalis* seed extracts is presented in Table No.3. carbohydrate, terpene, steroid, sugar and tannins. Alkaloids, saponins and glycosides were absent.

**Table No.2:** Mineral Composition of Defatted flour of *Cassia occidentalis*

Metal ions	Values (mg/100g)
Ca <sup>+</sup>	3.81
Na <sup>+</sup>	0.11
K <sup>+</sup>	1.86
Mg <sup>+</sup>	0.81
Fe <sup>+</sup>	16.44

**Table No.3:** Phytochemical screening of *Cassia occidentalis* seed extracts.

Extracts	% yield	Secondary metabolites							
		Alkaloid	Saponin	Terpene	Steroid	Tannins	CHO	Glycoside	Sugar
COH	14	—	—	++	++	+	++	—	++
COM	1.3	—	—	+	+	++	+	—	++

**Key:** COH (*Cassia occidentalis* hexane), COM (*Cassia occidentalis* Methanol)  
 + Slightly present      ++ Highly present      — Absent

## DISCUSSION

The proximate analysis in Table No.1 revealed that crude protein content has the lowest value (2.3%) among all the nutrient composition while carbohydrate was found to be the highest (48.1%). This is of the average when compared with that of other legumes ranging from 23% in Groundnut to 66% in Bambara groundnut[6]. The moisture content (8.0) is lower than that of most legume seeds [7] this implies that the shelf life for this seed will likely be longer than that of most legumes.

The ash content of 5.9% for this seed is slightly high compared with that of other legumes which has been reported to range between 3.0 and 4.8%. While crude fibre and lipid are 20.8% and 14.9% respectively.

Table No.2 indicated the presence of Fe, Mg, K, Na and Ca at 16.44, 0.81, 1.81, 0.11 and 3.81 respectively. From this result it can be deduced that *Cassia occidentalis* seed has Fe at high concentration and may be used for the treatment of anaemia when use as supplement. The concentration of both Mg and Na are very low. The phytochemical screening in Table No.3 showed the

presence of carbohydrate, reducing sugar, terpene and steroid as the active component of the plant. Several phenolic compounds like tannins present in the cells of plants are potential inhibitors of many hydrolytic enzymes such as pectolytic macerating enzymes used by plant pathogens.

It was also showed that component like Saponin, glycosides and Alkaloids were absent. Many plants contain non-phlobatanin which can get hydrolyse to release phenolics which are toxic to microbial pathogens [8]. Some of these compounds are likely to be active against certain bacteria, this may account for the traditional used as medicinal plants. Traditional medicine practitioner often uses two or more plants in synergy to treat infections caused by a variety of bacteria[8].

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