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Phytochemical Composition and Active Ingredients of *Garcinia kola* Extract Using Two Methods of Extraction the (Crude Ethanol and Aqueous Extract)

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ABSTRACT

Phytochemical composition and active ingredients of *Garcinia kola* extract using two methods of extraction (crude ethanol and aqueous extract) was conducted. Tannin was present in both the aqueous (+) and ethanol extracts (++) of the *Garcinia kola* qualitative phytochemical analysis. Both the ethanol (-) and aqueous (-) extracts lacked pflobatannins. In ethanol extracts (+), glycoside was detected but not found in aqueous (-). In the ethanol extract (-), saponin was not present, while it was present (++) in the aqueous extract. Comparing the aqueous extract to the ethanol extract counterpart, the mean values of saponins (30.74±10.64), flavonoids (52.97±2.80), and anthraquinones (69.74±3.77) were higher in the aqueous extract, while the corresponding mean values for the ethanol extract were 0.00±0.00, 0.67±0.24, and 26.34±26.34 for saponins, flavonoids, and anthraquinones, respectively.

Keywords: Phytochemical *Garcinia kola* Ethanol and Aqueous extracts

INTRODUCTION

In order to defend themselves or for their own physiological purposes, plants synthesize a variety of compounds. Greek word "plant" means "phyto," hence phytochemicals are plant chemicals (Nwali O.N. *et al.*, 2018). Some of these plant chemicals, also known as biomolecules, are necessary for the body to function physiologically, making them an essential component of diet plans (Molyneux R. J. *et al*., 2007). Phytate in legumes is one example of a phytochemical that is known to be poisonous and anti-nutrient (anti-absorptive) (Idokoa A. *et al.*, 2019). For pharmacological purposes, solvents are employed in the extraction, screening, identification, quantification, and isolation of phytochemicals from plants.

Bitter kola, or *Garcinia kola*, is a member of the Clusiaceae family of plants. Native to West and Central Africa, this tree serves a variety of purposes (Manourová *et al*., 2019). Traditionally, *G. kola* seeds are presented to guests as a form of entertainment. Men can also chew them as an aphrodisiac, prevent or treat colic diseases, or utilize them to relieve repressed coughs (Madubunyi, 2010). The purpose of this study is to identify *Garcinia kola's* active component and pytochemical composition.

MATERIALS AND METHODS

Garcinia kola collection

G. kola seeds were bought in Makurdi, Benue State, at the North Bank Market. For

three days, *G. kola* seeds were allowed to air dry at room temperature.

Phytochemical screening of the *Garcinia kola* extract

The *G. kola* extracts underwent phytochemical screening. This includes the measurement of flavonoids, alkaloids, phenol, and saponin. Based on screening techniques outlined by the AOAC (1990), all of these were established.

Preparation of aqueous extract of *Garcinia Kola*

After the outer layers of G. kola seeds were removed, they were left to air at room temperature for 72 hours in order to be processed into a meal. The extraction was done at the Department of Organic Chemistry, Sarwuan Tarka University of Agriculture, Makurdi, using finely powdered, dried seeds. For 48 hours, 100g of the dried powdered material were immersed in 200 mL of distilled deionized aqueous solvent. This solution was a funnel filter made of silk wool. The filtrate obtained was allowed to be dried under ambient temperature between 28 to 32 0c and the extract was weighed to be 5.0903g. Calculated % yield: 5.0903%.

Preparation of Ethanolic Extract of *Garcinia Kola*

After the outer coats of *Garcinia kola* were removed, the seeds were allowed to air dry for 72 hours at room temperature. 100g of ground, dried seed powder was soaked in 200 mL of methanol solvent and left for 48 hours. The resulting filtrate was then allowed to dry at room temperature for 28 to 32 0c, and the extract was weighed at 4.2341 g. The calculated yield was 4.2341%.

Qualitative phytochemical screening of seed *Garcinia kola*

Examples of the biologically active substances identified by the analysis were found in *Garcinia kola* seeds; these include Phlobatannin, anthraquinones, alkaloids, flavonoids, saponins, tannins, and glycosides.

Quantitative phytochemical determination of *Garcinia kola* seed extract

The amount of various compounds found in *Garcinia kola* seeds was determined by analysis. Examples of these include the determination of alkaloids, saponins, tannins, flavonoids, glycosides, phlobatannins, and anthraquinones.

Data Analysis

The student t test was used to examine the data gathered from the phytochemical composition.

RESULT

Qualitative Phytochemical composition of Aqueous and Ethanol extracts of *Garcinia kola*

Table 1 shows the qualitative phytochemical results of aqueous and ethanol extracts of *garcinia kola.* Tannin was present in aqueous (+) but moderately high (++) in ethanol extracts. Phlobatannins was not present in aqueous (-) but in ethanol extracts (-). Glycoside was not present in aqueous (-) and present in ethanol extracts (+). Saponin was moderately high (++) in aqueous but not present in ethanol extract (-). Terpeniods was present in aqueous (+) but not present in ethanol extracts (-). Sterols was present in both aqueous (+) but in ethanol extracts (+)). Flavonoids was moderately high (++) in aqueous but present in ethanol extracts (+).

Table 1. The results of the qualitative Phytochemical composition of Aqueous and Ethanol Extract

S/No.	Compounds	Aqueous %	Ethanol %
1	Tannins	+	+ +
2	Phlobatannins	-	-
3	Glycoside	-	+
4	Saponins	++	-
5	Terpenoids	+	-

6	Sterols	+	+
7	Flavonoids	++	+
8	Phenols	-	-
9	Resin	++	++
10	Alkaloids	+	-
11	Phenols	+	-
12	Balsams	++	+++
13	Anthraquinones	-	

+ = Positive test, - = Negative test.

Quantitative Phytochemical composition of Ethanol and Aqueous extracts of *Garcinia kola*

Table 2 shows the means of qualitative phytochemical composition of aqueous and ethanol extract. Mean value of saponins (30.74±10.64), flavonoids (52.97±2.80) and anthraquinones (69.74±3.77) were higher in aqueous extract compared to the counterpart ethanol extract with smean value of 0.00±0.00, 0.67±0.24 and 26.34±26.34 for saponins, flavonoids and anthraquinones, respectively. However, mean value of tanins (64.57±3.65), phenols (0.18±0.06), resins (5.60±1.62) and bsalms (79.05±0.43) were higher for ethanol extract compared to the aqueous extract with mean value of 32.33±9.43, 0.00±0.00, 5.31±0.99 and 0.00±0.00 for tanins, phenols, resins and bsalms, respectively. Additionally, terponoids and steroids had 0.00±0.00 mean value in both aqueous and ethanol extract, respectively.

Table 2. The results of the quantitative Phytochemical composition of Aqueous and Ethanol Extract

Phytochemical	Aqueous Extract	Ethanol Extract	P-Value
Tannins	32.33 ± 9.43^{b}	64.57 ± 3.65^{a}	0.03
Phlobatannins	0.00±0.00	0.00±0.00	-
Glycosides	0.00±0.00	0.00±0.00	-
Saponins	30.08 ± 10.64^{a}	0.00 ± 0.00^{b}	0.05
Terpenoids	0.00±0.00	0.00±0.00	-
Sterols	0.00±0.00	0.00±0.00	-
Flavonoids	52.97 ± 2.80^{a}	0.67 ± 0.24^{b}	0.00
Phenols	0.00 ± 0.00^{b}	0.18 ± 0.06^{a}	0.04
Resin	5.31 ± 0.99^{a}	5.60 ± 1.62^{a}	0.20
Alkaloids	0.69 ± 0.09^{a}	0.00 ± 0.00^{b}	0.00
Balsams	0.00 ± 0.00^{b}	79.05 ± 0.43^{a}	0.00
Anthraquinones	69.74 ± 3.77^{a}	26.34 ± 26.34^{b}	0.03

means in the same row with different superscripts differ significantly (p<0.05)

DISCUSSION

The phytochemical composition analysis of the *G. kola* seed revealed the presence of phenol, steroids, tannin, flavonoids, glycosides (cardiogenic and cyanogenic), and saponins. This is in line with the results of a study by Idoko *et al.,* (2022), which found that the ethanol extract of *G. kola* included phenol, sterols, alkaloids, tannin, flavonoids, saponins, and terpenoids. The results of this investigation are consistent with those of Molyneux *et al.* (2007), Idoko *et al.* (2019), and Alhassan *et al.* (2018), Molyneux *et al.* (2007), and Hoda *et al.* (2015), who reported the presence of alkaloids, tannins, saponins, flavonoids, steroids, and glycosides in Balanites aegyptiaca kernel. The rich content of alkaloids in all extraction solvents in this study suggests that *G. kola* extract could be a source of nontoxic medicinal formulations. Physiologically, the advantage of alkaloids in pharmaco-therapeutics is associated with their nontoxic properties Idoko *et al.,* (2022). According to Zubaidah *et al.,* (2019); Ibedu *et al.,* (2018), the main active elements in herbal recipes for the exertion of various pharmacological effects are tannins,

saponins, and flavonoids found in fruits, vegetables and herbs. Flavonoids, in particular quercetin, have been shown to have anticancer, inhibitory and free radical scavenging, improved cognitive function, and the ability to inhibit the production of histamine. They have also been shown to improve the flavor, taste, and color of food (Reuter *et al*., 2012; Omgba *et al.*, 2012).

CONCLUSION AND RECOMMENDATION

The phytochemical makeup of *G. kola* in this study indicates that it may be helpful in pharmaceutical and medical research to create disease-prevention vaccines and supplements. As a raw material, it can also be helpful in a variety of manufacturing industries.

It is recommended that farmers are advised to utilize aqueous extract since it yields more phytochemicals employed in the investigation and is less expensive than ethanol extract.

Declaration by Authors

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