

Harbal Curative Potency Of Nigerian *Piliostigma Thonningii* (Schumach) Leaf: Insight From Phytochemical And Physicochemical Investigations

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ABSTRACT

Piliostigmathonningii belongs to the family Fabaceae. It is evergreen shrub with a rounded crown and is used traditionally as a diuretic. The study established the phytochemical and physicochemical characters with the aim of assisting in proper identification, purity and quality of the leaves according to crude drug methods techniques. The physicochemical parameters evaluated include percentages of moisture content (5.90 ± 0.59), total ash value (8.33 ± 0.28), water-soluble ash (1.83 ± 0.44), acid insoluble ash (1.83 ± 0.21), alcohol extractive value (22.0 ± 2.80), water extractive value (3.30 ± 2.00) and the phytochemical screening showed the presence of saponin, tannins, triterpenes, flavonoids and alkaloid. The chemo-microscopy of the powdered leaves revealed the presence of calcium carbonate, calcium oxalate crystal and starch grain. The findings in this work confirmed the presence of some secondary metabolites and justified its utilization as a herbal remedy.

Keywords: Crude drug, physiochemicals, phytochemicals, *Piliostigmathonningii*; secondary metabolite.

1. INTRODUCTION

Medicinal plants have been widely utilized among developed and developing countries including Nigeria.

Studies have reported their potentials in treating, managing and curing many human diseases and infections [7],[8], [9] and [11]. This plant named *Piliostigmathonningii* belongs to the family of Fabaceae and is one of the medicinal plants widely used either by infusion, decoction or any other form in traditional medicine for the treatment of diarrhea, malaria, digestive disorder, cough, sore throat, toothache, infections, snakebites, skin diseases, worms, other intestinal problem and can also be used as diuretic [10]. In Nigeria, this plant is commonly known as "Wild baubinia", Igbo- Okpatu, Hava in Yoruba, Kalgo in Hausa. It is an evergreen shrub with a rounded crown and can grow up to 3 – 15 meters long. It is widely distributed in Asia and Africa including Nigeria such as Zaria, Bauchi, Ilorin, Lagos and Abeokuta. A lot of research has been done on the various parts of the plant, physiochemical and phytochemical evaluations have been carried out by several scholars. Phytochemicals are chemical found in plants which possess bioprotective properties, enabling them to function as antioxidants, anti malaria, immune boosters, anti inflammatory agents amidst several biological relevance, hence the need to investigate the phytochemical components to ascertain the authenticity of its use for the treatment of various illnesses and the secondary metabolite available in the plant. [2], reported the anti-malarial activity of ethanolic leaf extract of the *P. thonningii* plant and

significantly suppress the growth of *Plasmodiumbergheiberghiei*. [1], reported the antibacterial activities of the aqueous and methanol extracts of the leaves and were able to obtain some zones of inhibition. [3], reported the anti-tubercular, antibacterial, antifungal and cytotoxic activity with some significant findings. [4], reported the ability of the ethanol extract of the leaves to lower the lipid and cholesterol levels in rats. The Phytochemical screening of the plant carried out by other researchers in India reveals the presence of flavonoids, tannins, and alkaloids [9]. The plant has also been reported to contain nutritionally important vitamins (such as C, E, and beta-carotene) and minerals (such as calcium, magnesium, zinc, and potassium) all of which contribute towards its free radical scavenging activities. However, this study would focus on evaluating the physicochemical, chemo microscopy and phytochemical properties of the *Piliostigma thonningii* for its further utilization and standardization in Nigeria traditional medicine.

2. MATERIALS AND METHODS

Collection of Plant material preceded extraction of the plant. The fresh leaves of the plant *P. thonningii* were collected from Zaria, Samaru, Local Government Area of Kaduna State, Nigeria. The whole plant was identified and confirmed by Mallam Namadi Sanusi, a Taxonomist with a voucher number (0831) at the Herbarium Unit of Biological Sciences, Ahmadu Bello University, Zaria, Kaduna State. The leaves were air-dried under shade, powdered, weighed and stored in an airtight container for further use. More so, Plant

extraction was carried out using powdered leaves of *P. thonningii* (1000 g). The powdered leaf were macerated successively using 2.5 liters of each ethyl acetate, 70% methanol and aqueous for 72 hrs. The extracts were concentrated using rotary evaporator and evaporated on a water bath. The extracts were labeled and stored for subsequent use.

Subsequent determination of Physico-Chemical Contents of *Piliostigma thonningii* were carried out to determine Moisture content (loss on drying), total ash, water-soluble ash and acid insoluble ash values, extractive values (water and alcohol) of the plant sample, Chemo-microscopic Examination of the plant was carried out to observe the presence/and or absence of cell walls materials and cell inclusions. The methods as described in [12], guidelines on quality control methods for medicinal plant materials were used. Preliminary phytochemical screening using standard methods, as described by [5], were done. Saponins were tested using Frothing Test and Haemolysis Test, Steroids/Triterpenes were tested using Lieberman-Buchard's Test and Salkowski's Test, Flavonoids were tested using Shinoda's Test and Sodium hydroxide Test, Tannin's presence were confirmed using Ferric chloride Test and Lead sub-acetate Test, Alkaloids tested, Anthraquinone were tested using Borntrager's Test and Modified Borntrager's Test and finally, Cardiac Glycosides were tested using Keller-Kiliani's Test and Keddie's Test.

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3 RESULTS AND DISCUSSIONS

3.1 Results

Table 1: Physicochemical components of the Leaf of *P. thonningii*

Physicochemical parameters	Values ((%w/w) \pm SEM)
Ash content	8.33 \pm 0.28
Water soluble ash	1.83 \pm 0.44
Acid-insoluble ash	3.33 \pm 0.21
Moisture content	5.90 \pm 0.95
Water extractive value	3.30 \pm 2.33
Alcohol extractive value	22.00 \pm 2.80

Mean value of 5 counts

Table 2: Phytochemical constituents of the powdered leaf of *Piliostigmastonningii* Constituents

Phytochemical constituents	Test	Ethyl acetate	70% Methanol	Aqueous extract
Anthraquinones	Borntrager's test	-	-	+
	Combined Anthraquinone	-		+
Saponin	Frothing test	+	+	+
	Haemolytic Test			
Steroid/Triterpenes	Salkowski's test	+	+	+
	Lieberman Burchard's test	+	+	+
Tannins	Ferric Chloride test	+		+
	Lead subacetate test		+	
Carbohydrate	Molisch test	+	+	+
	Fehling test	+		+
Alkaloids	Wagner's test		+	
	Mayer's test	-	+	+
	Dragendoff's test		+	+
	Picric acid test		+	+
Cardiac glycosides	Keller-kiliani's test			
	Kedde's test			
Flavonoid	Sodium hydroxide test	-	+	+
	Ferric Chloride test	-		+
	Shinoda's test			

Key words: (+) present; (-) absent

Table 3: Analysis of the powdered leaf of Constituents tested

	Observation	Inference
Cellulose	Blue stained colour	+
Lignin	Light- pink colour	+
Suberin/ Cutin	Orange-red colour	+
Aleurone grains	Yellowish-brown colour	+
Calcium carbonate	Shinning materials not scattered and deformed	+
Calcium oxalate crystals	Scattered and deformed shinning materials	+
Inulin	Brownish-red aggregation of crystals	+
Mucilage	Present	+
Starch	Bluish- black colouration	+

Key words: (+) present; (-) absent

3.2 Discussions

In this study, the physicochemical parameters evaluated showed the percentage of moisture content, total ash value, water soluble ash, acid insoluble ash, alcohol extractive value and water extractive value (Table 1) and this result may serve as a reference standards in assessing quality and purity of crude herbal drugs [12], and [2]. The low percentage of moisture content (5.90%) could discourage bacteria and fungi microorganism growth but with a careful caution when water is being used to extract the phytoconstituents.

The phytochemical constituents revealed both the primary and secondary metabolites present in the plant (Table 2). It is observed that the ethylacetate extract of *P. thonningii* contain a few class of constituents with noticeable constituents mainly non-polar based metabolites and there was a numerous secondary metabolite in 70% methanol and the aqueous extracts which includes; alkaloid, tannins, triterpenes, saponin, carbohydrates, flavonoid and anthroquinones but cardiac glycosides was absent in the three extracts (Table 2). This confirms the potency of the plant as a good source of anti-bacterial, anti-malarial and other pharmacological activities that have been reported [9],[8], and [1].

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pharmacological activities that have been reported [9],[8], and [1].

Also the chemo-microscopy of the powdered leaves reveal the presence of calcium carbonate, calcium oxalate crystal; starch grain, cellulose, cutins, aleurone grain, inulin and mucilage which could be attributed to its potentials as pharmaceutical agents with the aim of assisting in proper identification, purity and quality in other to avoid adulteration[4],[6].

CONCLUSION

The study confirmed the potency of *piliostigmathonningii* as a good source of natural remedy in the treatment of various diseases. The ethnobotanical usages should be explored by the Nigerian herbal medicine practitioners for onwards development and processing into standardized official commercialization and for further scientific findings of the purity, isolation and safety.

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