Available online at www.pelagiaresearchlibrary.com

Pelagia Research Library

Asian Journal of Plant Science and Research, 2013, 3(6):69-73

ISSN : 2249-7412
CODEN (USA): AJPSKY

Comparative studies of phytochemical screening of *Ficus sycomorus* linn stem bark extract and *Piliostigma thonningii* roots extract

Bello Oluwasesan M., Zack Agbendeh M. and Adikwu Jacob G.

Department of Applied Chemistry, Federal University, Dutsin-Ma, Katsina State

---

ABSTRACT

Plants and its components have application in traditional medicine because of the myriad uses they have been subjected to. The ease of application is based on the secondary metabolites this plant contains. Present study deals with the qualitative analysis of Aqueous, Chloroform, Ethyl acetate, Methanolic and N-Hexane extracts of stem bark of Ficus sycomorus Linn and extract of roots of Piliostigma thonningii. These were extracted by cold percolation method using organic solvents such as Aqueous, Chloroform, Ethyl acetate, Methanol and Hexane. The methanol extract of stem bark of ficus sycomorus reveal alkaloids, flavonoids, glycosides, reducing sugars, resins, saponnins and tannins. The F.sycomorus is known as "Baure or Bore" and P. thonningii is known as" Kargo or kalgo" both in Hausa, they are small trees or shrub which have many uses as they are used in traditional medicine, and modern medical research has found that they have many beneficial properties.

Keywords: *Ficus sycomorus, Piliostigma thonningii*, qualitative analysis, Baure, Kargo

---

INTRODUCTION

Medicinal herbs were used to treat wounds and inflammations during the history of many civilizations. In Egypt (1,500 years B.C.), the papyrus "Ebers" related 800 remedies based on 150 plants. In India (600 years B.C.), the text "Susruta-samhita" described 700 medicinal plants which was quiet helpful for natural product chemists. Dioscorides in Greece (1st Century) wrote the "Materia Medica", which is considered as a precursor to all modern pharmacopeias and it gave the knowledge about herbs and remedies used by the Greeks, Romans, and other cultures in the antiquity [11]. Nowadays, the herbal medicines are still widely used in conventional as well as alternative medical practices in developed and developing countries as a complementary medicine [6]. Plants have been used as a source of inspiration in the development of novel drug. Phytochemicals, chemical compounds that occur naturally in plants are responsible for color and organoleptic properties, such as the deep purple of blueberries and smell of garlic. Phytochemicals'studies have attracted the attention of plant scientists due to the development of new and sophisticated techniques. These techniques played a significant role in giving the solution to systematic problems on the one hand and in the search for additional resources of raw materials for pharmaceutical industry on the other hand. Plant synthesizes a wide variety of chemical compounds, which can be sorted by their chemical class, biosynthetic origin and functional groups into primary & secondary metabolites. Knowledge of the chemical constituents of plants is desirable, not only for the discovery of therapeutic agents, but also because such information be of value in disclosing new resources of such chemical substances. [12]

Piliostigma thonningii schum (Fig 2 shows Leaves of *P. thionningii*) is an underexplored leguminous plant that belongs to the family of *caesalpiniacea*, a family that comprises of trees, shrubs or very rarely scramblers, distributed in Africa and Asia in open woodlands and savannah regions that are moist as well as wooded grasslands in low to medium altitudes [13] and [9]. The fruit is hairy, hard and flattish pod, which turns rusty brown, woody, twisted and splits at ripening and usually persistent on the tree between June and September [5, 6]. *P. thionningii* has been reported in literature to have age-long folkloric use in traditional medicine, especially in the treatment of malaria fever, wounds, ulcers, gastric/heart pain, gingivitis and as an antipyretic. According to the traditional healers

in Doila, this plant is called child remedy as it is mainly used as a remedy for children except its use against arthritis, headache, hemorrhoids and backache [1, 5].

Ficus sycomorus L (Moraceae) is believed to be one of such medicinal plants that need to be thoroughly evaluated in terms of its active and pharmacological constituents. It is a tropical and sub tropical plant species. It is known and called in Hausa as "Baure or Bore". It is a tree attaining up to a height of 20meters and sometimes reaching 6 meters in, growth with widely spreading branches (Fig 1 shows Leaves of *F.sycomorus*) and a massive crown. Sheep and cattle eat its young foliage [7]. Fruits of this plant are mixed ration for cows in order to increase milk flow (14). The dried fruits of this plant are taken orally by adult human beings in Venda (Cyprus) for the management of tuberculosis [2]. In addition, it was reported that, hot water extract from the dried stem bark of this plant is orally taken by adult human beings in treatment of diarrhea in Zaria, (Nigeria), which is one of its numerous antibacterial activities. They are also used as astringents and diuretics as reported [8].

Fig 1: Leaves of *F. sycomorus*

Fig 2: **Leaves of *P.thonningii* tree**

MATERIALS AND METHODS

Plant Materials

Fresh stem-bark of *F. sycomorus* and root-bark of *P.thoninngii* were collected from the outskirt of Mashi town in Mashi Local Government area of Katsina State, Nigeria. These plants were identified by Prof. B. S. Aliyu of the Biological Science Department, Bayero University, Kano, Nigeria, where the voucher numbers of the plants were submitted.

Preparation of Extracts

The stem-bark of *F. sycomorus* and root of *P. thoninngii* were air-dried and pounded into fine powder. The powder of these plants (200 g) were percolated with 750 ml of methanol at room temperature for two weeks, then filtered. Maceration of the concentrates were carried out using different solvents in other of their polarity, starting with N-Hexane, then Chloroform, Ethyl acetate, Methanol while ending with Water.

Chemicals and drugs

All the chemicals and solvents were standard and of analytical grade.

Phytochemical Screening

The fractions of various solvents of the stem-bark of *F. sycomorus and* root of *P.thonningii* were subjected to preliminary phytochemical screening, to identify the secondary metabolites present. The methods of analysis employed were those described by Brian and Turner (1975).

Alkaloids:

A quantity (3 ml) of concentrated extract was taken into a test tube and 1 ml HCl was added the mixture was heated gently for 20 min cooled and filter, the filtrate was used for following test.

a) Wagner test: Filtrate was treated with Wagner's reagent; formation of brown reddish precipitate indicates presence of alkaloids.

b) Hager's test: Filtrate was treated with Hager's reagent, presence of alkaloids confirmed by the yellow colored precipitate.

Cardial Glycosides:

Keller-Killani Test: Plant extract treated with 2 ml glacial acetic acid containing a drop of $FeCl_3$. A brown colour ring indicates the presence of positive test.

Flavonoids:

Shinoda test: The presence of flavonoids was estimated by Shinoda. The extracts were treated with few drops of concentrated HCl and magnesium ribbon. The appearance of pink or tomato red colour within few minutes indicated the presence of flavonoids (Somolenski et al., 1972).

Alkaline reagent test: The extracts were treated with few drops of diluted sodium hydroxide (NaOH) separately. Formation of intense yellow color which turned colorless on addition of few drops of diluted HCl indicated presence of flavonoids.

Reducing Sugars:

5ml of the extracts was diluted with distlled water. Fehling solutions A&B was added and the mixture warmed. The brick red precipitate at the bottom of the test tube indicates reducing sugars.

Resins:

10ml of extracts was obtained in a test-tube, the same amount of cupper acetate solution was added and the mixture was shaken vigorously and allowed to separate, a green colour indicates the presence of resin. [14]

Saponin:

5 ml extract was mixed with 20 ml of distilled water then agitated in graduated cylinder for 15 min formation of foam indicates Saponin.

Steroid:

1ml extract was dissolved in 10 ml of chloroform & equal volume of concentrated H_2SO_4 acid was added from the side of test tube .The upper layer turns red and H2SO4 layer showed yellow with green fluorescence .This indicates the presence of steroid.

Tannin:
2ml extract was added to 1% lead acetate a yellowish precipitate indicates the presence of tannins.

Table 1: Physical Characteristics of the Various Fractions stem bark of *F.sycomorus* and root bark of *P.thoninngii*

Plant Samples	Solvents	Texture	Colour
Ficus sycomorus	N-Hexane	Solid	Violet-red
	Chloroform	Solid	Violet-red
	Ethylacetate	Solid	Deep-red
	Methanol	Solid	Deep-red
	Water	Solid	Reddish
Piliostigma thoninngii	N-Hexane	Hard	Dark green
	Chloroform	Hard	Dark green
	Ethylacetate	Hard	Green
	Methanol	Hard	Green
	Water	Hard	Pale green

Table 2: Phytochemical Analysis of Stem bark extract of *Ficus sycomorus* Linn

S/N	SECONDARY METABOLITES	A.S.E	C.S.E	E.S.E	M.S.E	H.S.E
1	ALKALOIDS					
	a. Wagner's reagent	+	+	+	+	-
	b. Hager's reagent	+	+	+	+	-
2	FLAVONOID					
	a. Alkaline reagent test	+	+	+	+	+
	b. NH_4OH test	+	+	+	+	+
3	REDUCING SUGAR					
	a. Fehling Solution A&B	+	+	-	+	-
4	TANNINS					
	a. Lead Acetate test	+	-	+	+	+
	b. $FeCl_3$	+	-	+	+	+
5	CARDIAC GLYCOSIDES	-	+	-	-	+
6	SAPONINS	+	+	+	+	+
7	STEROIDS	-	-	-	-	-
8	RESINS	-	-	+	-	-

A.S.E.-Aqueous Stem bark Extract, C.S.E.-Chloroform Stem bark Extract, E.S.E.-Ethylacetate Stem bark Extract, H.S.E- He xane Stem bark Extract, M.S.E- Methanol Stem bark Extract
Note: (+) = Present, (-) = Absent

Table 3: Phytochemical Analysis of Root extract of *Piliostigma thonningii* Linn

S/N	SECONDARY METABOLITES	A.R.E	C.R.E	E.R.E	M.R.E	H.R.E
1	ALKALOIDS					
	a. Wagner's reagent	+	-	+	+	+
	b. Hager's reagent	+	-	+	+	+
2	FLAVONOID					
	a. Alkaline reagent test	+	+	-	+	-
	b. NH_4OH test	+	+	-	+	-
3	REDUCING SUGAR	NT	NT	NT	NT	NT
	a. Fehling Solution A&B					
4	TANNINS					
	a. Lead Acetate test	+	+	-	+	-
	b. $FeCl_3$	+	+	-	+	-
5	CARDIAC GLYCOSIDES	-	+	+	+	+
6	SAPONINS	+	+	-	+	-
7	STEROIDS	-	-	-	-	-
8	RESINS	-	+	-	-	-

A.R.E.-Aqueous Root Extract, C.R.E.-Chloroform Root Extract, E.R.E.-Ethyl acetate Root Extract, H.R.E-Hexane Root Extract, M.R.E- Methanol Root Extract
Note: (+) = Present, (-) = Absent, NT- Not tested.

RESULTS AND DISCUSSION

Table 2 shows the result of Phytochemical screening of *Ficus sycomorus* Linn. Preliminary Phytochemical investigation of the Aqueous, Chloroform, Ethylacetate, Methanol and Hexane extracts of the stem bark of the plant *Ficus sycomorus* Linn were compared. Flavonoids and Saponins were present in all the solvents' extracts whereas Alkaloid was evident in Aqueous, Chloroform, Ethyl acetate and Methanol extracts of the stem bark of the plant. It also shows that Tannins were present in Ethyl acetate, Methanol and Hexane soluble extracts only, Reducing sugar was absent in Ethyl acetate and Hexane extracts of the stem bark of the plant, Cardiac Glycosides were evident in

Chloroform and Hexane extracts whereas Resins could only be found in Ethyl acetate extract of the stem bark of *Ficus sycomorus* Linn. Steroids were absent in all the compared extracts of the plants.

Table 3 shows the result of Phytochemical screening of extract of root of *Piliostigma thonningii* Linn. Preliminary Phytochemical investigation of Aqueous, Chloroform, Ethyl acetate, Methanol and Hexane extracts of the root bark of the plant *P.thonnongii* were compared. Reducing sugars were not tested for; Alkaloids were present in all the solvents' extracts compared except in the Chloroform root extract of *P.thonningi whic*h it is evidently absent. Cardiac Glycosides were present in all the solvents' extracts compared except in Aqueous root bark of the plant which it is glaringly absent. Tannins, Saponins and Flavonoids were present in all the compared solvents' extracts but absent in Ethyl acetate and methanol extracts of *P. thonningi.* Resins were observed only in Chloroform extract of the plant's root but Steroid was evidently absent in all the compared Solvents' extracts of *P. thonningi's* root.

Present study deals with qualitative analysis of Stem bark of *F.sycomorus* and root extracts of *P. thonningi Linn*, On the basis of these data researcher can easily isolate particular metabolite from the stem bark and root extracts quantitatively.

CONCLUSION

It is concluded that in the present study, Aqueous and Chloroform extracts of both plants' parts contain more number of phytochemicals than the remaining extracts whereas the Hexane extract shows least number of the phytochemicals.

REFERENCES

[1] Ajali U., *Chemistry of Biocompounds.* 1st Edition, Rhyce Kerex Publishers, Enugu, Nigeria. **2002**, Pp 60-178
[2] Arnold H.J and Gulumian M. (1984); *Journal of Ethno Pharmacol*; 12 (1): 35 – 44
[3] Bha Haram V.A., Ceraefe M., Kowest C., Vest M. and Deundorf H., *Journal of Physiology Pharmacol*; **2002,** Vol 9 No I: Pp 36.
[4] Brian K.R. and Turner T.D., *Practical Evaluation of Phytochemicals.* Wright Scentechnical, Bristol, UK, **1975;** Pp. 57-59.
[5] Burkil H.M., The useful plants of West Tropical Africa. 2 Edn., Royal Botanic Garden Kew, **1995;** Pp. 146-149.
[6] Calixto J.B., Otuki M.F., Santos A.R., *Planta Medica*, **2003;** 69, 973–983, pMID: 14735432.
[7] Datziel J.M., The *Useful Plants of West Tropical Africa. Crown Agent for Over sea Government and Administration,* Mill Bank London, **1953;** Pp. 199.
[8] Evans C.W. and Trease O.C., *Pharmacognosy*, 14th Edition. W.B Sannaders Company Ltd. London; **1996;** Pp 268 – 270.
[9] Jimoh F.O., and Oladiji A.T., *Afr. J. Biotechnol*., **2005;** Vol 4:1439-1442.
[10] Mann J., Murder, Magic, and Medicine. Oxford University Press,.**2003** London
[11] Mojab F., Kamalinejad M., Ghaderi N., Hamid Roza vahidipour, *Iranian Journal of Pharmaceutical Research.* **1994;** 2(**2**) 77-82.
[12] Simpson D., and Cassells P., *Latin Dictionary*. Casell Ltd., **1999;** London.
[13] Wa H.J.M and Brayer–Brandwijk M.G.,*The Medicinal and Poisonous Plants of Southern and Eastern Africa*, 2nd Ed. E and S Livingstone Ltd. London. **1962;** Pp 252 – 253.
[14] Rajaram S. S. and Ashvin G. G., *Asian Journal of Plant Science and Research*, **2013**, 3(1):21-25
[15] Karthika S., Ravishankar M., Mariajancyrani J.and Chandramohan G., Asian *Journal of Plant Science and Research*, **2013**, 3(4):63-69