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Int J Pharm Bio Sci 2014 Jan; 5(1): (P) 355 - 359

Research Article **Medicinal Chemistry**

International Journal of Pharma and Bio Sciences **ISSN 0975-6299**

PHYTOCHEMICAL ANALYSIS OF LEAVES OF TECTONA GRANDIS LINN.

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ABSTRACT

Tectona grandis Linn belongs to the family Verbenaceae. The plants Tectona grandis Linn Commonly known as 'Teak' is a large to very large deciduous tree, 20-35 m in height with light brown bark. Present study deals with the phytochemical properties which have been carried out on the leaves of Tectona grandis Linn using Acetone, Chloroform, Methanol and Water solvents. Out of four solvents, Chloroform extract contains more number of secondary metabolites whereas Methanolic extract contain least number of secondary metabolites.

KEYWORDS: **Tectona grandis, Phytochemical Screening, Tectona grandis Linn.**

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INTRODUCTION

The nature has provided store house of remedies to cure all ailments of mankind. Plants are valuable sources of a vast array of Chemical compounds they synthesized and accumulated in various parts of plant body[1]. Infections diseases are considered as the second leading cause of death of developing countries and stands thirds in developed countries[2,3]. The uses of traditional medicinal plants for primary health care have steadily increased worldwide in recent years. Traditional plant medicines serve as a source of various types of active principle and WHO estimates 70 % of the World population still relies on the herbal medicines. Out of the total 2, 25,000 species of plants, only less than 10 % have been studied so far for their medicinal uses. The plant under investigation is Tectona grandis which belongs to the family Verbenaceae. The whole plant is medicinally important and many reports claim to cure several diseases according to an Indian traditional system of medicines. The survey reveals that the plant is used in the treatment of Urinary discharge, bronchitis, cold and headache. In scabies, used as a laxative and sedative, as diuretic, anti diabetic, analgesic and anti-inflammatory[4,5,6,7]. In the present study we isolated 19 phytochemicals qualitatively from various extracts.

MATERIALS AND METHODS

Collection of Plant material

The leaves of Tectona grandis were collected from in and around Kalbhiri Temple of Gadhinglaj Tahsil of Kolhapur district of Maharashtra state in the month of Feb 2013.

Identification

The sample was authenticated by R. S. Sawant, Department of Botany, Dr.Ghali College, Gadhinglaj.

Preparation of Test extract

The collected leaves of Tectona grandis Linn were washed and dried under shade. The coarse powder of leaves (100 gm) was soaked separately in 500 ml of each of Acetone, Chloroform, Methanol and Water and extracted in cold for 3 days with occasional shaking. The extract was filtered and filtrate was dried under shade except water extract, giving the percentage yield as shown in Table no 1. The dried extract was used for qualitative phytochemical Analysis.

Phytochemical Screening

Phytochemical test were carried out Adopting standards procedure[8,9,10].

Phytochemical tests

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 .result gives two layers, Upper layer shows red whereas lower layer yellow with green fluorescence, indicates positive test.

Tannin4 ml of Extract was react with FeCl3 solution gives green colour, indicates Positive test.

Saponin

20 ml of distilled water was added to 5 ml extract and shake well wait for 15 min, foam formation indicates positive test.

Anthocyanin

2 ml of aqueous extract is added to 2 ml of 2N HCl & NH_3, the appearance of pink red turns blue violet indicates presence of Anthocyanin.

Coumarin

3 ml of 10% NaOH was added to 2 ml of aqueous extract formation of yellow colour indicates coumarins.

Emodins

2 ml of NH_4OH and 3 ml of benzene was added to extract appearance of red colour indicates presence of emodins.

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: - 1ml of the extract was treated with Wagner's reagent; formation of brown reddish precipitate indicates presence of alkaloids.

b) Hager's test: - 1ml of the extract was treated with Hager's reagent, presence of alkaloids confirmed by the yellow colored precipitate.

Proteins

Xanthoproteic test: Extract was treated with few drops of concentrated HNO_3 formation of yellow indicates the presence of proteins.

Amino acids

Ninhydrin test: To the 2 ml extract 2 ml on ninhydrin reagent was added & boil for few minutes, formation of blue colour indicates the presence of amino acid.

Carbohydrate

Extract were dissolved individually in 5ml of distilled water and filtered. The filtrate was used for the following test.

a) Molisch's Test: - Filtrate were treated with 2 drops of alcoholic α-naphthol solution, formation of violet ring at the junction indicates the presence of carbohydrate.

b) Iodine Test:- 2ml of extract were treated with 5 drops of Iodine solution, gives blue color indicates the positive test

c) Fehling Test: - 2ml of extract were hydrolyzed with dilute HCl and neutralized with alkali & heated with Fehling's solution A and B, formation of red ppt indicates the presence of reducing sugar.

d) Benedict's test: - Filtrate were treated with Benedict's reagent and heated gently, orange red ppt indicates the presence of reducing sugar.

Flavonoid

a) Alkaline reagent test: - Extract was treated with 10 % NaOH solution, formation of intense yellow colour indicates presence of Flavonoid.

b) NH_4OH test: - 3 ml of extract was treated with few drops of 10 % NH_4OH solution development of yellow fluorescence indicates positive test.

c) Mg turning test: - Extract were treated with Mg turning and add conc.HCl to this solution add 5ml of 95 % ethanol, formation of crimson red colour indicates Flavonoid.

d) Zn test: - 2 ml extract were treated with Zn dust and conc.HCl development of red colour indicates presence of Flavonoid.

Diterpenes

Copper acetate test: - Extract were dissolved in water and treated with 10 drops of copper acetate solution, formation of emerald green colour indicates presence of diterpenes.

Phytosterol

Salkowski's test: - Extract was treated with chloroform and filtered. The filtrate was treated with few drops of concentrated H_2SO_4 and shakes, allow standing, appearance of golden red indicates the positive test.

Phenol

Ferric Chloride test: - Test extract were treated with 4 drops of Alcoholic $FeCl_3$ solution. Formation of bluish black colour indicates the presence of Phenol.

Phlobatannins

Deposition of red ppt when aqueous extract of each plant sample is boiled with 1%

Aqueous HCl was taken as evidence for presence of Phlobatannins.

Leucoanthocyanin

5 ml of isoamyl alcohol added to 5 ml of aqueous extract, upper layer appear red in colour indicates the presence of Leuanthocyanin.

Anthraquinone

5ml of Extract was hydrolyzed with dilute H_2SO_4 and then add 1ml of benzene and 1ml of NH_3, formation of Rose Pink coloration suggest Anthraquinone.

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.

Chalcones

2ml of NH4OH was added to 0.5 gm ethanolic extract, appearance of red colour showed the presence of chalcones.

Table No 1

Percentage Yield of leaves of Tectona grandis Linn.

Solvent	% yield
Acetone	4.821
Chloroform	5.843
Methanol	5.563

Table No. 2

Phytochemical Analysis of leaves of Tectona grandis Linn.

Sr.No	Phytochemicals	A.E.	C.E.	M.E.	W.E.
1	Steroids	+	+	+	+
2	Tannin				
	Lead acetate	+	+	-	+
	Ferric chloride	+	+	+	-
3	Saponin	-	+	+	+
4	Anthocyanin	-	+	-	-
5	Coumarins	+	+	-	+
6	Emodins	-	+	+	-
7	Alkaloids				
	Wagner Test	+	+	-	-
	Hager Test	+	+	+	+
8	Proteins Xanthoproteic Test	+	+	-	+
9	Amino acids Ninhydrin Test	-	-	-	+
10	Carbohydrate				
	Molisch's test	+	+	+	-
	Benedict's test	-	+	-	-
	Fehling test	-	+	-	-
	Iodine Test	-	-	-	-
11	Flavonoids				
	Alkaline reagent test	-	+	+	+
	NH_4OH	+	+	+	+
	Mg turning test	+	+	+	-
	Zn Test	-	-	-	-
12	Diterpenes	+	+	+	+
13	Phytosterol Salkowski Test	+	+	+	+
14	Phenols	-	-	-	+
15	Phlobatannin	+	+	+	-
16	Leucoanthocyanin	-	+	-	+
17	Anthraquinone	+	+	-	-
18	Cardial Glycosides Kellar-Killiani Test	+	+	-	+
19	Chalcones	-	-	+	+

+ = Present; - =Absent ; A.E. - Acetone Extract;
C.E. - Chloroform Extract, M.E. - Methanolic Extract; W.E.- Water extract

RESULTS AND DISCUSSION

In the present investigation we isolated 19 secondary metabolites from the leaves extract of Tectona grandis Linn. Namely Steroids, Tannin, Saponin, Anthocyanin, Coumarins, Emodins, Alkaloids, Proteins, Amino Acids, Carbohydrate, Flavonoids, Diterpenes, Physterol, Phenol,

Phlobatannin, Leucoanthocyanin, Anthraquinone, Cardial Glycosides and Chalcones. Sandhya Mittal et.al (2012) also reported Reducing Sugar, Terpenoids, Flavonoid Tannin, and Saponin from Tectona grandis[11]. Nine Phytochemicals from various extracts of the leaves of Tectona grandis has been noted by Krishana et.al [12]. Shruthi DP et.al isolated Saponin, Phenols, Anthraquinone, Steroids, Tannin, Terpenoids and Alkaloids from the Methanolic and Water extract of leaves of Tectona grandis[13].Glycosides, Flavonoids, Tannins, Steroids, Carbohydrate and Saponin were found in the Methanolic and Petroleum extract of Tectona grandis[14]. 15 Secondary metabolites were recorded qualitatively from the Tectona grandis plants[15].

REFERENCES

1. Girija S. and Ravindran R, Screening for qualitative Phytochemical of Gmelina asiatica, Herbal Tech, 8(9):21-22, (2011).
2. WHO. Traditional Medicine Strategy, World Health Organization (2002).
3. Nathan C, Antibiotics at the Crossroads, Nature; 431:899-902, (2004).
4. Singh J, Bhayan TC, Ahmed A, Ethnobotanical Studies on the mishing tribes of Assam with special references to food and Medicinal Plant's. Eco. Tax. Bot. 12:350-356, (1996).
5. Nayeem N, Karvekar MD. Analgesic and Anti-inflammatory activity of the Methanolic extract of frontal leaves of Tectona grandis. Internet. J. Pharmacol. 8 (1) ISSN-1531-2976, (2010).
6. Ghaisas M, Navghare K, Takawale A, Zopev , Tanwar M and Deshpande A. Tectona grandis on dexamethasone induced insulin resistance in mice. J.Ethnopharmacol. 122 suppl 2 : 304-307, (2009).
7. Diallo A, Gbeassor M, Vovor A, Eklu GK, Aklikokou K. Effect of Tectona grandis leaves on phenylhydrazine- induced anemia in rats. Fitotherapy. 79 suppl 5 : 332-336, (2008).
8. Trease GE, Evan WC. Pharmacognosy, Ed 12, English language Book Society, Balliere Tindall, 309-315 and 706-708, (1983).
9. Kokate C.K, Purohit A. P. and Ghokhale S.B. Pharmacognosy, Nirali Prakashan, Pune, India (1997).
10. Hegde Karunkar and Joshi Arun B, Scholars Research Library Der Pharmacia lettre 2(3):255 (2010).
11. Sandhya Mittal, Nidhi Rao, Sudhanshu and Ekta Meghani, Phytochemical Potential of successive series of Tectona grandis L. and Viola Odorata L., International Journal of Pharmaceutical Research and Development, 4:08, 099-102, (2012).
12. Mahesh s. Krishana and Jayakumaran Nair A., Anthraquinone from leaves of *Tectona grandis* : A detail study on its Antibacterial activity and other Biological properties. International Journal of Phytomedicine. 2: 50-58, (2011).
13. Shruthi D.P., Sunith K.E., Harith Kumari E, Govindappa M, and Siddalingeshwara K.G., Phytochemical Screening, Antioxidant and Anti inflammatory activity of different extracts from leaf, Stem and Bark of Tectona grandis. International Journal of Research in Pharmacology and Pharmacotherapeutics, 1(2): 140-146 (2012).
14. Jangame C. M., Burande M. D., Hepatoprotective activity of Methanolic and Petroleum extracts of Tectona grandis against Paracetamol induced Hepatotoxicity, International Journal of Pharma Tech Research 5(1): 249-253 (2013).
15. Kothale K.V., Thoke B.T. and Rothe S.P., Pharmacognostic investigation on some members of Family Verbenaceae, Bionano Frontier. 5 (2-II), 2012.