INTERNATIONAL RESEARCH JOURNAL OF PHARMACY
www.irjponline.com ISSN 2230 – 8407
Research Article

PHYTOCHEMICAL SCREENING OF *ACORUS CALAMUS* AND *LANTANA CAMARA*

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Article Received on: 02/04/12 Revised on: 20/04/12 Approved for publication: 19/05/12

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ABSTRACT
Acorus calamus and *Lantana camara* is an important medicinal plants with several ethnomedicinal properties. In this study plants *Acorus calamus* and *Lantana camara* were screened for the presence of major phytochemical groups. The phytochemicals are the wide variety of compounds produced by plants manipulated wisely in the pharmacognostic drug development and treatment of the major ailments. Phytochemical screening of the plants extracts of *Acorus calamus* and *Lantana camara* showed the presence of glycosides, carbohydrates, phenolic compounds, alkaloids, flavonoids and tannins, saponins, steroids and triterpenoids as major phytochemical groups. *Acorus calamus* tested positive for all the phytochemicals tested and *Lantana camara* tested negative for the presence of protein, amino acid and oil and fats.

KEY WORDS: Phytochemical screening, *Acorus calamus* and *Lantana camara* plants extracts.

INTRODUCTION

Plants and plant-based medicaments are the basis of many of the modern pharmaceuticals we use today for various ailments[1]. Plant-derived substances have recently become of great interest owing to their versatile applications therefore the medicinal value of plants lies in some chemical constituents which produce a definite physiologic action in the human body. The most important of these bioactive constituents of plants are alkaloids, tannins, flavanoids and phenolic compounds[2]. For discovery and development of novel drugs, scientists are looking forward to the alternative sources and in last few decades, medicinal plants have been extensively studied for their bioactive principles to develop new lead molecules for pharmaceutical use therefore aim of the present study be to find out the phytochemical active constituents of plants extracts of *Acorus calamus* and *Lantana camara*.

Acorus calamus (fig.1.1) family Acoraceae is a tall perennial wetland monocot plant with creeping and extensively branched, aromatic rhizome, cylindrical, up to 2.5 cm thick[3]. The leaves are between 0.7 and 1.7 cm wide, with average of 1 cm. Plants are very rarely flower or set fruit, but when they do, the flowers are 3 to 8 cm long, cylindrical in shape, greenish brown and covered in a multitude of rounded spikes. The fruits are small and berry-like, containing few seeds[4]. The scented leaves and rhizomes of sweet flag have been traditionally used as a medicine in Ayurvedic medicinal practice in India, the rhizomes have been used to cure several diseases like fever, asthma and bronchitis, and as a sedative. Native tribes used it to treat a cough, made a decoction as a carminative and as an infusion for cholic[5].

Fig. 1.1 ***Acorus calamus***

Fig. 1.2 ***Lantana camara***

Lantana camara (fig.1.2) family Verbenaceae, an ornamental shrub, spread as an intractable weed in many parts of the India. The plant has curved prickles on its branches, grows to a height of 2–3 m, and spreads its branches to cover an area of about 1-2 m. Matured leaves are rough, cause irritation to the skin when touched, give off an unpleasant odor, and is 5–9 cm long[6]. The flowers are sub umbellate when young. The fruit is a drupe, 0.5 cm in diameter, greenish in early stages and dark blue on ripening. The plant starts flowering in April–May and fruiting continues till Nov–Dec[7]. All parts of this plant have been used traditionally for several ailments throughout the world. The leaves of this plant were used as an antitumeral, antibacterial, and antihypertensive agent[8], roots for the treatment of malaria, rheumatism, and skin rashes[9].

Plant Material And Preparation Of Extracts

Plant *Lantana camara* and *Acorus calamus* were collected from the vanita ropani in the month of august at Bhopal. The collected plant was shaded dried, coarsely powdered separately for extraction. Each of the dried and powdered samples was soxhlet extracted with methanol for 96 hours. The extracts were concentrated using water bath set at 60°C. After that, the respective extracts were weighed and percentage extractive values were determined.

PHYTOCHEMICAL SCREENING

The phytochemical tests were carried out for the above mentioned plants extracts using the standard procedures to identify the components[10].

TESTS FOR ALKALOIDS

Mayer's Test: Alkaloids give cream colour precipitate with Mayer's reagent.(Potassium mercuric iodide solution).

Dragendorf's Test: Alkaloids give reddish brown precipitate with dragendorf's reagent. (Potassium bismuth iodide solution).

Wagner's Test: Alkaloids give reddish brown precipitate with Wagner's reagent. (Solution of Iodine in Potassium Iodide).

TESTS FOR FLAVANOIDS

Shinoda Test (Magnesium hydrochloride reduction test): To the test solution add few fragments of magnesium ribbon and add concentrated hydrochloric acid drop wise, pink

scarlet, crimson red or occasionally green to blue colour appears after few minutes.

Alkaline Reagent Test: To the test solution add few drops of sodium hydroxide solution, formation of an intense yellow colour which turns to colourless by the addition of few drops of dilute acetic acid indicate the presence of flavonoids.

Ferric Chloride Test: To the test solution, add few drops of ferric chloride solution, intense green colour was formed.

TEST FOR PHENOLIC COMPOUNDS

Ferric Chloride Test: To the test solution and add few drops of neutral 5% ferric chloride solution. A dark green colour indicates the presence of phenolic compounds.

Lead Acetate Test: To the test solution and add few drops of 10% lead acetate solution. White Precipitate indicates the presence of phenolic compounds.

Gelatin Test: To the test solution and add few drops of 10% Gelatin solution. White Precipitate indicates the presence of phenolic compounds.

TEST FOR TANNINS

Ferric Chloride Test: To the test solution, few drops of ferric chloride test reagent were added. An intense green, purple, blue or black colour developed was taken as an evidence for the presence of tannins.

Lead Acetate Test: To the test solution , a few drops of 10% lead acetate were added. Precipitate was formed, indicate the presence of tannins.

TEST FOR GLYCOSIDES

Keller Killiani Test (Cardiac glycosides): To 0.5g of plant extract, add 0.4 ml of glacial acetic acid containing a trace amount of ferric chloride. Transfer to a small test tube; add carefully 0.5 ml of concentrated sulphuric acid along the sides of the test tube, blue colour appears in the acetic acid layer, indicate the presence of cardiac glycosides.

Borntrager's Test (Anthraquinone Glycosides): 0.5 g of the plant extract was shaken with benzene and organic layer got separated and half of its own volume of 10% ammonia solution added. A pink, red or violet coloration in the ammonical phase indicated the presence of anthraquinone glycosides.

TESTS FOR AMINO ACIDS

Millon's Test: To the test solution, add about 2ml of Millon's reagent (Mercuric nitrate in nitric acid containing traces of nitrous acid), white precipitate appears, which turns red upon gentle heating.

Ninhydrin Test: Amino acids and proteins when boiled with few drops of 5% solution of Ninhydrin, violet colour appears.

TEST FOR PROTEIN

Biuret Test: To the test solution and add 4% NaOH solution and few drops of 1%CuSO4 solution, violet colour appears, indicate the presence of protein.

Millon's Test: To the test solution, add about 2ml of Millon's reagent (Mercuric nitrate in nitric acid containing traces of nitrous acid), white precipitate appears, which turns red upon gentle heating.

TESTS FOR STEROLS AND TRITERPENOIDS

Libermann-Burchard Test: Extract treated with few drops of acetic anhydride, boil and cool, concentrated sulphuric acid is added along the side of test tube, shows brown ring at the junction of two layers and the upper layer turns green which shows the presence of sterols and formation of deep red colour indicate the presence of triterpenoids.

Salkowski's Test: Treat extract in chloroform with few drops of concentrated sulphuric acid, shaken well and allow to stand for some time, red colour appears in the lower layer indicate the presence of sterols and formation of yellow coloured lower layer indicate the presence of triterpenoids.

TESTS FOR CARBOHYDRATES

Molisch's Test: Treat the 1ml of test solution with few drops of alcoholic α-napthol. Add 0.2 ml of concentrated sulphuric acid slowly along the sides of test tube, purple to violet colour ring appears at the junction.

Fehling's Test: Equal volume of Fehling's A (Copper sulphate in distilled water) and Fehling's B (Potassium tartarate and Sodium hydroxide in distilled water) reagents are mixed and few drops of sample is added and boiled, a brick red precipitate of cuprous oxide forms, if reducing sugars are present.

TEST FOR OILS AND FATS

A small quantity of the extract was pressed in between the two filter papers. Oil stain on the filter papers indicates the presence of oils and fats.

TEST FOR SAPONINS

Froth Test: A pinch of the dried powdered plant was added to 2-3 ml of distilled water. The mixture was shaken vigorously. Formation of foam indicates the presence of saponin.

TEST FOR ORGANIC ACIDS

Oxalic Acid: To the test solution and few drops of 1% $KMnO_4$ and dilute H_2SO_4, colour disappears.

Malic Acid: To the test solution added 2-3 drops of 40% $FeCl_3$ solution, appears yellowish colour.

TEST FOR INORGANIC ACIDS

Sulphate Test: To the test solution and add lead acetate reagent, white precipitate appears which is soluble in NaOH.

Carbonate Test: To the test solution and add dilute HCl solution, liberate CO_2 gas. Indicate the presence of carbonate.

RESULT

Methanolic plants extract of *Acorus calamus* and *Lantana camara* showed the presence of glycosides, carbohydrates, phenolic compounds, saponins, alkaloids, flavonoids, tannins, saponins, steroids and triterpenoids as major phytochemical groups and *Lantana camara* tested negative for the presence of protein, amino acid and oil and fats and test for organic oxalic acid are positive although test for malic acid negative for both plants extracts. On the other hands test for inorganic sulphate are present in plant extract of *Acorus calamus* (Table 1)

Table 1: Phytochemical constituents of *Acorus calamus* and *Lantana camara* plants

S.No.	Phytoconstituents	*Acorus calamus*	*Lantana camara*
1.	**Alkaloids**		
	a. Mayer's test	+	+
	b. Dragendore's test	+	+
	c. Wagner's test	+	+
2.	**Flavonoids**		
	a. Shinoda test	+	+
	b. Alkaline reagent	+	+
	c. $FeCl_3$ test	+	+
3.	**Phenolic compounds**		
	a. Lead acetate test	+	+
	b. $FeCl_3$ test	+	+
	c. Gelatin test	+	+
4.	**Tannins**		
	a. Lead acetate test	+	+
	b. $FeCl_3$ test	+	+
5.	**Glycosides**		
	a. Borntrager's test	+	+
	b. Keller-killiani test	+	+
6.	**Amino acid**		
	a. Millons test	+	–
	b. Ninhydrin test	+	–
7.	**Protein**		
	a. Biuret test	+	–
	b. Millons test	+	–
8.	**Steroids and Terpenoids**		
	a. Libermann test	+	+
	b. Salkowskis test	+	+
9.	**Carbohydrates**		
	a. Molisch's test	+	+
	b.Fehling test (reducing sugar)	+	+
10.	**Oil and fat**	+	–
11.	**Saponins**		
	a. Frothing test	+	+
12.	**Organic acids**		
	a.Oxalic acid	+	+
	b. malic acid	–	–
13.	**Inorganic acids**		
	a. Sulphate	+	–
	b. Carbonate	–	–

Key: + = Present and - =Absent

DISCUSSION

Phytochemical screening of the plants revealed some differences in the constituents of the two plants tested. *Acorus calamus* tested positive for all the phytochemicals tested. *Lantana camara* showed the absence of protein, amino acid, oil and fats. The presence of alkaloids in plants extract may be participating in plant metabolism sequences and the presences of terpinoids may be show cytotoxic activity against a wide range of organisms, ranging from bacteria and fungi. Saponins are the glycoside of triterpenes or steroids and include the group of cardiac glycosides and steroidal alkaloids therefore saponins may be used in traditional medicine as anti-infecting agents. Furthermore the presence of flavonoids and tannins in the plants is probable to be responsible for the free radical scavenging effects. Flavonoids and tannins are phenolic compounds and plant phenolics are a major group of compounds that act as primary antioxidants or free radical scavengers. These phytochemical compounds are the key candidates in the medicinal value of the plant.This data can also help us to choose the superior race of this valuable plant with greater quantity of medically and therapeutically important phytochemicals.

ACKNOWLEDGEMENT

The authors express gratitude Prof. Dr. Jyoti saxena, Department of chemistry Sarojini Naidu Government Girls Post Graduate (Autonomous) College and CMBT laboratory Bhopal, for her kind support.

REFERENCES

1. Abraham Z. Glimpses of Indian Ethno botany. Oxford & Publishing Co., New Delhi, 1981; 308-320.
2. Hill AF. Economic botany a text book of useful plants and plant products. 2nd edn. Mcgraw-Hill book company Inc, NY. 1952.
3. Balakumbahan R, Rajamani K, Kumanan K. *Acorus calamus*: An overview. Jour Med Plants Res. 2010; 4: 2740-2745.
4. Singh R, Sharma PK, Malviya R. Pharmacological Properties and Ayurvedic Value of Indian Buch Plant (*Acorus calamus*): A Short Review. Advan Biol Res. 2011; 5: 145-154.
5. Asha DS, Deepak G. (2009). Antimicrobial activity of *Acorus calamus* (L.) rhizome and leaf extract. Acta Biol. Szegediensis. 2009; 53: 45-49.
6. Thamotharan G, Sekar G, Ganesh T, Saikat sen, Raja chakraborty, Senthil kumar N. Anti- Ulcerogenic effect of *Lantana camara* Linn. Leaves on in vivo test models in Rats: Asian Jour Pharma Clinical Res. 2010; 3: 57-60.
7. Sharma OP, Sharma SA. Review of the Hepatotoxic Plant *Lantana camara*,Critical Reviews in Toxicology. 2007.
8. Taoubi K, Fauvel MT, Gley J, Moulis C. Phenylepropanoid glycosides from *Lantana camara* and Lippia multoflora. Planta Med Res. 1997; 63: 192-193.
9. Chharba SC, Mahunnah RLA, Mshiu EN, (1998). Plants used in traditional medicine in eastern Tanzania. Jour Ethnopharma Res. 1998; 39: 83-103.
10. Kokate CK. A text book of Practical Phaarmalognosy. Vallabh Prakashan 5th edn. 2005; 107-111.

Source of support: Nil, Conflict of interest: None Declared