Academic Sciences

International Journal of Current Pharmaceutical Research

ISSN- 0975-7066 Vol 4, Issue 1, 2012

Research Article

PRELIMINARY PHYTOCHEMICAL SCREENING OF *AILANTHUS EXCELSA* ROXB.

SHASHANK BHATT, DR. SURESH DHYANI

Department of Biotechnology, NIMS University, Jaipur, Rajasthan, India. Email: shashank_bhatt2003@yahoo.co.in

Received: 04 December 2011, Revised and Accepted: 24 December 2011

ABSTRACT

The present paper shows the therapeutic importance of *Ailanthus excelsa* Roxb. and features of the medicinal character. The plant leaf compounds were extracted with petroleum ether, chloroform, 95% ethanol, and distilled water for 18 hours and found different medicinal compounds as glycosides, saponins, phenol, lignin, and tannins were presented.

Keywords: *Ailanthus excelsa* Roxb., Glycosides, Saponin.

INTRODUCTION

Plants have an almost limitless ability to synthesize substances mainly secondary metabolites, of which at least 12,000 have been isolated, a number estimated to be less than 10 % of the total. In many cases, these substances serve as the molecules of plant defense against predation by microorganism, insects and herbivores. Further, some of which may involve in plant odour (terpenoids), pigmentation (tannins and quinines), and flavour (capsacin). However, several of these molecules possess medicinal properties. *Ailanthus excelsa* Roxb. (Simaroubaceae) is commonly known as Mahanimba. *Ailanthus* is a genus of trees belonging to the family of Simaroubaceae, The genus is native from east Asia south to northern Australasia. It's Hindi name is maharuk *Ailanthus excelsa* Roxb. is a fast growing tree and is extensively cultivated in many parts of India in the vicinity of villages. It is cultivated as an avenue tree for its deep shade and can be used for ant-erosion purposes. (Anonymous, 1956). *Ailanthus excelsa* is a large deciduous tree, 18-25 m tall; trunk straight, 60-80 cm in diameter; bark, light grey and smooth, becomes grey-brown and rough on large trees, aromatic, slightly bitter. Leaves alternate, pinnately compound, large, 30-60 cm or more in length; leaflets 8-14 or more pairs, long stalked, ovate or broadly lance shaped from very unequal base, 6-10 cm long, 3-5 cm wide, often curved, long pointed, hairy gland; edges coarsely toothed and often lobed. *Ailanthus excelsa* is really a plant of haven [Dinesh kumar et. al.]. They are fast-growing trees growing to 25–45 m tall, with spreading branches and large (40–100 cm). The small yellow to greenish flowers are borne on branched panicles. They turn reddish later and eventually brown. They stay on the tree for a long time. The fruit is a samara drawn out into a long wing with the seed in the middle. The wood is fine grained and satiny. *Ailanthus excelsa* has the antibacterial activity against different types of bacterial strains [Meenakshi Shrimali et. al.]. The stem of *Ailanthus excelsa* Roxb. (Simaroubaceae) may develop vascular occlusions and gum-resin cavities in the xylem as a response to injury and infection. In recent years it has been isolated for the first time from this plant (J. J. SHAH and A. M. BABU). They have paid attention, showing promising antitumor, antiviral, antimalarial, antileukemic and antifeedant properties. (Polonsky, 1985). The bark has been used in Asian and Australian medicine to counteract worms, excessive vaginal discharge, malaria and asthma. (Kirtikar and Basu, 2003; Chevallier, 1996).

MATERIAL AND METHODS

Preliminary screening of Secondary Metabolites

The leaves were dried in the shaded area and powdered using mixer grinder, and subjected to soxhlet extraction with petroleum ether, chloroform, 95% ethanol, and distilled water for 18 hours in the order of increasing polarity of solvents. The condensed extracts were used for preliminary screening of phytochemicals such as alkaloids (Iodine,Wagner and Dragendorff's tests), flavonoids (Pew's,Shinoda and NaOH tests), glycosides (Keller-Kiliani, conc. H_2SO_4 ,and Molish tests), Lignins (Labat and Lignin tests), phenols (ellagic acid and phenol tests), saponins (foam and haemolysis tests), sterols (Liberman-Burchard, and Salkowski tests), tannins (gelatin test) were carried out.

Preliminary screening of phytochemicals Test

Phytochemical Screening

The extract obtained was subjected to Preliminary Phytochemical screening.

Test for Alkaloids

Iodine Test: Mix 3 ml test solution and few drops of dilute iodine solution. Blue colour appears; it disappears on boiling and reappears on cooling [6].

Wagner's Test: To 2-3 ml extract with few drops Wagner's reagent. Formation of reddish brown precipitate indicates the presence of alkaloids [9].

Dragendorff's Tests: To 2-3 ml extract, add few drops Dragendorff's reagent Formation of orange brown precipitate indicates the presence of alkaloids [9].

Test for Flavonoids

Pew's Tests: To 2-3 ml extract, added zinc powder in a test tube, followed by dropwise addition of concentrate HCl. Formation of

purple red or cherry colour indicates the presence of flavonoids [11].

Shinoda Tests:- To 2-3 ml extract, few fragments of magnesium metal were added in a test tube, followed by dropwise addition of concentrate HCl. Formation of magenta colour indicated the presence of flavonoids [9].

NaOH Tests: To 2-3 ml of extract, few drops of sodium hydroxide solution were added in a test tube. Formation of intense yellow colour that became colourless on addition of few drops of dilute HCl indicated the presence of flavonoids [6].

Test for Glycosides

Keller-Kiliani Test: To 2 ml extract, add glacial acetic acid, one drop 5% $FeCl_3$ and conc. H_2SO_4. Reddish brown color appears at junction of the two liquid layers and upper layer appears bluish green indicates the presence of glycosides [9].

Concentrate H_2SO_4 Test: To 5ml extract, add 2ml glacial acetic acid, one drop 5% $FeCl_3$ and conc. H_2SO_4. Brown ring appears indicates the presence of glycosides [6].

Molisch's Test: To 1 ml of extract, 2 drops of Molisch's regent was added in a test tube and 2 ml of concentrate H_2SO_4 was added carefully keeping the test tube slightly curved. Formation of violet ring at the junction indicated the presence of glycosides [9].

Test for Lignins

Labat test: The test solution was mixed with gallic acid; it developed olive green colour indicating the positive reaction for lignins [4].

Lignin test: Formation of red colour, when 2% (w/v) furfuraldehyde was added to the test solution indicated the presence of lignin [4].

Test for Phenols

Ellagic Acid Test: The test solution was treated with few drops of 5% (w/v) glacial acetic acid and 5% (w/v) $NaNO_2$ solution. The solution turned muddy or niger brown precipitate occurred in the extract indicated the presence of phenols [4].

Phenol Tests: When 0.5 ml of $FeCl_3$ (w/v) solution was added to 2 ml of test solution, formation of an intense colour indicated the presence of phenols [4].

Test for saponins

Foam Test: The extract was diluted with 20 ml of distilled water and it was shaken in a graduated cylinder for 15 minutes. A 1 cm. layer of foam indicated the presence of saponins [9].

Haemolysis Tests:- Add leaves extract to one drop of blood placed on glass slide. Hemolytic zone appears [8].

Test for Sterols

Liebermann-Burchard Test: Mix 2ml extract with chloroform. Add 1-2 ml acetic anhydride and 2 drops concentrated H_2SO_4 from the side of the test tube. First red, then blue and finally green colour indicated the presence of sterols [9].

Salkowski Tests: To 2 ml of extract, add 2ml chloroform and 2 ml concentrated H_2SO_4 and was shaken well. Chloroform layer appeared red and acid layer showed greenish yellow fluorescence indicated the presence of sterols [9].

Test for Tannins

Gelatin Test: To the extract, gelatin (Gelatin dissolves in warm water immediately) solution was added. Formation of white precipitate indicated the presence of tannins [13].

RESULT AND DISCUSSION

The shade dried plant leaves were powdered and subjected to soxhlet extraction with petroleum ether, chloroform, 95% ethanol, and distilled water for 18 hours in the order of increasing polarity of solvents. The results of the phytochemical screening of leaves extract of *Ailanthus excelsa* Roxb. were presented in Table-1. Different types of secondary metabolites such as glycosides, phenol, lignin, saponins and tannins were presented while alkaloids, flavonoids and sterols were not present in *Ailanthus excelsa* Roxb. These compounds are known to have curative activity against several pathogens and therefore can be suggested for the treatment of different diseases.

Table 1:

Test	Petroleum Ether	Chloroform	95% Ethanol	Distilled Water
Alkaloids				
Iodine Test	-ve	-ve	- ve	- ve
Wagner's Test	- ve	- ve	- ve	- ve
Dragendorff Test	- ve	- ve	- ve	- ve
Hanger's Test	- ve	- ve	- ve	- ve
Flavonoids				
Pew's Test	- ve	- ve	- ve	- ve
Shinoda Test	- ve	- ve	- ve	- ve
NaOH Test	- ve	- ve	- ve	- ve
Glycosides				
Glycosides Test	- ve	+ ve	+ ve	- ve
Keller Killani Test	+ ve	+ ve	+ ve	- ve
Conc. H_2SO_4	+ ve	+ ve	+ ve	- ve
Molisch's Test	+ ve	+ ve	+ ve	- ve
Phenol				
Ellagic Test	- ve	- ve	+ ve	- ve
Phenol Test	- ve	- ve	+ ve	- ve
Lignin				
Lignin Test	+ ve	+ ve	+ ve	- ve
Labat Test	+ ve	+ ve	+ ve	- ve
Saponins				
Foam Test	- ve	- ve	+ ve	- ve
Haemolysis Test	- ve	- ve	+ ve	- ve
Sterols				
Liberman- Burchard Test	- ve	- ve	- ve	- ve
Salkowski Test	- ve	- ve	- ve	- ve
Tannins				
Gelatin Test	- ve	- ve	+ ve	- ve
Lead Acetate Test	- ve	- ve	+ ve	- ve

CONCLUSION

Some plant leaves are very useful for treatment of different types of disease such as Diabetes. It is a good source of drug for human health. Quantitative analysis of the phytochemicals of these plants leaves and also the antifungal and antimicrobial activities should be investigated.

ACKNOWLEDGEMENT

Praying and dedicating my research article to Maa Saraswati, the goddess of knowledge & wisdom. I find no words to express my deepest gratitude to my parents, Mr. Krishna Kumar Bhatt and Mrs. Subhadra Bhatt whose encouragement helped me in going ahead on this bright path. I share the credit of my work to respectable elder brother Mr. Mayank Bhatt who very often guided me to work.

The research work would have been a dream, had it not been enlightened, by my well wishers and the above respectables. Last but not least the Almightly God is unforgettable without whose kindness and grace, nothing could have happened.

REFERENCES

1. Anonymous, 1956. The Wealth of India: Raw Materials. Council of Industrial and Scientific Research, New Delhi.
2. Chevallier, A. 1996 *The Encyclopedia of Medicinal Plants*, Dorling Kindersley, London.
3. Dinesh Kumar, Z.A. Bhat, P. Singh, M.Y. Shah and S.S. Bhujbal, (2010) *Ailanthus excelsa* is really a plant of heaven. *International Journal of Pharmacology*: 6: 535-550.
4. Gibbs R.D., (1974) Chemotaxonomy of Flowering Plants. Vol.1, *McGill Queen's University Press*, Montreal and London.
5. J. J. Shah and A. M. Babu (1986) Vascular Occlusions in the Stem of *Ailanthus excelsa* Roxb. *Ann Bot 57 (5): 603-611.*
6. Khandewal K.R., (2008) Practical Pharmacognocy. *Nirali Prakashan*, Pune, edition: 19.
7. Kirtikar, K.R. and B.D. Basu, 1995. Indian Medicinal Plants. Vol. 1, International Book Distributors, Dehradun, India, pp: 371-372.
8. Kokate C.K., (1994) Practical Pharmacognosy, 4th ed., *Vallabh Prakasan, Delhi,* 107-111.
9. Kokate C K, Purohit A P and Gokhale SB. (2001) Carbohydrate and derived Products, drugs containing glycosides, drugs containing tannins, lipids and protein alkaloids. *Text book of Pharmacognosy*, 7, edition: 133 -166, 167- 254, 255-2 69, 272-310, 428-52 3.
10. Meenakshi Shrimali , Jain DC, Darokar MP, Sharma RP, (2001) Antibacterial activity of *Ailanthus excelsa* (Roxb.) *Phytotherapy Research* Volume 15, Issue 2, pages 165–166,
11. Peach K., Tracey MV. (1956) Modern methods of plant analysis. Vol. 3, *Springer Verlag, Berlin*.
12. Polonsky, J., 1985. Quassinoid bitter principle-II. Fortschr. Chem. Org. Naturst., 47: 221-264.
13. Treare GE, Evans WC. (1985) Pharmacognosy 17th edn., *Bahiv Tinal, London.* P 149.