ISSN: 0976-3031

Available Online at http://www.recentscientific.com

CODEN: IJRSFP (USA)

International Journal of Recent Scientific Research
Vol. 8, Issue, 6, pp. 17443-17446, June, 2017

International Journal of Recent Scientific Research

DOI: 10.24327/IJRSR

Research Article

QUALITATIVE PHYTOCHEMICAL ANALYSIS OF LEAF EXTRACTS OF *SESBANIA CANNABINA*

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DOI: http://dx.doi.org/10.24327/ijrsr.2017.0806.0355

ARTICLE INFO

Article History:

Received 17th March, 2017
Received in revised form 21st April, 2017
Accepted 05th May, 2017
Published online 28th June, 2017

Key Words:

Sesbania cannabina, Leaves, Fabaceae, Phytochemical, Secondary metabolites and Extract.

ABSTRACT

Medicinal plants have played an important role since ancient times in treating various kinds of diseases. Increased drug resistance and side effects of pharmaceutical drugs have led to more research based study on traditionally available plants. *Sesbania cannabina* is widely used as traditional medicine and food by different tribes and communities in India and in neighboring countries. The present study analyses the qualitative phytochemical constituents of different solvent extracts of *Sesbania cannabina* leaves. The extracts of *Sesbania cannabina* leaves were prepared by using petroleum ether, ethyl acetate and methanol. The qualitative analysis of phytochemicals comprises carbohydrates, proteins, aminoacids, tannins, glycosides, alkaloids, triterpenes and flavonoids. The study revealed that the *Sesbania cannabina* leaf extracts contains various bioactive compounds and thus suggests their use in the treatment of various ailments.

INTRODUCTION

Various plants have been used for many years in daily life to treat disease in all over the world. Plants produce a diverse range of bioactive molecules, making them a rich source of different types of medicines. Natural products provide crucial, unmatched chemical diversity to modern drug discovery programs. Natural products play an important role in drug development programs in the pharmaceutical (Baker *et al,* 1995). The role of traditional medicines in the solution of health problems is invaluable on a global level. Medicinal plants continue to provide valuable therapeutic agents, both in modern and traditional medicine (Krentz and Bailey, 2005). With the associated side effects of the modern medicine, traditional medicines are gaining importance and are now being studied to find the scientific basis of their therapeutic actions (Gupta and Briyal, 2004).

The evaluation of all the drugs is based on phytochemical and pharmacological approaches which leads to the drug discovery referred as natural product screening (Foye *et al*, 2008). Any part of the plant may contain active components such as bark, leaves, flowers, roots, fruits and seeds (Gordon and David, 2001). The therapeutic value of plants lies in some phytochemical constituents present in it that may be useful for healing of human diseases (Pradeepa *et al*., 2014). Phytochemicals are primary and secondary metabolites, which are naturally occurring in the leaves, vegetables, and roots that have defense mechanism and protect from various diseases. Primary metabolites are proteins, carbohydrates, chlorophyll, lipids and common sugars, which are synthesized during photosynthesis, and these organic compounds are essential for plant life, growth and development (Wadood *et al*, 2013). Secondary metabolites are tannins, flavonoids, phenolics, saponins and alkaloids, which are synthesized by the plant during development and are time, tissue and organ specific (Linga rao and Vijayvergia, 2012). The phytochemical analysis of the plants is very important commercially and has great interest in pharmaceutical companies for the production of the new drugs for curing of various diseases.

Sesbania cannabina is a multipurpose leguminous crop and is widely adaptable to various adverse climatic conditions. It belongs to family Fabaceae and is commonly used as a green manure crop. *Sesbania cannabina* is an annual shrub and can fix atmospheric nitrogen due to presence of root nodules (Srivastava, 2014).

Sesbania cannabina is commonly called canicha, danchi, dunchi fibre, prickly sesban, prickysisham, sesbania pea (English), sesbane (French), canicha, danchi, dhaincha (Hindi),

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sanô (Tibetan), mrindazia, msalia-Nyuma (Swahili), sano-khangkhok (Thai) (Anita *et al*, 2009).

Classification

Kingdom - Plantae
Subkingdom - Tracheobionta
Super division - Spermatophyta
Division - Magnoliophyta
Class - Magnoliopsida
Subclass - Rosidae
Order- Fabales
Family - Fabaceae
Genus -Sesbania Scop
Species - *Sesbania cannabina* Poir

Figure 1 *Sesbania cannabina*

The leaves of *Sesbania cannabina* have aperient, diuretic, emetic, emmenagogue, febrifuge, laxative, and tonic properties and can be used to cure dysentery, eyes, fevers, headaches, small pox, sores, sore throat, and stomatitis (Duke and Wain,1981). The astringent bark was used in treating small pox and other eruptive fevers. The juice of *Sesbania cannabina* flowers is also effective for treatment of headache, head congestion, or stuffy nose. Leaves are chewed to disinfect the mouth and throat (Singh *et al*, 1980). Leaves are also considered good for eyes and it is a common believe that regular use of it as a vegetable improves eyesight and prevent eye diseases. The natives also use it for anaemic patients. According to the healers, as medicine, this vegetable is good for patients suffering from dysmenorrhoea (Srivastava, 2014). The flowers and young leaves of *Sesbania cannabina* are edible and are often used as a vegetable to supplement meals. Tender pods may also be eaten as string beans. The dried leaves of *Sesbania cannabina* are used in some countries as a tea.

MATERIALS AND METHODS

Collection of plant material: The leaves of plant were collected from Bhopal, Madhya Pradesh, India. The plant was identified and authenticated by Dr.Zia Ul Hasan, Professor & Head -Department of Botany, Safia college of Science, Bhopal.

Preparation of plant extracts*:*

The leaves of *Sesbania cannabina* were washed, dried in shade, coarsely powdered in a grinder, weighed and then kept in a closed jar. The successive extraction of the samples from non polar to polar solvents was done by using three different types of solvents such as petroleum ether, ethyl acetate, methanol using standard technique of maceration. The leaves were kept in Petroleum ether for 2 days, and 7 days each in ethyl acetate and methanol, with occasional shaking/ stirring. The extracts thus obtained were evaporated to dryness at room temperature and stored in a sterile air tight container. The concentrated mass obtained, i.e. the crude extract for the three solvents was weighed and kept in a refrigerator for further experimental procedure.

Qualitative Phytochemical Analysis: Detailed phytochemical testing was performed to identify presence or absence of different phytoconstituents. The color intensity or the precipitate formation was used as analytical responses to these tests. Following standard procedures were used (Kokate *et al*, 2006)

Tests for Alkaloids

To the extract, dilute hydrochloric acid was added, shake it well and filtered. With the filtrate, the following tests were performed.

Mayer's Test: To 2-3 ml of filtrate, few drops of Mayer's reagent were added along sides of tube. Formation of white or creamy precipitate indicates the presence of alkaloids.

Hager's Test: To 1-2 ml of filtrate, few drops of Hager's reagent were added in a test tube. Formation of yellow color precipitate indicates the presence of alkaloids.

Wagner's Test: To 1-2 ml of filtrate, few drops of Wagner's reagent were added in a test tube. Formation of reddish brown precipitate indicates the presence of alkaloids.

Tests for Carbohydrates

Molish Test: 2 ml of aqueous extract was treated with 2 drops of alcoholic α-naphthol solution in a test tube and then 1 ml of concentrated sulphuric acid was added carefully along the sides of the test tube. Formation of violet ring at the junction indicate the presence of carbohydrates.

Tests for Reducing sugar's

Fehling's Test: To 1 ml of aqueous extract, 1 ml of Fehling's A and 1 ml of Fehling's B solutions were added in a test tube and heated in the water bath for 10 minutes. Formation of red precipitate indicates the presence of reducing sugar.

Benedict's Test: Equal volume of Benedict's reagent and extract were mixed in a test tube and heated in the water bath for 5-10 minutes. Solution appears green, yellow or red depending on the amount of reducing sugar present in the test solution which indicated the presence of reducing sugar.

Tests for Flavonoids

Alkaline Reagent Test: The extract was treated with few drops of sodium hydroxide separately in a test tube. Formation of intense yellow color, which becomes color less on addition of few drops of dilute acid, indicate presence of flavonoids.

Shinoda test: To the extract, 5 ml (95%) of ethanol was added. The mixture was treated with few fragments of magnesium turning, followed by drop wise addition of concentrated

hydrochloric acid. Formation of pink color indicate presence of flavonoids.

Lead Acetate Test: The extract was treated with few drops of lead acetate solution. Formation of yellow precipitate may indicate the presence of flavonoids.

Tests for Glycosides:

Legal's Test: 1 ml of test solution was dissolved in pyridine. 1 ml of sodium nitropruside solution was added and made alkaline using 10% sodium hydroxide solution. Formation of pink to blood red color indicates the presence of Cardiac glycosides.

Keller-Killiani Test: To 2 ml of test solution, 3 ml of glacial acetic acid and 1 drop of 5% ferric chloride were added in a test tube. Add carefully 0.5 ml of concentrated sulphuric acid by the side of the test tube. Formation of blue color in the acetic acid layer indicates the presence of Cardiac glycosides.

Tests for Tannin and Phenolic compounds

Ferric Chloride Test: Some amount of extract was dissolved in distilled water. To this solution 2 ml of 5% ferric chloride solution was added. Formation of blue, green or violet color indicates presence of phenolic compounds.

Lead Acetate Test: Some amount of extract was dissolved in distilled water. To this solution few drops of lead acetate solution was added. Formation of white precipitate indicates presence of phenolic compounds.

Dilute Iodine Solution test: To 2-3 ml of extract, few drops of dilute iodine solution were added. Formation of transient red color indicates presence of phenolic compounds.

Tests for Saponins

Froth Test: The extract was diluted with distilled water and shaken in graduated cylinder for 15 minutes. The formation of layer of foam indicates the presence of saponins.

Tests for Triterpenoids and Steroids

Salkowski's Test: The extract was treated with chloroform and filtered. The filtrate was added with few drops of concentrated sulphuric acid, shaken and allowed to stand. If the lower layers turns red, sterol are present. Presence of golden yellow layer at bottom indicates the presence of triterpenes.

Libermann-Burchard's Test: The extract was treated with chloroform. To this solution few drops of acetic anhydride were added, boiled and cooled. Concentrated sulphuric acid was added through the sides of the test tube. Formation of brown ring at the junction of two layers, if upper layer turned green, indicate presence of steroids and formation of deep red color indicate presence of triterpenoids.

Tests for Protein and Amino acids

Biuret's Test: The extract was treated with 1 ml of 10% sodium hydroxide solution in a test tube and heated. A drop of 0.7% copper sulphate solution was added to the above mixture. The formation of violet or pink colour indicates the presence of proteins.

Ninhydrin Test: 3 ml of the test solution was heated with 3 drops of 5% Ninhydrin solution in a water bath for 10 minutes. Formation of blue colour indicates the presence of amino acids.

RESULTS AND DISCUSSION

Results obtained for qualitative screening of phytochemicals in *Sesbania cannabina* leaves are presented in table 1. The plant showed the presence and absence of various kinds of phytoconstituents. Among all the phytoconstituents present in the plant extracts Saponins, Carbohydrates, Triterpenoids and Steroids were found to be the most common one. Glycosides, alkaloids and proteins were absent in all the plant extracts except the methanolic extract of *Sesbania cannabina* (Table 1). The phytochemical analysis of methanolic extract revealed the presence of alkaloids, carbohydrates, reducing sugars, proteins, saponins, glycosides, tannins, triterpenes and flavonoids, which have various medicinal properties. The test also revealed that the methanol extract have higher contents of the phytochemicals. Preliminary phytochemical screening on medicinal plant is important in the detection of bioactive principles which is a new source of therapeutically and industrially valuable compounds that may lead to drugs discovery and development (Singh *et al*, 2015). Extraction is the vital step to extract the desired chemical components from the plant materials using polar and non-polar solvents (Tanwer and Vijayvergia, 2010). The factors affecting the choice of solvent are; quantity of phytochemicals to be extracted, rate of extraction, diversity of different compounds extracted, diversity of inhibitory compounds extracted, ease of subsequent handling of the extracts, toxicity of the solvent in the bioassay

Table 1 Phytochemical analysis of different solvent extracts of *Sesbania cannabina* leaves

S. No.	Experiment	Result		
		Petroleum ether	Ethyl acetate	Methanol
1. Alkaloids				
1.1	Mayer's reagent test	-	-	-
1.2	Hager's reagent test	-	-	+
1.3	Wagner's reagent test	-	-	+
2. Carbohydrates				
2.1	Molish's test	+	+	+
3. Test for Reducing Sugar's				
3.1	Fehling's test	+	+	+
3.2	Benedict's test	+	+	+
4. Flavonoids				
4.1	Alkaline reagent test	+	+	+
4.2	Shinoda test	-	+	+
4.3	Lead acetate test	+	-	+
5. Glycoside				
5.1	Legal's test	-	-	+
5.2	Killer- Killiani test	-	-	-
6. Tannin and Phenolic compound				
6.1	Ferric chloride test	-	-	+
6.2	Lead Acetate test	-	+	-
6.3	Dilute Iodine solution	-	-	-
7. Saponin				
7.1	Foam Test	+	+	+
8. Test for Triterpenoids and Steroids				
8.1	Salwonski Test	+	+	+
8.2	Libberman and Burchard's test	+	+	+
9. Test for Proteins and Amino acids				
9.1	Biuret's Test	-	-	+
9.2	Ninhydrin Test	-	-	+

(+) Present (-) Not detected

process, potential health hazard of the extractant (Tiwari *et al*., 2011). The logic in using different solvents when screening for phytochemicals in plant materials was clearly validated in this study.

CONCLUSION

The present study revealed that the extracts of *Sesbania cannabina* leaves contains many important phytochemical constituents such as carbohydrates, proteins, glycosides, flavonoids, tannins, phenols, saponins, carbohydrates, triterpines and alkaloids can be taken for the further study investigating pharmacological activities such as antibacterial, antitumour, antiviral, anti-inflammatory, neuroprotective, antioxidant, hepatoprotective, immunomodulatory and antidiabetic, urinary anti-infectives and to isolate the active compounds and develop effective drugs. In the present study conclude that the *Sesbania cannabina* leaves have the potential to act as a source of useful drugs because of presence of various phytochemical constituents such as alkaloids, flavonoids, phenol, terpenoids, saponin and carbohydrates. These phyto constituents seemed to be the potential to act as a source of useful drugs and also to improve the health status of the consumers as a result of the presence of various compounds that are vital role for good health. Further studies are needed to isolate the bioactive compounds that could be used to formulate new and more potent drugs of natural origin. Hence, this study may be useful to explore the pharmacological and biosynthetic activity of *Sesbania cannabina* further.

References

Anita, D.D., Sridhar, K.R., Bhat R. (2009). Diversity of fungi associated with mangrove legume *Sesbania bispinosa* (Jacq.) W. Wight (Fabaceae). Livestock Research for Rural Development, 21(5):67

Baker, J. T., Borris, R. P., Carte Cordell, B. G. A., Soejarto, D. D., Cragg, G. M., Gupta, M. P., Iwu, M. M., Madulid, D. R., Tyler, V. E. (1995). Natural products drug discovery and department: New perspective on internal collaboration. *Journal of Natural Products*, 58:1325-1357.

Duke, J.A. and Wain, K.K. (1981).Medicinal plants of the world. Computer index with more than 85,000 entries, 3.

Foye, W.O., Lemke, T.L. and Williams, D.A. (2008). Foye's Principles of Medicinal Chemistry. 6th Ed Lippincott Williams and Wilkins. Philadelphiap, 44-45.

Gordon, M.C., and David, J.N. (2001). Natural product drug discovery in the next millennium. *Pharmaceutical Biology*, 39(1): 8-17.

Gupta, Y. K., and Briyal, S. (2004). Animal models of cerebral ischemia for evaluation of drugs. *Indian Journal of Physiology and Pharmacology,* 48: 379-394.

Kokate C.K., Purohit A.P., and Gokhale S.B. (2006). Pharmacognosy; 23 ed., Nirali prakashan, 493-497.

Krentz, A. J., and Bailey, C. J. (2005). Oral antidiabetic agents: current role in type 2 diabetes mellitus. *Drugs,* 65:385-411.

Linga rao, M., and Vijayvergia, N. (2012). Quantification of primary and secondary metabolites of Svensonia hyderobadensis-a rare medicinal plant. *International Journal of Pharmacy and Pharmaceutical Sciences*, 4:519-521.

Pradeepa, M., Kalidas, V., and Geetha, N. (2014). An In silico approach for the identification of anti-colon cancer phytocompounds from Avena sativa. L. *International Journal of pharma* and bio sciences, 5:543–552.

Singh, R., Muftah, A.M.S., and Belkheir, A. (2015). Antibacterial and antioxidant activities of Mentha piperita L. *Arabian Journal*, 8:322-328.

Singh, R., Sidhu, P.S., Vadhera, S., Sital, J.S., Bhatia, S. (1980). Extra-cellular invertase of *Rhizobium japonicum* and its role in free sugar metabolism in the developing root nodules of *Sesbania cannabania*. Physiologia Plant, 48(4): 504-508.

Srivastava, N. (2014). Taxonomic Characterisation and Economic importance of lesser known Green manure Crop *Sesbania cannabina* Poir. International Research Journal of Biological Sciences, 3(5): 85-88.

Tanwer, B.S.,and Vijayvergia, R. (2010). Phytochemical Evaluation and Quantification of Primary metabolites of Alangium salviifolium. *International Journal of pharma* and bio sciences, 1:1-6

Tiwari, P., Kumar, B., Kaur, M., Kaur, G., and Kaur, H. (2011). Phytochemical screening and Extraction: *A Review. Int. Pharm. Sciencia,* 1: 98-106.

Wadood, A., Ghufran, M., Jamal, S.B., Naeem, M., Khan, A., Ghaffar, R., *et al*. (2013). Phytochemical analysis of medicinal plants occurring in local area of mardan. *Biochemistry* & *Analytical Biochemistry*, 2:1-4.

How to cite this article:

Deepika Jain and Savita Shrivastava.2017, Qualitative Phytochemical Analysis of Leaf Extracts of Sesbania Cannabina. *Int J Recent Sci Res.* 8(6), pp. 17443-17446. DOI: http://dx.doi.org/10.24327/ijrsr.2017.0806.0355

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