Annals of R.S.C.B., ISSN:1583-6258, Vol. 21, Issue 1, 2017, Pages. 18 - 26
Received 24 April 2017; Accepted 20 June 2017.

Phytochemical Screening of Some Medicinal Plants in Rajasthan

Dr. Prem Singh Meena,
Associate Professor
Department of Botany, Government College, Tonk

Abstract

Phytochemicals are highly effective in terms of medicine. There is a constant and urgent need to create new pharmaceutical compounds with novel chemical structures and modes of action due to the worrisome increase in the incidence of new diseases. The qualitative analysis is extremely important for identifying the phytochemical elements present in medicinal plants. Plants have therapeutic value because they contain certain bioactive components. In the current study, the phytoconstituents in the leaf extracts of four different medicinal plants *Casia tora, Solanum nigrum, Cuscuta reflexa, and D. inoxia* were identified. The leaves of four plants were collected from their native environments, washed, and air dried before being crushed. The solvent extracts of the various leaves were produced using the Soxhlet equipment and ethanol. By using the accepted techniques, alkaloids, steroids, flavonoids, saponins, tannins, and terpenoids were qualitatively estimated. The highest total phenolic and flavonoid content were registered by *D.inoxia*

Keywords: Preliminary phytochemical analyses, *Casia tora, Solanum nigrum, Cuscuta reflexa,* and *D. inoxia*

1. INTRODUCTION

Different plant chemicals are extracted by phytochemical screening in order to assess their biological activity or medicinal potential. Plants have medicinal value because they contain certain chemical components that clearly affect the biological system physiologically.[1] Plant-based chemicals have recently received a lot of interest due to their wide range of applications. Medicinal plants are a group of species that possess a wide range of active ingredients that can be utilised to treat various human or animal illnesses. They are the most plentiful source of bio-drugs on earth. Chemical entities and pharmacological intermediaries, modern medications, conventional medical procedures, natural medicines, dietary supplements, and nutraceuticals, as well as counterfeit drugs[2].Alkaloids, carbohydrates, terpenoids, steroids, flavonoids, and tannins are only a few examples of phytochemicals found in medicinal plants that have a certain physiological impact on the human body and are useful for treating and curing human illnesses.[3]

We are well aware of plants' significance. The plant kingdom is a treasure trove of potential

Annals of R.S.C.B., ISSN:1583-6258, Vol. 21, Issue 1, 2017, Pages. 18 - 26
Received 24 April 2017; Accepted 20 June 2017.

medications, and in recent years, there has been a rise in public understanding of the value of medicinal plants. Drugs made from plants are widely available, inexpensive, efficient, and safe, and they seldom ever cause side effects. The most obvious choice for evaluating the current hunt for therapeutically effective novel medications, such as anticancer treatments, is the plants that have been selected for medical use over thousands of years[4],antibacterial medications[5]and antihepatotoxic substances.

The World Health Organization (WHO) states that the best source for a wide range of medications would be medicinal plants. In developed nations, traditional medicines with ingredients derived from medicinal plants are used by about 80% of people. To learn more about these plants' characteristics, security, and effectiveness, however, more research should be done[6]

Secondary metabolites are incredibly diverse chemically and taxonomically and have unknown purposes. They are extensively used in a variety of fields, including human therapy, veterinary care, agriculture, and scientific research[7].It has been demonstrated that several phytochemicals from various chemical classes have inhibitory effects on all varieties of bacteria in vitro[8]

Since the beginning of time, plant products have been used in phytomedicines. Barks, leaves, flowers, roots, fruits, and seeds can all be used to make this[9].The ability to synthesise complex chemical substances will benefit from knowledge of the chemical components of plants [10,11,12]

2. MATERIALS AND METHODS

2.1. Plant sample collection

In Rajasthan, India, the leaves of *Casia tora, Solanum nigrum, Cuscuta reflexa, and D. inoxia* were harvested in good health and transported to the lab. The leaves were rinsed under running water and allowed to air dry at room temperature. In preparation for future research, the dried plant samples were ground into a powder in a blender and stored in airtight plastic bags. According to APG IV classification, every plant underwent botanical authentication..

2.2. Preparation of plant extract

The dry powder was successively extracted in ethanol. 10 g of the dried and powdered plant material was extracted with 160 ml of each ethanol using a Soxhlet apparatus for 6 to 8 hours at a temperature below the boiling point of the solvents. The obtained crude extracts were concentrated using a rotary evaporator at 40° C while under vacuum, filtered using Whatman No. 1 filter paper, and then kept at 4° C for further use.

2.3 Phytochemical analysis

Qualitative phytochemical analysis The extract was tested for the presence of bioactive compounds by using following standard methods [13,14,15].

Annals of R.S.C.B., ISSN:1583-6258, Vol. 21, Issue 1, 2017, Pages. 18 - 26
Received 24 April 2017; Accepted 20 June 2017.

2.3.1 Test for Alkaloids

a. Mayer's test

To a 1 mL of plant sample extract, 2 mL of Mayer's reagent was added along the sides of the test tube. Appearance of white creamy precipitate indicates the presence of alkaloids.

b. Wagner's test

To a 1 mL of plant sample extract, 2 mL of Wagner's reagent was added along the sides of the test tube. A reddish-brown precipitate confirms the test as positive.

c. Hager's test

To a 1 mL of extract, 3 mL of Hager's reagent was added and appearance of yellow precipitate gives positive result.

2.3.2 Testfor Steroids

a. Libermann-Burchard's test

The extract was dissolved in of 2 mL acetic anhydride. To this, 1 or 2 drops of concentrated sulphuric acid was added slowly along the sides of the test tube. An array of colour change shows the presence of steroids.

b. Salkowaski test

1 mL of extract, chloroform and concentrated sulphuric acid was mixed and two layers were formed. Colour change from bluish red to cherry red in chloroform layer and green fluorescence in acid layer gives positive result.

2.3.3 Test for Flavonoids

a. Lead acetate test

1 mL of plant extract was taken and slowly few drops of 10% Lead acetate solution was added. Formation of yellow precipitate gives a positive result.

2.3.4. Test for Glycosides

a. Keller kilani test

1 mL of extract was mixed with acetic acid containing traces of ferric chloride, mixture was then transferred to a test tube containing concentrated sulphuric acid. Colour change from reddish brown to blue at function of two phase gives positive result.

2.4 Quantitative phytochemical analysis

2.4.1 Total phenolic content

The Folin-Ciocalteu reagent method was modified to determine the amount of phenol in the aqueous extract. To 1ml of plant extract, 2.5ml of 10% Folin-Ciocalteu reagent and 2ml of 2% Na2CO3 solution were added. The resulting combination was allowed to sit at room temperature

Annals of R.S.C.B., ISSN:1583-6258, Vol. 21, Issue 1, 2017, Pages. 18 - 26
Received 24 April 2017; Accepted 20 June 2017.

for 15 minutes. At 765 nm, the sample's absorbance was measured. The standard used was gallic acid (1 mg/ml).

There were three copies of each test run. Gallic acid equivalent (mg/g of the isolated chemical) was used to express the results, which were calculated using the standard curve[16].

2.4.2 Total flavonoid content

A modified version of the aluminium chloride colorimetric method was used to calculate the flavonoid concentration. 5.6 ml of distilled water, 0.6 ml of methanol, 0.2 ml of 10% aluminium chloride, 0.2 ml of 1M potassium acetate, and 1 ml of sample plant extract were combined with 1 ml of the extract and left at room temperature for 30 minutes. At 420nm, the absorbance was measured. The standard utilised was 1 mg/ml of quercetin.

There were three copies of each test run. The standard curve was used to calculate the flavonoid concentration, which was then represented as quercetin equivalent (mg/g of the isolated molecule)[16].

3. RESULTS

The pharmacological effects of these all plants are due to the presence of bioactive chemical constituents. *D.inoxia* contained all tested constituents as shown in Table.1

The highest total phenolic and flavonoid content were registered by *D.inoxia*69.25 mg/gm and 35.12 mg/gm.

Following table shows the results of qualitative analysis of different medicinal plants.

Table :1 Preliminary phytochemical analysis

Tests	**Plant Extracts**			
	Casia tora	***Solanum nigrum***	***Cuscuta reflexa***	***D.inoxia***
(A) Alkaloids				
1. Wagner's test	-ve	+ve	+ve	+ve
2. Mayer's test	-ve	-ve	+ve	+ve
3. Hager's test	-ve	-ve	+ve	+ve
(B) Steroids				
1. Libermann burchard test	+ve	-ve	+ve	+ve
2. Salkowaski test	+ve	+ve	+ve	+ve
(C) Flavonoids				

Annals of R.S.C.B., ISSN:1583-6258, Vol. 21, Issue 1, 2017, Pages. 18 - 26
Received 24 April 2017; Accepted 20 June 2017.

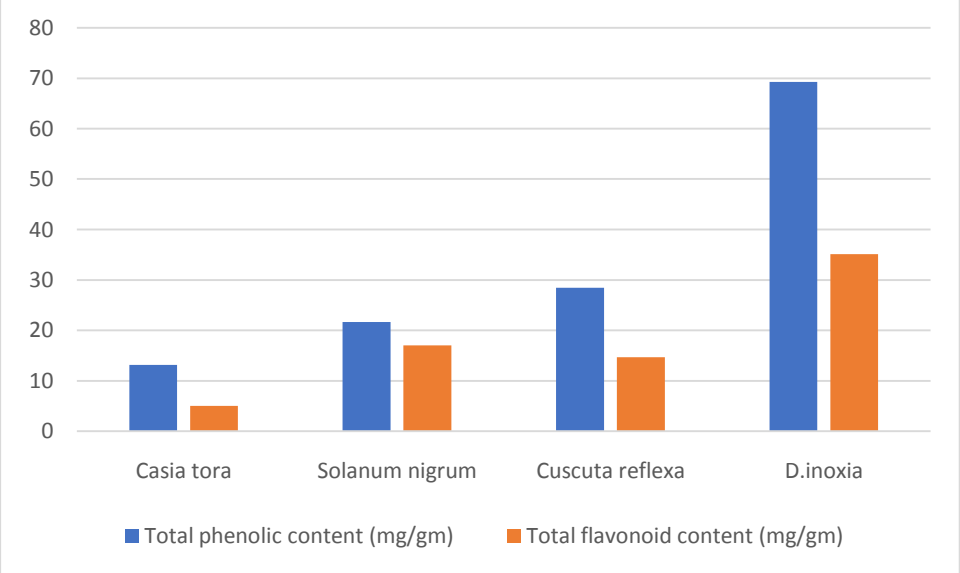
1. Lead acetate test	-ve	-ve	+ve	+ve
(D) Glycosides				
1. Keller kilani test	+ve	-ve	-ve	+ve

Where; + Positive, - Negative

Table :2 Quantitative estimation of phenolic and flavonoid content

Plant sample	Total phenolic content (mg/gm)	Total flavonoid content (mg/gm)
Casia tora	13.15	5.04
Solanum nigrum	21.65	17.01
Cuscuta reflexa	28.45	14.65
D.inoxia	69.25	35.12

Graph 1 Estimation of phenolic and flavonoid content



4. DISCUSSION

The preliminary phytochemical analysis of the four medicinal plants used in this study revealed that they all possess the phytochemicals that make up them and that these phytochemicals have a variety of significant biological functions. Alkaloids have pharmacological actions such as antibacterial[17], antiarrhythmic, analgesic [18], and antihyperglycemic [19] actions, according to reports. Alpha-glucosidase activity [20], antioxidant activity [21], and anti-inflammatory activity [22] were all known properties of flavonoids.

Due to the presence of the aforementioned biologically significant phytochemicals that the current

Annals of R.S.C.B., ISSN:1583-6258, Vol. 21, Issue 1, 2017, Pages. 18 - 26
Received 24 April 2017; Accepted 20 June 2017.

study was able to identify in the leaves *Casia tora, Solanum nigrum, Cuscuta reflexa,* and *D. inoxia* these research findings clearly support the medicinal use of these plants.

One of the most significant and common families of plant metabolites is the phenolic compounds[23]. They have biological characteristics including antiapoptosis, antiaging, and anticancer. Improvement of endothelial function, anti-inflammatory, anti-atherosclerotic, cardiovascular protection, and suppression of angiogenesis and cell proliferation activities [24].The antioxidant effects of medicinal plants that are high in phenolic compounds have been discussed in numerous research [25,26]. The primary source of natural antioxidants is plant phenolic compounds such flavonoids, phenolic acids, tocopherols, etc. [27].Tannins attach to proline-rich proteins and prevent the creation of new proteins. Plants are known to produce flavonoids, which are hydroxylated phenolic compounds, in response to microbial infection. Flavonoids have been shown to exhibit antibacterial properties in vitro against a variety of pathogens.

Their capacity to interact with extracellular and soluble proteins as well as the bacterial cell wall is likely what causes them to be active [28] Additionally, they work well as antioxidants and exhibit potent anticancer properties [29,30,31]Additionally, it was discovered that the plant extracts included saponins, which are known to have an anti-inflammatory impact [32]

Red blood cells can be precipitated and coagulated by saponins. Saponins have a number of qualities, including the ability to create foam in aqueous solutions, hemolytic activity, cholesterol-binding abilities, and bitterness [33]Steroids are particularly significant substances, especially in light of their connections to other substances like sex hormones [34] which have been reported to have antibacterial effects [35].

5. Conclusion

The overall findings of the study indicate that all four plants—*Casia tora, Solanum nigrum, Cuscuta reflexa,* and *D. inoxia* possess at least one pharmacologically active component. It is also used to discover a new molecule that can be used as a medicine to cure disease in order to develop therapies that show promise in the treatment of dysfunctional disorders. It is important to conduct more quantitative and chromatographic research on the phytochemical substances found in all plants.

REFERENCES

1. Aslam, F., Khalil-ur-Rehman, M.A., Sarwar, M., 2009. Antibacterial activity of various phytoconstituents of neem. Pak. J. Agri. Sci.,46:3
2. Ncube NS, Afolayan AJ & Okoh AI. Assessment techniques of antimicrobial properties of

natural compounds of plant origin: current methods and future trends. African Journal of Biotechnology 2008; 7(12):1797-1806.

3. Krishnaiah D, Sarbatly R & Bono A. Phytochemical antioxidants for health and medicine: A move towards nature. Biotechnology and Molecular Biology Reviews, 2007; 1:97-104
4. Dewick, P.M. 1996. Tumor inhibition from plants: Tease and Evans.
5. Phillipson, J.D., Wright, C.W. 1996. Plants With Antiprotozoal Activity : Tease and Evans, Pharmacognosy, 14th edn., WB Saunders Company, London, pp. 612.
6. Arunkumar, S., Muthuselvam . 2009. Analysis of phytochemical constituents and antimicrobial activities of aloevera L. against clinical pathogens. World J. Agril. Sc., 5(5): 572-576.
7. Vasu, K., Goud, J.V., Suryam, A., Singara, Chary, M.A. 2009. Biomolecular and phytochemical analyses of three aquatic angiosperms. Afr. J. Microbiol. Res., 3(8):418-421.
8. Cowan, M.M. 1999. Plant products as antimicrobial agents. Clin. Microbiol. Rev. 564-582.
9. Criagg, G.M., David, J.N. 2001. Natural product drug discovery in the next millennium. J. Pharm. Biol., 39: 8-17.
10. Mojab, F., Kamalinejad, M., Ghaderi, N., Vanidipour, H.R. 2003. Phytochemicals screening of some species of Iranian plants. Iran. J. Pharm. Res., 3: 77-82.
11. Parekh, J., Chanda, S. 2007. Antibacterial and phytochemical studies on twelve species of Indian medicinal plants. Afr. J. Biomed. Res., 10: 175-181. [11] Parekh, J., Chanda, S. 2008.
12. Phytochemicals screening of some plants from western region of India. Plant Arch., 8: 657-662.
13. Sofowra, A. 1993. Medicinal Plants And traditional Medicine In Africa. Spectrum Books Ltd., Ibadan, Nigeria, pp. 191-289.
14. Trease, G.E., Evans, W.C. 1989. Pharmacognosy, 11th edn., Bailliere Tindall, London, pp. 45-50.
15. Harborne, J.B. 1973.Phytochemicals Methods. Chapman and Hall Ltd., London, pp. 49-188.
16. Aiyegroro, O.A., Okoh, A.I. 2010. Preliminary phytochemical screening and in vitro antioxidant activities of aqueous extract of Helichrysum longifolium DC. BMC compl. And Alt. Med., 10: 21.
17. The antibacterial, antibiotic-enhancing and antivirulence activities. International Journal Antimicrobial Agents, 2014; 44(5):377-386.
18. Raymond SS, Jahr JS & Pitchford JMW. The essence of Analgesia and Analgesics. Cambridge University Press, 2010: 82-90.
19. Qiu S, Sun H, Zhang AH, Xu HY, Yan GL, Han Y & Wang XJ. Natural alkaloids: basic aspects, biological roles, and future perspectives. Chinese Journal of Natural Medicines, 2014;

12(6):401-406

20. Geng P, Yang Y, Gao Z, Yu Y, Shi Q & Bai G. Combined effect of total alkaloids from Feculae bombycis and natural flavonoids on diabetes. Journal of Pharmacy and Pharmacology, 2007; 59(8):1145-1150.
21. Gil MI, Ferreres F & Tomas-Barberan FA. Effect of post-harvest storage and processing on the antioxidant constituents (flavonoids and vitamin C) of fresh-cut spinach. Journal of Agricultural and Food Chemistry, 1999; 47:2213-2217.
22. Panthong A, Kanjanapothi D, Tuntiwachwuttikul P, Pancharoen O & Reutrakul V. Anti-inflammatory activity of flavonoids. Phytomedicine, 1994; 1:141-144.
23. Sreenivasa Rao VeerankI,"**A Hybrid Cloud and Cluster Computing Paradigm for Life Science Applications**",International Conference on Soft Computing and Intelligent Technologies [ICSCIT– 2021]",ISBN: 978-93-91535-15-5,24 December 2021,sreeni.bi@gmail.com,http://proceeding.conferenceworld.in/ICSCIT2021/44.pdf
24. Singh, R., Singh, S.K., Arora, S. 2007. Evaluation of antioxidant potential of ethyl acetate extract/fractions of Acacia auriculiformis A. Cunn. Fod Chem. Toxicol., 45: 1216-1223.
25. Han, X., Shen, T., Lou, H. 2007. Dietry polyphenols and their biological significance. Int. J. Mol. Sci., : 950-988.
26. Brown, J.E., Rice-Evans, C.A. 1998. Luteolin rich artichoke extract protects low density lipoprotein from oxidation in vitro. Free Radical Res., 29: 247-255.
27. Krings, U., Berger, R.G. 2001. Antioxidant activity of roasted foods. Food Chem., 72: 223-229.
28. Ali, S.S., Kasoju, N., Luthra, A., Singh, A., Sharanabasava, H., Sahuand, A., Bora, U. 2008. Indian medicinal herbs as source of antioxidants. Food Res. Int., 41: 1-15.
29. Nandal, N. Impact of product innovation on the financial performance of the selected organizations: A study in indian context. Psychol. Educ. J. 2021, 58, 5152–5163.
30. Marjorie, C. 1996. Plant products as antimicrobial agents. Clincal Microbiol. Rev., 12: 564-582.
31. Salah, N., Miller, N.J., Pagange, G., Tijburg, L., Bolwell, G.P, Rice, E., Evans, C. 1995. Polyphenolic flavonoids as scavenger of aqueous phase radicals as chai breaking antioxidant. Arc. Biochem. Broph., 2: 339-346.
32. Del-Rio, A., Obdululio, B.G., Casfillo, J., Main, F.G., Ortuno, A. 1997. Uses and properties of citrus flavonoids. J. Agric. Food Chem., 45: 4505-4515.
33. Okwu, D.E. 2004. Phytochemicals and vitamin content of indigenous species of southeastern Nigeria. J.Sustain. Agric. Environ., 6(1): 30-37.
34. Just, M.J., Recio, M.C., Giner, R.M., Cueller, M.U., Manez, S., Billia, A.R., Rios, J.L. 1998.

Antiinflammatory activity of unusual lupine saponins from Bupleurum fruticescens, 64: 404-407.

35. [Sodipo, O.A., Akiniyi, J.A., Ogunbamosu, J.U. 2000. Studies on certain on certain characteristics of extracts of bark of Pansinystalia macruceras (K schemp) picrre Exbeille. Global J. Pure Appl. Sci., 6: 83-87.
36. Raquel, F.E. 2007. Bacterial lipid composition and antimicrobial efficacy of cationic steroid coppounds. Biochemica et Biophysica Acta. 2500-2509.
37. Okwu, D.E. 2001. Evaluation of chemical composition of medicinal plants belonging to Euphorbiaceae. Pak Vet. J., 14: 160-162.