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PRELIMINARY PHYTOCHEMICAL SCREENING OF *ACACIA CAESIA* (L.) WILLD.

DR. C. ARUNA

Lecturer in Botany, Government degree college, Kodur (Rs), Kadapa district, Andhra Pradesh, India.

ABSTRACT

Plant kingdom is a treasure house of potential drugs. The drugs from plants are easily available , less expensive, efficient and without side-effects. Medicinal plants contain some natural products which perform definite physiological action on the human body. These products are called phytochemicals which are synthesized primary or rather secondary metabolism of plants . Secondary metabolites are of major interest because of their biological activities ranges from antimicrobial, antibiotic, insecticidal and hormonal properties which are highly important in pharmacological and pharmaceutical activities. To find out phytochemical constituents in the *Acacia caesia* plant, the plant parts were collected at Mallemadugu dam of chittoor district, Andhra Pradesh. They were shadow dried and extracted with methanol, petroleum ether and water. Phytochemical screening was carried out according to Standard procedures. Phenols, flavonoids, terpenoids, carbohydrates, proteins, reducing sugars, Anthocyanidins, tannins, lignins and indoles were found to be present in the extracts.

KEYWORDS: ***Acacia caesia*, phytochemicals, traditional medicine**

DR. C. ARUNA
Lecturer in Botany, Government degree college, Kodur (Rs), Kadapa district, Andhra pradesh, India.

***Corresponding author**

INTRODUCTION

The use of natural products with therapeutic properties is as ancient as human civilisation and for a long time, minerals, plant and animal products were the main sources of drugs. Several plants are used in various purposes because of their natural drug contents they are used very much in medicine. Complementary and alternative medicine is one of the emerging fields on health care today. Some modern drugs have been deduced from folklore and traditional medicines[1,2]**.** Therefore the safe traditional medicinal plants are investigated to obtain potential chemotherapeutic drugs[3].

Figure 1 Whole plant

Figure 2 Twig with flowers

Figure 3 Flowers

Figure 4 Fruits

Acacia caesia(L.) willd is a prickly straggler distributed near the water hedged areas commonly called Korintha or yerracheeki. It belongs to family Mimosaceae. Leaves, flowers and fruits are part of tree used for therapeutic activity. All parts of the plant are medicinally important in traditional system of medicine like stem juice is administered internally in respiratory troubles[4]. The bark decoction is used as lice killer[5]. Soft beaten bark has cleansing properties and protect the skin against microorganism[6]. Fruit powder is used in skin disease ointments, wounds and burns. It is antidote to snakebite and is used by tribal people[7]. Flowers are used by santal women to treat menstrual disorders[8]. The plant is used to treat tuberculosis, fistula, cough, evil eye and small pox[9]. There is no previous investigations in phytochemical screening of this plant. Hence the present study has been made to investigate the phytochemical screening of the plant *Acacia caesia.*

MATERIALS AND METHODS

Plant materials

Acacia caesia plant parts namely leaves, flowers, fruits and bark was collected and washed with tap water rinsed with distilled water and blotted gently between the folds of

filter paper, chopped into small fragments and shade dried. The dried samples were grounded into powder and stored in polythene containers at room temperature.

Preparation of the extracts

The solvents of varied polarity namely methanol, petroleum ether and water were taken for testing because it is the sequential order of solvents for the extraction of medicinal plant materials. 20g of plant parts powder is dissolved in 200ml of the methanol/petroleum ether/water solvents and kept in the dark for oneday. These extracts are concentrated under reduced pressure to one third volume and used for the detection of 15 components of phytochemical analysis.

Screening Procedure

Phytochemical screening of the species *A. caesia* was done by the standard procedures prescribed by[10,11,12,13 &14,].

1. Test for Alkaloids

2ml of the extract was evaporated to dryness, the residue obtained was digested with 1% HCl. The resulting acidic solution was divided into two parts. To one part Mayers reagent was added. Development of precipitation and turbidity shows the presence of alkaloids and to the second part Wagners reagent was added. Development of yellowish white precipitate shows the presence of alkaloids.

2. Test for Flavonoids

i) Shinoda' s test : 2ml of the extract, few drops of Conc. HCl is added and followed by addition of small pieces of magnesium ribbons. Development of pinkish red colour shows the presence of Flavonoids.

ii) Ferric chloride test : 2 ml of the extract, few drops of Ferric Chloride solution was added. Formation of blackish red colour indicate the presence of Flavonoids. The types of flavonoids are also tested with following reagents as shown in the table1.

Table 1

Colour reactions of Flavonoids with defferent reagents

Flavonoid Compound	REAGENT I 5% NaCl	REAGENT II Conc. H_2SO_4	REAGENT III Sodium amalgam
Dihydro-chalcones	Pale yellow	Pale yellow	No colour change
Flavones	Yellow	Intense yellow to red	Red
Flavonols	Yellow to brown	Intense yellow	Yellow to pale red
Flavonones	Yellow	Yellow	Red

3. Test for Phenolic Compounds

i) Phenols test : 2 ml of the plant extract, 1 or 2 drops of 1% Ferric chloride solution is added. Formation of Intense blue colour indicates the presence of phenols.

ii) Ellagic acid test : 2 ml of the extract was treated with a few drops of 5 % acetic acid and few drops of 5% sodium nitrate solution. If muddy or brown precipitate indicates the presence of Phenols.

4. Test for Terpenoids

Liebermann–burchard's test : 2 ml of the extract is treated with 0.5ml acetic anhydride and 0.5ml of $CHCl_3$ followed by adding 0.5 ml of Conc.H_2SO_4. Formation of reddish voilet colour shows the positive test for terpenoids.

5. Test for Steroids

i) Salkowski test *:* 2 ml of the extract, $CHCl_3$ was added followed by the addition of Conc.H_2SO_4. Formation of red colour shows the positive test for steroidal compounds.

ii) Liebermann's Burchard test : 2 ml of the extract is treated with 0.5 ml $CHCl_3$ followed by adding Conc. H_2SO_4 along the sides of the test tube. Formation of green colour indicates the presence of steroids.

6. Test for Carbohydrates

i) Molisch test : 5 ml of the extract, Alfa Napthal solution (1.0g of alfa napthal was dissolved in 100ml ethanol w/v) was added and conc. H_2SO_4 solution was added gently along the walls of the inclined test tube. Formation of red or violet colour indicates the presence of carbohydrates.

7. Test for Proteins

i) Million's test : 2ml of the extract was boiled by adding the Million's Reagent (Mercuric nitrate in Nitric acid). Formation of white precipitate that gradually turns red upon heating was observed for the presence of proteins.

ii) Pitrowski test : 2 ml of the extract, 2 drops of 0.05% $CuSo_4$ and 2 ml of 10% NaOH was added. Appearance of violet/purple colour is considered as a positive test for Proteins.

8. Test for Reducing Sugars

5 ml of the extract, 5 ml of Benedicts reagent was added. The test tube is incubated in boiling water bath for 10-30 minutes. The development of an orange red precipitate indicates presence of Reducing Sugars.

9. Test for Anthocyanidins:

5 ml of the extract, 5ml of methanolic HCl was added. The Formation of red or purple colour considered as a positive test for Anthocyanidins.

10. Test for Anthraquinones

5 g of the plant powder, 20 ml of Benzene was added and filtered. To the filtrate 5 ml of 10 % NH_4OH solution was added and shaken well. The formation of pink ,red or violet colour in the test tube indicated the presence of Anthraquinones15,16.

11. Test for Saponins

5ml of the plant extract was evaporated to dryness; Tap water is added and shaken vigorously in the graduated cylinder for 15 minutes. Formation of persistent 2 cm honey comb froth was taken as a positive test for Saponins[17].

12. Test for Tannins

i) Gelatin test : The 5ml of the extract was concentrated, residue was dissolved in water and tested with 1% gelatin solution (1g of gelatin dissolved in 10g NaCl w/v solution). Appearance of white precipitate is taken as a positive test for Tannins.

ii) Ferric chloride test : 2 ml of the extract, a few drops of ferric chloride was added. A blackish precipitate indicates the presence of Tannins.

13. Test for Lignins: *i)*

Lignin test : 2ml of the plant extract was tested by adding few drops of conc. HCl and 2% furfuraldehyde. Development of red colour indicates the presence of Lignin.

ii) Labat test : 2ml of the extract was mixed with gallic acid. It develops olive green colour indicates the positive test for Lignins.

14. Test for Indoles:

Enrilich test : 5 ml of the extract, Enrilich reagent (5% dimethyle amino-benzaldehyde) was added. The development of violet colour indicates the presence of indoles.

15. Test for Glycosides

Keller Kilani test : 5 ml of the extract, glacial acetic acid and 2 drops of ferric chloride is added. The contents were transferred to a test tube containing 2ml of Conc. H_2So_4. A reddish brown colour ring was observed at the junction of two layer considered as positive test for Glycosides[18].

RESULTS

In the present investigation, preliminary phytochemical screening has been done in various extracts of *Acacia caesia* leaves, flowers, fruits and bark showed the presence of phytochemical constituents namely flavonoids, phenols, terpenoids, anthocyanidins, carbohydrates, proteins, saponins, tannins, lignins, indoles and the absence of alkaloids, dihydrochalcones, steroids, anthraquinones and glycosides (Table 2)

Table 2
The phytochemical analysis of Acacia caesia plant parts
(Leaves,flowers, fruits and bark)

S.No	Phytochemicals	leaves			Flowers			Fruits			Bark		
		M	PE	W	M	PE	W	M	PE	W	M	PE	W
1.	Alkaloids	-	-	-	-	-	-	-	-	-	-	-	-
2.	Flavonoids	+	+	+	+	+	+	+	+	+	+	+	+
	a)Dihydro chalcones	-	-	-	-	-	-	-	-	-	-	-	-
	b) Flavones	+	-	+	+	-	+	-	+	-	-	-	-
	c) Flavonols	-	-	-	-	-	-	+	-	+	+	-	+
	d) Flavononones	-	+	-	-	+	-	-	-	-	-	+	-
3	Phenols	+	+	+	+	+	+	+	+	+	+	+	+
4	Terpenoids	+	+	-	-	+	+	+	+	+	+	+	-
5	Steroids	-	-	-	-	-	-	-	-	-	-	-	-
6	Carbohydrates	+	-	+	-	-	-	+	+	-	+	+	-
7	Proteins	+	-	+	-	-	-	+	-	+	-	-	-
8	Reducing Sugars	+	+	-	+	+	-	+	+	-	-	-	-
9	Anthocyanidins	-	-	-	+	+	+	+	+	+	-	-	-
10	Anthraquinones	-	-	-	-	-	-	-	-	-	-	-	-
11	Saponins	-	-	-	-	-	+	-	-	-	+	+	+
12	Tannins	-	-	-	-	-	-	-	+	+	-	+	+
13	Lignins	-	-	-	+	-	-	+	-	-	-	-	-
14	Indoles	-	-	-	+	+	-	-	-	-	-	-	-
15	Glycosides	-	-	-	-	-	-	-	-	-	-	-	-

+ = presence: - = Absence: M = Methanol: PE = Petroleum ether: W= Water

DISCUSSION

The plant under study is generally used in the treatment of human disorders caused by microbes. The biological activity of the plant depends upon its chemicals present. Knowledge of the chemical constituents of the plant is desirable because such information will be valuable for synthesis of complex chemical substances[19]. In this connection preliminary screening is important. Among all the secondary metabolites phenols, flavonoids, anthocyanidins and terpenoids are present in all parts. Polyphenolic compounds are commonly found in both edible and inedible plants and they have been reported to have multiple biological effects, including antioxidant activity[20]. Intake of flavonoids may be associated with decreased risk of cancer, cardiovascular and inflammation diseases in humans[21]. Saponins have been found to possess spermicidal, cardiovascular spasmolytic, expectorant, antihistamine, antitussive and show fungicidal activity[22] . Tannins are reported as cytotoxic and antineoplastic acivity[16,22]. The terpenoids have also been shown to decrease blood sugar level in animal studies[23].

CONCLUSION

To conclude the present study we have found that most of the biologically active phytochemicals were present in the methanolic extract of *Acacia caesia* in all plant parts. As the phytochemicals protect human from a host of diseases[24]. The phytochemical screening results can be used for the standardization of the drugs, qualitative, quantitative analysis of the chemicals and to design the drug based on its importance. Exploitation of these pharmacological properties involves further investigation of these active ingredients by implementation techniques of extraction, purification, separation, crystallization and identification. A more research has to be undertaken to explore the wonderful therapeutic properties of the medicines.

REFERENCES

1. R. Mothana, S. Abdo, S. Hasson, F. Althawab, S. Alaghbari, and U. Lindequist, "Antimicrobial, antioxidant and cytotoxic activities and phytochemical screening of some yemeni medicinal plants," Evidence-Based Complementary and Alternative Medicine, 7(3); 323-330, (2010).
2. Al-Zubairi, A. Abdul, S. Wahab, C. Peng, S. Mohan, and M.Elhassan," Eleucineindica possesses antioxidant, antibacterial and cytotoxic properties," Evidence-Based Complementary and Alternative Medicine.
3. I. Bouhlel, H. Mansour, I. Limem, M. Sghaier, A. Mahmoud, and J. Chibani, "Screening of antimutagenicity via antioxidant activity in different extracts from the leaves of Acacia salicina from the centerof Tunisia," Environmental Toxicology and Pharmacology, 23, 56–63,(2007).
4. Sudarshanam, G. Ethnobotanical Survey and Phytopharma Chemical Screening of selected Tirupathi. Medicinal plants of Chittoor District, A.P. (Thesis). Dept. of Botany, S.V.University, (1987).
5. Narayana Rao, and Thammann, Medicinal plants of Tirumala. Published by TTD, Tirupathi,(1990).
6. Guhabaksha, D.N., Sensarma, P., Pal, D.C. A Lexican of medicinal plants in India.(Vol I), published by Naya Prakash, 206, Bidhan sarami, Calcutta, 700006, India, (1999).
7. Bharat kumar, R. Ethnobotanical studies of Sriharikota Island. (Thesis), Dept. of Botany, S.V.University, Tirupathi, (2000).
8. Pullaiah. Encyclopedia of world Medicinal plants. I. : 7, (2006).
9. Dukes, A. (2008). Phytochemical and Ethnobotanical Databases. Green Farmacy garden, 8210, Murphy road, Fulton M.D, 20759, (2008).
10. Amarasingham, P.P., Bisset, N.G., Millard, P.H and Woods, M.C. Phytochemical survey of Malaya part III. Alkaloids and Saponins. J. Economic Taxonomic Botany, 18: 270-278, (1964).
11. Bhattacharjee, S.K. (1956). Hand Book of Medicinal plants. Shashi Jan Printers, Jaipur. 2000.
12. Das, A.K. and Bhattacharjee, A.K. A systematic approach to phytochemical screening. *J. Tropical science*, XII, 54-58, (1970)
13. Gibbs, R.D. Chemotaxonomy of flowering plants. I, (1974) MC Gill Queens University press, Montreal and London.
14. Harborne, J.B., Turner, B.L. Plant chemosystematics. Academic press, London. : 61-62, (1984).
15. Wall, M.E., Krider, M.M., Krewson, C.F., Eddy, C.R., Willaman, J.J., Corell, D.S. and Gentry. Steroidal Sapogenesis- vii. Survey of plants for teroidal sapogenesis and other constituents. *J.Am. Pharm.Assoc.Sci*.Edn.43:1-7, (1954).
16. Fransworth, N.R. Biological and phytochemical screening of plants. *Journal of pharmaceutical sciences.* 55: 225-276, (1966).
17. Cambie,, R.C., Cain, B.F. and La Roche, S. A New Zealand phytochemical Survey II the dicotyledons.. *New Zealand Journal of science*, 4: 604-663 (1961).
18. Kokate, C.K., Purohit, A.P. and Gokhale, S.B. Pharmacognosy, Vol 1-2, (1999), Nirali publishers, Pune.
19. Mojab,F., Kamalinejad,M., Ghaderi,N. and Vandipour, H.R. Phytochemical screening of some species of Iranian plants. Iran J. Pharm; Res.3; 77-82, (2003).
20. Ka¨hko¨nen, M. P., Hopia, A. I., Vuorela, H. J., Rauha, J.-P., Pihlaja, K., Kujala, T. S., et al. Antioxidant activity of plant extracts containing phenolic compounds. Journal of the Agricultural and Food Chemistry. 47, 3954–3962. . (1999).
21. Haytowitz, D.B., Eldridge, A.L., Bhagwat, S., Gebhard, S. E., Holden, J.M., Beacher, C.R., Peterson, J. and Dwyer, J. Flavonoid content of vegetables. HNRC on Aging and Tufts University, Schools of Medicine and Nutrition, Boston, MA, USDA., (2000).

22. Nigam, S.K. and Misra, G. Phytochemistry: basic principles in relation to ethnobotany. In S.K.Jain (Ed.), Methods and Approaches in Ethnobotany. Society of Ethnobotanists, Lucknow (India): 125-140, (1989).
23. Mandal,S.C., Maity, T.K., Das, I., Saba, B.P. and Pal, M. Anati-inflammatory evaluation of Ficus racemosa Linn. Leaves extract. J. Ethnopharmacol. 72: 87-92, (2009).
24. A.Poongothai., K.P. Sreena., K. Sreejith., M. Uthiralingam. And S. Annapoorani. Preliminary phytochemicals screening of *Ficus Racemosa* Linn. International journal of pharma and Bio Sciences. Vol2. 431-434, (2011).