



**PHYTOCHEMICAL SCREENING & PHARMACOGNOSTIC INVESTIGATION OF
LEAVES EXTRACT OF *BAUHINIA PURPUREA*, *AVICENNIA OFFICINALIS* &
*CASTANOSPERMUM AUSTRAL***

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ABSTRACT

In order to find possible medical applications, phytochemical screening and pharmacognostic studies of leaf extracts entail examining the chemical makeup and properties of plant leaves. Physicochemical investigations look at the physicochemical characteristics of the leaves, whereas phytochemical screening finds particular chemicals like alkaloids, flavonoids, and tannins. Alkaloids, saponins, flavonoids, tannins, and glycosides are among the secondary metabolites that are commonly found in extracts of the leaves of *Bauhinia purpurea*, *Avicennia officinalis*, and *Castanospermum australe* when subjected to phytochemical screening and pharmacognostic analysis. A study on the antibacterial and antioxidant qualities of plant extracts found that these chemicals are recognized for their potential pharmacological activity and can be useful for creating therapeutic medicines.

KEYWORD: Pharmacognostic Analysis, Leaf Extracts.

1. INTRODUCTION

Plants have long been utilized as cures to address a variety of real-world problems, including as improving long-term health, reducing physical discomfort, and increasing the tastes and aromas of food. Plant-based health awareness frameworks have been used for about 5000 years in China and India. Throughout Europe, plant prescriptions were common until roughly fifty years ago. The Arab countries, China, and India have all freely created their own distinctive indigenous medical systems. But when it comes to the breadth of the research, the ayurvedic pharmaceutical arrangement is thought to be the best structure.

"Phytomedicine" describes the dynamic material components that are present in different plant parts and have particular pharmacological effects on the body. For centuries or more, these phytomedicines—also referred to as phytoconstituents—have been utilized for a number of objectives that go beyond those often associated with traditional therapeutic support. The lack of patent certainty for distinctive features is one of the several barriers preventing research in the areas of phytomedicines and phytotherapy from progressing. Unlike other pharmaceutical businesses, these are often small-scale commercial enterprises. However, the

Ayurvedic framework is the most unparalleled in terms of study breadth and depth.

The study of natural medicine is distinguished by the use of language derived from plants to support medical claims. Phytomedicine or plant medicine are other names for it. In recent years, the term "phytotherapy" has been proposed as a more suitable term for organic or homemade drugs. Natural pharmaceuticals were the best medical services framework in the middle of the 20th century since they were found before analgesics or anti-infection medications. Natural therapy has steadily lost public support as allopathic procedures have grown in popularity because to the rapid therapeutic advantages of manufactured medications.

2. MATERIAL AND METHOD

2.1 Selection of plant material

The plants have been selected on its availability and folk use of the plant.

2.2 Collection of plant material

Active secondary metabolites may be found in the bark, leaves, flowers, roots, fruits, and seeds of the plant.

2.2 Drying & Storage

To get rid of any undesired elements or dust particles that are sticking to the plant sample leaves, separate them and give them a wash in sterile distilled water. Fresh plant pieces were dried under cover of shade yet in the sun. Dried leaves of *Bauhinia purpurea*, *Avicennia officinalis* and *Castanospermum austral* were preserved in plastic bags and closed tightly and powdered as per the requirements.

2.3 Phytochemical screening

Medicinal plants are traditional medicinal resources and many of the modern medicinal products are produced indirectly from plants. Phytochemical components consist of two primary bioactive components (chlorophyll, proteins, amino acids, sugar, etc.) and secondary bioactive components (alkaloids, terpenoids, flavonoids, etc.). Phytochemical examinations were carried out for all the extracts as per the standard methods.

3. RESULT AND DISCUSSION

Nature herbal medicines are well thought out for being successful and safe natural therapy for a variety of diseases. Our aim in this study was to show preliminary

chemical screening, anti-microbial activity, antioxidant activity and anti-acne activity of *Bauhinia purpurea*, *Avicennia officinalis* and *Castanospermum austral*. The dried Leaves material was washed carefully under running tap water and was grinded using electronic grinder. The powder was successively extracted by maceration method, using solvents of increasing polarity, namely petroleum ether, chloroform, ethyl acetate, methanol and aqueous. *Bauhinia purpurea*, *Avicennia officinalis* and *Castanospermum austral* was tested on the different standardization criteria such as organoleptic measurement, percentage loss, percentage yield, and phytochemical screening *Bauhinia purpurea*, *Avicennia officinalis* and *Castanospermum austral*.

3.1 Phytochemical screening of extracts

Preliminary phytochemical analysis generally helps identify and classify the plant extracts' bioactive constituents. For extracts of all samples, a small portion of the dried extracts of plant leaves underwent phytochemical screening methods for chemical testing of alkaloids, glycosides, flavonoids, saponins, phenolics, proteins and amino acids, diterpenes and tannins separately.

Table 3.1: Result of Phytochemical Screening of extracts of *Bauhinia purpurea*.

S. No.	Constituents	Ethanol extract	Aqueous extract
1.	Alkaloids A) Wagner's Test: B) Hager's Test:	+Ve +Ve	+Ve +Ve
2.	Glycosides A) Legal's Test:	-Ve	-Ve
3.	Flavonoids A) Lead acetate Test: B) Alkaline Reagent Test:	+Ve +Ve	+Ve +Ve
4.	Saponins A) Froth Test:	-Ve	-Ve
5.	Phenolics A) Ferric Chloride Test:	+Ve	+Ve
6.	Proteins and Amino Acids A) Xanthoproteic Test:	+Ve	+Ve
7.	Carbohydrate A) Fehling's Test:	+Ve	+Ve
8.	Diterpenes A) Copper acetate Test:	+Ve	-Ve
9.	Tannin A) Gelatin test:	+Ve	+Ve

The *Bauhinia purpurea* ethanolic extract leaves showed presence of Phenols and Flavonoids. The ethanolic extracts possess almost all the phytochemicals that were tested when compared aqueous solvent. It could be seen from table that flavonoids, Carbohydrate, Diterpenes, tannins, alkaloids and phenolics were present in the *Bauhinia purpurea* ethanol extract. Leaf phytochemical screening showed negative findings glycosides and saponins. The *Bauhinia purpurea* aqueous leaves extract showed presence of flavonoids, Carbohydrate, tannins,

alkaloids and phenolics. *Bauhinia purpurea* aqueous leaves extract in phytochemical screening showed negative findings glycosides, Diterpenes and saponins.

Table 3.2: Result of Phytochemical Screening of extracts of *Avicennia officinalis*.

S. No.	Constituents	Ethanol extract	Aqueous extract
1.	Alkaloids A) Wagner's Test: B) Hager's Test:	+Ve +Ve	+Ve +Ve
2.	Glycosides A) Legal's Test:	+Ve	+Ve
3.	Flavonoids A) Lead acetate Test: B) Alkaline Reagent Test:	+Ve +Ve	+Ve +Ve
4.	Saponins A) Froth Test:	-Ve	+Ve
5.	Phenolics A) Ferric Chloride Test:	+Ve	-Ve
6.	Proteins and Amino Acids A) Xanthoproteic Test:	-Ve	-Ve
7.	Carbohydrate A) Fehling's Test:	+Ve	+Ve
8.	Diterpenes A) Copper acetate Test:	+Ve	-Ve
9.	Tannin Gelatin test:	+Ve	+Ve

The results of phytochemical screening of leaves extract of *Avicennia officinalis* were depicted in table. The phytochemical screening results also showed mostly similarity in the phytochemicals composition of ethanol solvents aqueous). Leaves extract of *Avicennia officinalis* in ethanol and aqueous solvents underwent phytochemical screening using chemical tests and results was shown in table. The phytochemical tests revealed various bioactive secondary metabolite which might be responsible for their medicinal attributes.

The ethanolic extract of leaves of *Avicennia officinalis* had revealed the presence of Alkaloids, glycosides, flavonoids, Carbohydrate, tannin, diterpenes and Saponins, Phenolics and Proteins and Amino Acids absent in ethanolic extract. The Phytochemical screening of aqueous extract showed results the present Alkaloids, glycosides, flavonoids, Carbohydrate and tannin and Saponins, Phenolics, Proteins, diterpenes and Amino Acids absent in aqueous extract.

Table 3.3: Result of Phytochemical Screening of extracts of *Castanospermum austral*.

S. No.	Constituents	Ethanol extract	Aqueous extract
1.	Alkaloids A) Wagner's Test: B) Hager's Test:	-Ve -Ve	-Ve -Ve
2.	Glycosides A) Legal's Test:	-Ve	-Ve
3.	Flavonoids A) Lead acetate Test: B) Alkaline Reagent Test:	+Ve +Ve	+Ve +Ve
4.	Saponins A) Froth Test:	+Ve	-Ve
5.	Phenolics A) Ferric Chloride Test:	+Ve	-Ve
6.	Proteins and Amino Acids A) Xanthoproteic Test:	-Ve	-Ve
7.	Carbohydrate A) Fehling's Test:	-Ve	-Ve
8.	Diterpenes A) Copper acetate Test:	-Ve	-Ve
9.	Tannin A) Gelatin test:	+Ve	+Ve

Ethanolic extract of *Castanospermum austral* showed positive test for Flavonoids, Saponins, Phenolics and

Tannin. And Phytoconstituent absent in ethanolic extract of *Castanospermum austral* Glycosides, Alkaloids,

Carbohydrat, Diterpenes, Proteins and Amino Acids.) Aqueous extract of *Castanospermum austral* showed positive test for only Flavonoids and Tannin.

CONCLUSION

Medicinal plants are a natural source of antimicrobial and anti-inflammatory agents. They have been shown to be effective in treating bacterial skin diseases, such as acne and eczema, by either preventing the growth of microorganisms or dramatically lowering their burden. Thanks to their antibacterial, anti-inflammatory, antioxidant, and analgesic properties, plants may be useful in the fight against bacterial skin disorders. Although there is no scientific proof of plants' pharmacological action against bacterial skin infections, they have historically been utilized to treat bacterial skin disorders. Traditionally used medicinal plants may provide new opportunities for the creation of innovative herbal compositions effective against bacterial skin infections.

The bioactive components of plant extracts are often identified and categorized with the aid of preliminary phytochemical investigation. Alkaloids, glycosides, flavonoids, saponins, phenolics, proteins and amino acids, diterpenes, and tannins were chemically tested independently in a small percentage of the dried extracts of plant leaves for all samples. The ethanolic extract of the leaves of *Bauhinia purpurea* revealed the presence of flavonoids and phenols. When compared to aqueous solvent, the ethanolic extracts include nearly all of the phytochemicals that were examined. The *Bauhinia purpurea* ethanol extract included flavonoids, carbohydrates, diterpenes, tannins, alkaloids, and phenolics. Glycosides and saponins were the only phytochemicals found negatively in leaf screening results. The aqueous leaf extract from *Bauhinia purpurea* revealed the presence of flavonoids, carbohydrates, tannins, alkaloids, and phenolics. When glycosides, diterpenes, and saponins were screened for phytochemicals using an aqueous leaf extract from *Bauhinia purpurea*, the results were negative.

The findings of the phytochemical screening also revealed that the phytochemical makeup of the aqueous and ethanol solvents was largely similar. Using chemical testing, an extract of *Avicennia officinalis* leaves in ethanol and aqueous solvents was subjected to phytochemical screening. The phytochemical analyses identified a number of bioactive secondary metabolites that may be in charge of their therapeutic properties. The presence of alkaloids, glycosides, flavonoids, carbohydrates, tannin, diterpenes, and saponins, as well as phenolics, proteins, and amino acids that were absent from the ethanolic extract, was discovered in the leaves of *Avicennia officinalis*.

The aqueous extract's phytochemical screening revealed that while saponins, phenolics, proteins, diterpenes, and amino acids were lacking, alkaloids, glycosides,

flavonoids, carbohydrates, and tannin were present. Tests on the ethanolic extract of *Castanospermum austral* revealed positive results for tannin, phenolics, saponins, and flavonoids. Additionally, *Castanospermum austral*'s ethanolic extract lacks phytoconstituent. Glycosides, proteins, amino acids, carbohydrates, alkaloids, and diterpenes. The only compounds in the *Castanospermum austral* aqueous extract that tested positive were flavonoids and tannin.

REFERENCE

1. Avancini CAM, Wiest JM, Mundstock EA. Bacteriostatic and bactericidal activity of the *Baccharis trimera* (Less.) D.C. *Compositae decocto*, as disinfectant or antiseptic. *Arq Bras Med Vet Zootec.*, 2000; 52(3): 230-4.
2. Aziz, F. T. A., Sanad, F. A. A., Temraz, A., El-Tantawy, W. H., & Hassan, M. A. (Accepted/In press). Study of cardioprotective activity of the methanolic extract of the aerial parts of *Bauhinia madagascariensis* compared to *Bauhinia purpurea* against adrenaline-induced myocardial toxicity in rats. *Drug and Chemical Toxicology*.
3. Balaji Hari1, T.K. Padmaja1, P.Brahma Naidu1, S. Roopa Naik1, Balaji Meriga. Anti-inflammatory and antioxidant activity of ethanolic extract of *Bauhinia purpurea* bark. *International Journal of Drug Delivery*, 2012; 4: 507-514.
4. Balasubramanian J Anti-inflammatory activity of *Avicennia officinalis* in methanolic extract, *Journal International Journal of Research in Pharmacology & Pharmacotherapeutics (IJRPP)* – 2013; 2(3).
5. Bhoomi B. Joshi, megha g. chaudhari, Kinnari Mistry, in vitro anti-diabetic and anti-inflammatory activity of stem bark of *bauhinia purpurea*, *Bulletin of Pharmaceutical and Medical Sciences (BOPAMS)*, 2013; 1(2): 139-150.
6. Das, S.K., Behera, S., Patra, J.K. et al. Green Synthesis of Silver Nanoparticles Using *Avicennia officinalis* and *Xylocarpus granatum* Extracts and In vitro Evaluation of Antioxidant, Antidiabetic and Anti-inflammatory Activities. *J Clust Sci.*, 2019; 30: 1103–1113.
7. Janaína K.L. Campos a, Chrisjacele S.F. Araújo a, Tiago F.S. Araújo a, Andréa F.S. Santos b, José A. Teixeira b, Vera L.M. Lima a, Luana C.B.B. Coelho, Anti-inflammatory and antinociceptive activities of *Bauhinia monandra* leaf lectin, *Biochimie Open*, June 2016; 2: 62-68.
8. Nikitha K, Mohammed Swalih K, Pharmacological evaluation of *Bauhinia variegata* root for analgesic and antiinflammatory activity, *International Journal of Research in Pharmacy and Pharmaceutical Sciences* www.pharmacyjournal.in, 2022; 7(3): 16-25.
9. Nirmala Jane Pais, Ullas Prakash D Souza, Prasanna Shama K and Shastry CS; anti inflammatory and anti nociceptive evaluation of roots extracts of *bauhinia purpurea* linn, *international journal of*

- pharmaceutical, chemical and biological sciences, IJPCBS, 2012; 2(3): 225-235.
10. P. Arockia Mary Fernandez, D. Vasumathi, S. Lingathurai and S. Lokkirubhar, Pharmacological Properties of *Avicennia marina* (Forssk) Vierh, International Journal of Pharmacy and Biological Sciences-IJPBSTM, 2021; 11(1): 162-167.
 11. P. Thirunavukkarasu, T. Ramanathan*, L. Ramkumar, R. Shanmugapriya and G. Renugadevi, The antioxidant and free radical scavenging effect of *Avicennia officinalis*, Journal of Medicinal Plants Research, 23 September, 2011; 5(19): 4754-4758.
 12. P. Lalitha, A. Parthiban, V. Sachithanandam, R. Purvaja, R. Ramesh, Antibacterial and antioxidant potential of GC-MS analysis of crude ethyl acetate extract from the tropical mangrove plant *Avicennia officinalis* L. South African Journal of Botany, November 2021; 142: 149-155.
 13. Prabhu, S., Vijayakumar, S., Ramasubbu, R. et al. Traditional uses, phytochemistry and pharmacology of *Bauhinia racemosa* Lam.: a comprehensive review. Futur J Pharm Sci., 2021; 7: 101.