PHYTOCOGNOSTIC AND PHARMACOLOGICAL REVIEW OF *ALBIZIA AMARA*

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ABSTRACT

An essential medicinal herb called *Albizia Amara* can be found all over India. Pharmaceutical components of high importance are present throughout the entire plant. The current articles provide information on bioactive ingredients and the therapeutic value of *Albizia Amara*. This plant has a long history of usage in traditional medicine, particularly for the treatment of leprosy, toxic illnesses, gonorrhea, skin diseases, diarrhea, skin conditions, and poisonous bites. The plant extracts of *Albizia Amara* contained a wide range of bioactive substances, including macrocyclic spermine alkaloids, triterpene saponins, phenols, flavanols, glycosides, tannins and sterols, according to additional phytochemical research. Plant extracts also have pharmacological effects like anticancer, antihyperlipidemic, antibacterial, antimicrobial and antioxidant capabilities. This will be a perfect plant resource for the treatment of different endemic diseases due to the presence of several pahytoconstituents, pharmacological activity and extensive distribution.

Keywords: *Albizia Amara*, medicinal plant, Bioactive Compounds, Pharmacological properties.

INTRODUCTION

In the dry forests of India, the Fabaceae family member *Albizia Amara* is a beneficial medical tree with a number of uses. The tropical and subtropical regions of Asia, Africa, and Australia are home to more than 100 species of Albizia. The Indian subcontinent is home to about 16 species of Albizia which have been planted as avenue trees and shade trees in tea and coffee plantations[1]. *Albizia* species are important in society because they produce high-quality timber and are a useful source of gum. Most importantly, some of the most valued species in ayurvedic treatment are *Albizia Amara, Albizia lebbeck, Albizia procera, Albizia julibrissin, and Albizia Amara*. The *Albizia Amara* tree's wood has a dark purple-brown colour with lighter bands. It is highly strong and robust and it is used to make cabinets for use in construction and agriculture. *Albizia Amara* plant extracts are widely utilized in conventional medicine[2]. Albizia is an herb that was originally grown in southern and eastern Asia, the flower and stem bark are used to make medicine. Albizia is taken by mouth for anxiety, cancer, depression, insomnia, sore throat and also to reduce swelling associated with trauma. Albizia has significantly anti-inflammatory, pain relieving and mood supporting properties. Also increase oxytocin level in the human body.

Geographical Distribution

It has a high demand for light, is shade-intolerant, extremely tough, and exhibits notable drought resistance. It can be found all throughout Africa from Sudan and the Ethiopian region south to Zimbabwe, Botswana and Transvaal. It primarily thrives in forests made of sand. It can be found in the arid states of Tamil Nadu, Andra Pradesh and Karnataka in India[3].

Morphology

Large deciduous *Albizia Amara* trees can grow up to 10 meters tall and their branches are heavily pubescent in either yellow or grey. Leaves are 12cm long with a 1.3cm long petiole, a gland near the middle and above the petiole, a rachis up to 12cm long, 6-10 pairs of pinnae and 15 to 25 pairs of narrow-elliptic, overlapping leaflets that are 8mm by 2.5mm, pubescent or glabrescent, base-subacute and obtuse at the apex. Pods are flat, compressed, greyish brown, 8-20cm long, weakly veined, straight or wavy lengthwise and contain 6-8 seeds. Flowers are creamy white to pale yellow, single to 2-3 fascicled in the upper axis[4].

Fig 1: *Albizia Amara*

Taxonomic Classification[5]:

Kingdom : Plantae
(Unranked) : Angiosperm
(Unranked) : Eudicots
(Unranked) : Rosid's
Order : Fables
Family : Fabaceae
Subfamily : Mimosaceae
Tribe : Inga
Genus : *Albizia*
Species *: Amara*
Uses: The leaves and flower are used in the treatment of boils and ulcer

- Also use to treat erysipelas
- The paste of leave and bark is use to cure both sin disease and poisonous bite.

Antimicrobial Activity

Salmonella Typhimurium strain TM677 was effectively eradicated by the ethanolic extract of seeds because it contained macrocyclic alkaloids with strong bactericidal properties. Macrocyclic spermine alkaloids and echinocytes acid were identified through phytochemical examination of the ethanolic extract[6]. According to Baltazar G and Nashim CM, the ethanolic leaf extract has the broadest antibacterial spectrum, and among the studied microorganisms, E. coli and Salmonella typhi were the most vulnerable bacteria, while Cryptococcus neoformans was the most susceptible fungus. Saponins, tannins, alkaloids, terpenoids, glycosides, flavonoids, phenols, cardiac glycosides, and quinones were all present in the extract[7]. Treatment of diarrhoea and other stomach issues brought on by E. coli and S. typhi was more successful when *Albizia Amara* leaf extract was administered. Chloroform leaf extract with alkaloids and steroids demonstrated greater antibacterial and antifungal action, antimicrobial, according to Praveen and Thippeswamy streptococcus faecalis (NCIM 5025) and Fusarium latera tum were the most susceptible bacterium and fungus, respectively, of the 21 microorganisms tested the activity against[8]. Thippeswamy and Mohana evaluated Budmunchiamine-A (BUA) which was derived from methanolic leaf extract for its antifungal, antimicrobial and ant aflatoxigenic properties. BUA at a dosage of 1 mg/ml totally suppressed the in vitro generation of Aspergillus flavus and its aflatoxin B19. Additionally, Thippeswamy reported that BUA had a growth-inhibitory effect on the fumonosin B1 synthesis of the phytopathogenic fungus Fusarium verticillioides. Therefore, it was emphasised that BUA can be employed as an antifungal agent against mycotoxin contamination and post-harvest microbial infestation of food items[9].

Antioxidant Activity

The ethanolic leaf of *Albizia Amara* has been shown by Suresh Kumar, Sucheta S, and Sudarshana Deepa to have potent anti-oxidant and free radical scavenging capabilities. The extract passed a preliminary screening that revealed the presence of phenolic chemicals,

alkaloids, flavonoids, tannins, and saponins. Mulapalli noted *Albizia Amara* leaf antioxidant properties[10]. The ethanolic extract of leaf increases the activity of superoxide dismutase and catalase which indicate it is good antioxidant which may be due to the presence of saponins, tannins and glycosides. The antioxidant activity of the extract was investigated by three different methods-2, 2, Diphenyl -1-Picryl hydrazine (DPPH) radical assay, free radical scavenging assay and reducing power assay. Further, total phenol content of the ethanolic extract in terms of Gallic acid equivalent was found to be 243.47 µg. Thus, it was discovered that in *Albizia Amara*, there was a positive correlation between total phenols and antioxidant activity. The *Albizia Amara* leaf acetone extract and its sub-fractions were studied for their potential as free radical scavengers and antioxidants by Kandhasamy Soundararajan and Sun-Chul Kang .The ethyl acetate fraction of these demonstrated higher 2, 2, Diphenyl -1-Picryl hydrazine (DPPH) and ABTS radical scavenging activities than the standard quercetin due to the presence of chemical components like Melanocetid, teracacidin, 3'-0 methyl melanocetid, and 3'-0- methyl teracacidin trimethyl ether[11]

Anti-inflammatory activity

Sastry et al.,1966 reported the ethanolic extract of Albizia to show anti-inflammatory and analgesic activity in hot plate method, the percent inhibition was 61.91% (Khan et al.,2010) the ethanolic leaves extract show presence of oleanolic acid and echinocytes acid.

Skin Diseases

The seed oil contains high amount of linoleic acid and palmitic acid and low content of capric acid and lignoceric acid which is used for the treatment of leprosy and leukoderma, it is used as a remedy for dandruff (Mar et al., 1991) paste of the leaves and root bark of Albizia is use to cure both skin disease and poisonous disease.

Other phytochemical properties

The seed of Albizia are regarded as astringent and is use for the treatment of Gonorrhoea, Diarrhoea and piles. The bark and tree yield gum are used to treat ulcer and infection. It contains chemical constituents like Saponin, Tannin and Glycoside (Mar et al.,1991).

PHYTOCHEMICAL SCREENING OF LEAVES ALBIZIA AMARA

Phytochemical analysis is devoted to the publication of original articles concerning the development, improvement, validation and extension of application of analytical methodology in the plant science. The trans phytochemical prefers the biologically active organic substances found in plants use by human as food.

The chemical tests for various Phytoconstituents in the dried powder and extracts of *Albizia Amara* were carried out as described below and the results were recorded.

a) Detection of Alkaloids

- Dragendroff’s reagent: In 5ml of distilled water, the material was dissolved. To this, 5ml of 2M HCL was added until an acid reaction occurred. Next, 1ml of Dragendroff's reagent was added, and the quick production of an orange red precipitate was checked.

- Mayer's reagent: The material was combined with a little amount of diluted hydrochloric acid and tested to see if a white precipitate formed[12].

b) Detection of Glycosides

- Borntrager's test: In a test tube, the powdered substance was heated for five minutes with one millilitre of sulfuric acid. The hot filtrate was shaken with a similar volume of chloroform after cooling. Half of the volume of diluted ammonia was added to the lower layer of solvent after it had been separated. The ammoniacal layer produces a rose-pink to red tint.
- Modified Borntrager's test: 2ml of the weak sulfuric acid was added to the test substance before it was cooked. This was shaken with an equivalent amount of new, freshly made, 5% aqueous ferric chloride solution before being treated for 5 minutes. Half of the volume of diluted ammonia was added to the lower layer of solvent after it had been separated. The ammoniacal layer produces a rose-pink to crimson hue[13].

c) Detection of Steroids:

Liebermann Burchard's Test: A few drops of acetic anhydride were added to the powdered medication before it was heated and chilled. Conc. sulphuric acid was poured from the sides of the test tube, causing the formation of a brown ring at the intersection of two layers, both the production of a deep red colour, which indicated the presence of tri terpenoids and made the upper layer green, indicating the presence of steroids[14].

d) Detection of terpenoid

- Salkowski Test: The extract was exposed to a few drops of strong sulphuric acid; the production of a yellow lower layer shows the presence of tri terpenoids, whereas the presence of steroids is indicated by the bottom layer's red colour[15].

e) Detection of Flavonoids

- Shinoda test: The presence of flavonoids is indicated by the appearance of pink to crimson red, occasionally green to blue colour after a few minutes following the addition of a few pieces of magnesium turnings and concentrated HCl to the extract solution[15].
- Alkaline reagent test: When a few drops of sodium hydroxide solution were added to the test solution, a strong yellow colour that turned colourless after the addition of a few drops of diluted acid indicated the presence of flavonoids[16].

f) Detection of Phenols

- Ferric chloride test: A small amount of the material was dissolved in 2ml of distilled water, and then a few drops of 10% aqueous ferric chloride solution were added. The colour of the solution was then checked to see if it appeared blue or green[17].

g) Detection of Tannins

- Lead acetate Test: The test solution was blended with a basic lead acetate solution, and the presence of a white precipitate was looked for.

h) Ferric chloride test: A few drops of a 5% aqueous ferric chloride solution were added to a 2 ml sample of the drug's aqueous extract, and the sample was then tested for the presence of a bluish-black colour[18].

i) Saponin detection

- The sample was mixed with a drop of sodium bicarbonate solution, rapidly agitated, and left for three minutes. It was investigated how any honeycomb-like froth developed[19].

Table 1: Phytochemical screening of plant *Albizia Amara* (leaf extract).

Name of chemical constituent	Test	Petroleum Ether	Acetone	Ethanol	Water
Alkaloids	a) Mayers test b)Dragendroff's Reagents	_ +	+ +	+ +	+ +
Glycosides	Borntrager's test	_	_	_	+
Steroids	Liberman Burchard's	_	_	+	+
Terpenoids	Salkowski test	_	_	+	+
Flavonoids	a). HCl b).Sodium Hydroxide	_ _	_ _	+ _	+ +
Phenols	Ferric Chloride test	_	+	+	+
Tannins	a). Lead acetate b).Ferric Chloride test	_ _	_ _	+ +	+ +
Saponins	Sodium Bicarbonate	_	_	_	+

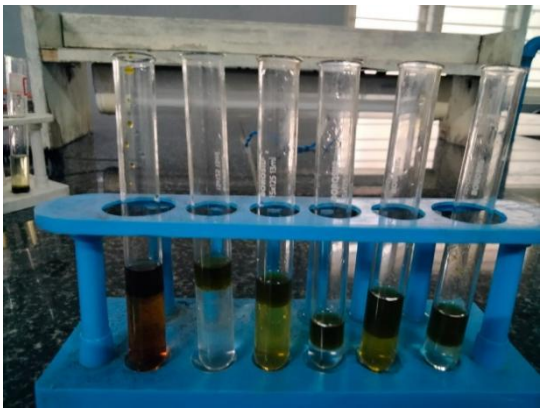

Fig2: Preliminary phytochemical screening with petroleum ether

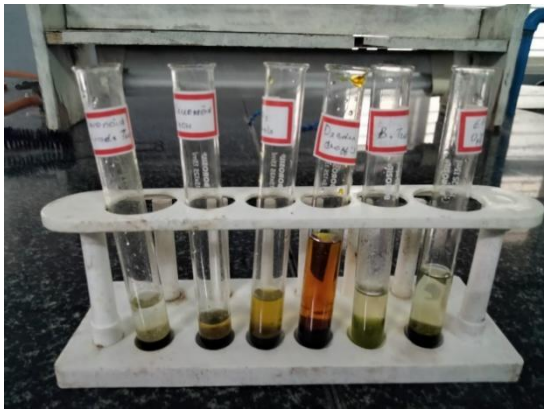

Fig3: preliminary phytochemical screening with water

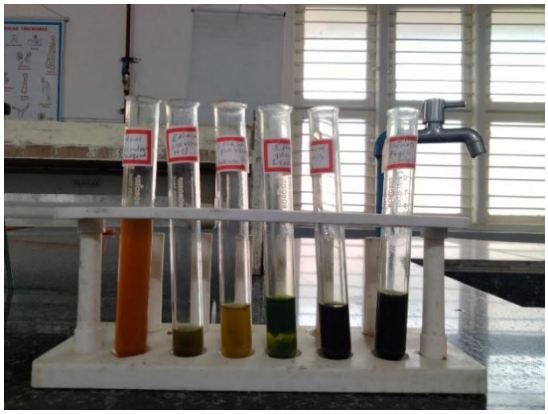

Fig4: Preliminary phytochemical screening with Acetone

Fig 5: Preliminary phytochemical screening with Methanol

FLUORESCENCE ANALYSIS OF *Albizia Amara* LEAF EXTRACT:

Fluorescence is a significant phenomenon that many phytoconstituents found in plant materials exhibit. Some phytoconstituents displayed fluorescence in the visual range when exposed to sunlight[19]. Many natural materials glows when exposed to ultraviolet light, which is not visible during the day. Even though they are not exactly crude medications utilizing fluorescence, some substances can frequently be transformed into fluorescent derivatives by applying various

chemical reagents and chemicals. Each chemical has a unique fluorescence hue. In cleanses that are fluorescent, a non-fluorescent component may be fluorescing.

Albiza Amara leaf fluorescence was investigated in both natural and UV light at 365 nm wavelength. One of the 12 tests had a different colour in daytime and UV 365 nm, while one of the other tests had different colours when compared to commercially available, normally powered controls. Table 2 shows the findings of the fluorescence examination of leaf powder. When exposed to various chemical reagents, the leaf powder took on a distinctive hue.[20].

Sample	Visible/daylight	365nm UV light
Powder as such	Green	Green
Powder + 1N aq. NaOH	Pale green	Green
Powder + 1NHCl	Light green	Pale green
Powder + Con. H2SO4	Pale green	Pale green
Powder + 50% H2SO4	Light green	Pale green
Powder + Acetic Acid	Green	Fluorescence green
Powder + Ferric Chloride	Light green	Green
Powder + HNO3 + NH3	Brown	Green
Powder + Petro. Ether	Fluorescence green	Dark green
Powder + Chloroform	Green	Brown green
Powder + Methanol	Brown	Green
Powder + Ethanol	Green	Dark green

Table 2: Fluorescence analysis of *Albizia Amara* leaf extract

DISCUSSION AND CONCLUSION

There is currently a significant amount of study being done on various plant species and their therapeutic properties, which has led to a revaluation of traditional medicine throughout the world. In recent years, herbal medicines have quickly gained popularity as an alternative form of treatment. For the treatment of liver disorders, numerous polyherbal formulations, which combine various herbal extracts/fractions are used. Investigation of preliminary phytochemical analysis of various like in Fig: 2 Petroleum ether extracts revealed that alkaloids, glycosides, steroids, terpenoids, flavonoids, phenols, and saponins were absent. Similarly, Fig: 3 acetone and ethanol extracts revealed the absence of alkaloids and phenols, respectively, while Fig: 4 ethanol also revealed the presence of glycoside and saponin. Finally, Fig: 5 water extract revealed the presence of saponins, tannins, alkaloids, glycosides, Phenols, Flavonoids, Terpenoids, and Steroids.

Table 1 provides a summary of the phytochemical screening of the petroleum ether, acetone, ethanol, and water extracts. The acquired results demonstrated that water extracts included all of the Phyto-constitutes that had been evaluated. Alkaloids, steroids, tannins, phenols, terpenoids, and cardiac glycosides were all found in ethanol extract, but flavonoids and other glycosides were not. Alkaloids, phenols, and cardiac glycosides were all present in acetone

extracts, but flavonoids, steroids, saponin, glycosides, and terpenoids were not. In Petroleum ether extract, none of the phytochemicals that were examined were present.

It is clear from the research's findings that *Albiza Amara* is employed as a body coolant and antidandruff agent, with antimicrobial activity and antioxidant activity. For the evaluation of the phytochemical profile, the dried leaf powder and also the four-leaf extracts of this plant were looked into. One of the studies revealed that water extract had a significant concentration of Phyto-constituents. This study found that the plant has phytochemical components that increase its therapeutic efficacy. The powered sample and the extracts were subjected to fluorescence analysis and FT-IR spectrum analyses, which revealed them to be an intriguing drug that is crucial in determining the quality and purity of the drug. Plant leaf extract has been shown to be effective in many diseases' ulcer, poisonous bites, piles, diarrhoea, skin diseases, asthma, arthritis, malaria, antiseptic and pneumonia due to presence of various active constituents.

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