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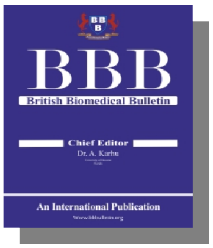

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Phytochemical Evaluation of Ethanolic Extract of Aerial Parts of *Albizia procera*

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A B S T R A C T

The aim of this study was to evaluate the phytochemical activity of ethanolic extract of aerial parts of *Albizia procera Roxb.* (*Benth.)* belonging to the family *Mimosaceae.* The aerial parts were collected and extract prepared from ethanol by hot continuous percolation method in Soxhlet apparatus for 24 hrs and found triterpenoids, carbohydrates, glycosides, phytosterols, phenolic compounds, saponins, tannins and flavonoids. Each active compound shows different activities against different type of diseases like cancer, liver disorders, diabetes, atherosclerosis and inflammatory diseases etc. It also possesses antioxidant properties. According to their characteristics, they can be involved into medicinal plant category.

Introduction

The plant kingdom is undoubtedly valuable as a source of new medicinal agents[1]. Medicinal plants have various effects on living systems[2]. Medicinal plants contents are used for the development of new drug compounds that are used in the treatment of different type of diseases like liver and heart problems, cancer, diabetes[3], atherosclerosis etc. There is no rational therapy available for treating the above diseases is still a challenge to the modern medicine. Therefore, most of the medicinal plants raw materials are used for the development of new drugs[4,5]. These medicinal plants are used to treatment for variety of diseases without any side effects[6].

Albizia procera is widely distributed from India and Myanmar through Southeast Asia to Papua New Guinea and northern Australia. The habitat ranges from monsoon forest, mixed deciduous forest, savannah woodlands, pyrogenic grassland, roadsides and dry gullies, to stunted, seasonal swamp forest. It is commonly found in open secondary forest and in areas with a pronounced dry season. *Albizia procera* is a tree with an open canopy, up to 30 m tall and trunk of 35 (60 max.)cm in diameter; bole straight or crooked, up to 9 m. Bark smooth, pale yellowish-brown or brown with horizontal ridges; branches terete, glabrous. Leaves bipinnate; apex rounded or subtruncate, often emarginate, mucronate; both surfaces sparsely appressed puberulous, rarely glabrous on top side. Flowers 15-30 per glomerule, sessile, uniform, bisexual. Fruits rich red or reddish-brown, flattened pods, chartaceous, glabrous, with distinct marks over the seeds; mature pods each containing 6-12 seeds, seeds are small, greenish-brown, elliptical to round, flat, with a hard, smooth seed coat.

This plant is used traditionally in anticancer[7], pain, convulsions, delirium and septicemia[8]. The decoction of bark is given for rheumatism, haemorrhage and is considered useful in treating pregnancy problems, for stomach-ache and sinus. They were reported to exhibit various pharmacological activities such as CNS activity, cardiotonic activity, lipid-lowering activity, anti-oxidant activity hepato-protective activity, hypoglycemic activity, etc[9]. Even through, traditionally, leaves of *Albizia procera* were extensively used for the treatment of variety of wounds[10]. Seeds are powdered and used in amoebiasis. It cures urinary tract infections including glycosuria, haemorrhoids, fistula and worm infestation. It also suppresses skin diseases. Fruits of *Albizia procera* acts as astringent and diminishes Kapha and Sukra[11]. In India, leaves are poulticed on to ulcers[12]. Hence the present study was to evaluate the phytochemical activity of ethanolic extract of aerial parts of *Albizia procera Roxb.* (*Benth.*).

Collection and Identification of Plant materials

The aerial parts of *Albizia procera* were collected from Tuliarai, Tirunelveli District of Tamil Nadu, India. Taxonomic identification was made from Botanical Survey of Medicinal Plants Unit Siddha, Government of India. Palayamkottai. The aerial parts of *Albizia procera* were dried under shade, segregated, pulverized by a mechanical grinder and passed through a 40 mesh sieve.

Preparation of Extracts

The above powdered materials were successively extracted with ethanol by hot continuous percolation method in Soxhlet apparatus[13]for 24 hrs. The extract was concentrated by using a rotary evaporator and subjected to freeze drying in a lyophilizer till dry powder was obtained.

Preliminary Screening of Phytochemical Test

Phytochemical Screening of ethanolic extract from *Albizia procera*

The extract was subjected to preliminary phytochemical screening for the detection of various plant constituents present. The term qualitative analysis refers to the establishing and providing the identity of a substance. The pharmacological actions of crude drugs were determined by the nature of their constituents the phytoconstituents are responsible for the desired therapeutic properties. To obtain these pharmacological effects, the plant materials itself or extract in a suitable solvent or isolated active constituent may be used.

The ethanolic extract of *Albizia procera* was subjected to the following chemical tests used for the identification of various active constituents[14].

Tests for Alkaloids

Dragendroff's Test

A fraction of the extract was treated with Dragondroff's reagent and observed for the formation of yellow coloured precipitate, indicated the presence of alkaloids.

Wagner's Test

A fraction of the extract was treated with Wagner's reagent and observed for the formation of a reddish brown precipitate, indicated the presence of alkaloids.

Mayer's Test

A fraction of the extract was treated with Mayer's reagent and observed for the formation of white precipitate or creamy coloured precipitate, indicated the presence of alkaloids.

Hager's Test

A fraction of the extract was treated with Hager's reagent and observed for the formation of yellow precipitate, indicated the presence of alkaloids.

Test for Carbohydrates

Molisch's Test

To 2 ml of the extract, 1 ml of α-napthol solution was added, and concentrated sulphuric acid was added through the sides of test tube. Purple or reddish violet colour at the junction of the two liquids revealed the presence of carbohydrates.

Fehling's Test

To 1ml of the extract, equal quantities of Fehling's solution A and B were added, while heating formation of a brick red precipitate that indicated the presence of carbohydrates.

Benedict's test

To 5ml of Benedict's reagent, 1ml of extract solution was added and boiled for 2 minutes and cooled. Formation of a red precipitate showed the presence of carbohydrates.

Tests of Glycosides

Legal's Test

The extract was dissolved in pyridine and sodium nitroprusside solution was added to make it alkaline. The formation of pink red to red colour showed the presence of glycosides.

Baljet Test

To 1 ml of the ethanolic extract was added with 1 ml sodium picrate solution and the yellow to orange colour revealed the presence of glycosides.

Borntrager's Test

A few ml of dilute HCl was added to 1 ml of the extract solution. It was then boiled, filtered and the filtrate was extracted with chloroform. The chloroform layer was then treated with 1 ml of ammonia. The formation of red colour showed the presence of anthraquinone glycosides.

Keller Killiani Test

The extract was dissolved in acetic acid containing traces of ferric chloride and it was then transferred to a test tube containing sulphuric acid. At the junction, formation of a reddish brown colour, which gradually became blue, confirmed the presence of glycosides.

Tests for Phytosterol[15]

Libermann Burchard Test

Mixed 3ml of extract was added with 3ml of acetic acid anhydride. It was heated and then cooled. Few drops of concentrated sulphuric acid were added. Appearance of blue colour shows the presence of phytosterol.

Salkowski's Test

Dissolve the extract in chloroform and equal volume of concentrate sulphuric acid was added. Formation of bluish red to cherry red colour in chloroform layer and green fluorescence in the acid layer represented the steroid components present in the extract.

Test for Coumarins

Moistened plant extract (0.5g) was taken in a small test tube and converted it with filter paper moistened with 1N NaOH. The test tube was placed for few minutes in boiling water. Filter paper was removed and examined under UV light for yellow fluorescence to indicate the presence of coumarins.

Test for Flavonoids[16,17]

Shinoda test

The dried extract powder or extract was treated with 5ml of 95% ethanol. Few drops of concentrated hydrochloric acid and 0.5g of magnesium turnings. Pink colour was observed which shows the presence of flavonoids.

Test for Tannins and Phenolic compounds[18]

Ferric chloride test

1 ml of the extract was added with ferric chloride and observed for the formation of a dark blue or greenish black colour indicated the presence of Tannins and Phenolic compounds.

Gelatin Test

A fraction of the extract was treated with 1%gelatin containing 10%NaCl and observed for the precipitation, indicated the presence of Tannins and Phenolic compounds.

Tests for Proteins and Amino Acids

Biuret Test

1ml of the extract was treated with 1ml of 40% sodium hydroxide solution followed by 2 drops of 1% copper sulphate solution. Formation of a violet colour showed the presence of proteins.

Xanthoproteic Test

1ml of the extract was treated with 1ml of concentrated nitric acid. A white precipitate is formed, it was boiled and cooled. Then 20% of sodium hydroxide or ammonia was subsequently added orange

colour indicated the presence of aromatic amino acids.

Lead Acetate Test

A fraction of extract was treated with 1ml of lead acetate. Formation of a white preciptate indicate the presence of proteins.

Test for Saponins

About 1 ml of ethanol extract was diluted separately with distilled water to 20 ml, and shaken in a graduated cylinder for 15 minutes. $A^{1\%}$ 1 cm layer of foam indicated the presence of saponins.

Test for Triterpenoids

Two or three granules of tin metal in 1ml thionyl chloride solution were dissolved 1ml of the extract was added into a test tube. The formation of pink colour indicated the presence of triterpenoids.

Test for Fixed Oils

Spot Test

A small quantity of extract was pressed between two filter papers. Oil stains on the filter paper indicated the presence of fixed oils.

Saponification Test

1 ml of the extract was added with few drops of 0.5N alcoholic potassium hydroxide along with a drop of phenolphthalein. The mixture was heated on a water bath for 1-2 hrs. The formation of soap or partial neutralization indicated the presence of fixed oils.

Results and Discussion

The above powdered materials were successively extracted with ethanol by hot continuous percolation method in Soxhlet apparatus for 24 hours. The results of the phytochemical screening of ethanolic extract of aerial parts of *Albizia procera* were present in Table-1. Different types of secondary metabolites such as triterpenoids, carbo-hydrates, glycosides, phytosterols, phenolic compounds, saponins, tannins and flavonoids were presented.

Current reports show that the Flavonoids, a group of poly phenolics, are free radical scavengers, super antioxidants which have anti-inflammatory, prevent oxidative cell damage through their water soluble property and also possess anti-cancer activity [19, 20] have show immense potential anti-oxidant properties. Flavonoids in intestinal tract lower the risk of heart disease Triterpenoids shows analgesic, hepato-protective and anti-inflammatory properties[21]. Tannins may have potential value such as cytotoxic, anti-cancer agents and hasten the healing of wound and inflamed mucous membranes[22,23]. Saponins are used in hypercholesterolemia, hyperglycemia, anti-oxidant, anticancer, anti-inflammatory and weight loss etc. according to medical field. It is a bioactive antibacterial agent of plants[24,25]. Phytosterols have cardiotonic activity, possess insecticidal and antimicrobial properties. Phenolic compounds have anti-oxidative, antidiabetic, anticarcinogenic, antimutagenic and anti-inflammatory[26], inhibition of angiogenesis and cell proliferation as well as the improvement of endothelial function[27].

Conclusion

This investigation has revealed that the ethanolic extract of aerial parts of *Albizia procera* have high phytochemical contents like triterpenoids[28], carbohydrates, glycosides, phytosterols, phenolic compounds, saponins, tannins and flavonoids[29] etc. These active constituents

show different activities against different type of diseases like cancer, liver disorders, diabetes, atherosclerosis and inflammatory diseases etc. It also possesses antioxidant properties. This is an indication that they are of high medicinal value[30].

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Table 1. Phytochemical analysis of ethanolic extract of aerial parts of *Albizia procera*

S.No.	Test	Ethanol
I	Alkaloids	_
II	Carbohydrates and glycosides	+
III	Phytosterols	+
IV	Triterpenoids	+
V	Flavonoids	+
VI	Phenolic compounds and tannins	+
VII	Protein and Amino Acid	_
IX	Saponins	+
X	Fixed oil and fats	-

+ Positive; - Negative