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Research Article **Botany and Microbiology**

Phytochemical Investigation of Ethanol, Methanol, Hydro-Alcoholic and Aqueous Flower Extracts of *Cassia* Species

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ABSTRACT

Cassia, a traditional herbal medicines have a long history of use and are generally considered to be safer than synthetic drugs. Over 50% of all modern clinical drugs are natural products that play an important role in drug development in pharmaceutical industries. The present communication constitutes a review on the distribution, phytography, medicinal properties and pharmacological actions of *Cassia alata* all parts of this plant contain a variety of biologically active compounds such as anthraquinones, flavonoids, flavon-3-ol derivatives, alkaloid, glycosides, tannin, saponin, terpenoids, reducing sugar and steroids those have various medicinal properties. The fruit and stem bark extract shows various activities like antipyretic, anti-inflammatory, antioxidant, antidiabetic, hypolipidemic, hepato-protective, antimicrobial, antitumor, antiulcer etc.

Keywords: *Cassia alata*, Preliminary phytochemical analysis,

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INTRODUCTION

Nature has been a source of medicinal agents for thousands of years and an impressive number of modern drugs have been isolated from natural resources. Traditional medicine is an important source of potentially useful new compounds for the development of chemotherapeutic agents. The essential values and uses of some plants have been worked out and published, but many of them remain unexplored to date. Therefore, there is a necessity to explore their uses and to conduct pharmacognostic and pharmacological studies to discover their medicinal properties [1]. In traditional medicine, Cassia fistula is one of the most commonly used plants in Unani and Ayurvedic medicines, this plant has been described to be useful against skin diseases, liver troubles, tuberculous glands and its use in the treatment of haematemesis, pruritus, leucoderm and diabetes has been suggested. [2] The topography of India which is in the tropical belt with its varied climatic zones makes it a vast storehouse of medicinal plants. There is a continuous and urgent need to discover new compounds with diverse chemical structures and novel mechanisms of

action[3]. Most of the pharmaceutical industries are highly dependent on the wild population for the supply of raw material for extraction of medicinally important compounds. The genetic diversity of medicinal plants in the world is getting endangered at an alarming rate because of ruinous harvesting practice and over-harvesting for the production of medicines, with little or no regard to the future. Furthermore, extensive destruction of the plant-rich habitat as a result of forest degradation, agriculture encroachments, and urbanization. In modern medicine, plants are used as sources of direct therapeutic agents, as a model for new synthetic compounds and as a taxonomic marker for the elaboration of more complex semi-synthetic chemical compounds [4].

Herbal Ayurveda products are used as medicines in the form of either extracts or powder; and, they do have growth inhibitory effect against microbial pathogens. Many scientists have validated the biological activities of plants and their chemical constituents and demonstrated that aqueous and alcoholic extracts of several plants elicit antibacterial activity [8-10].

MATERIALS AND METHODS

Collection of Plant Materials:

The medicinal plant of *Cassia alata* L was collected from Poondi Village Thanjavur District. The collected materials were sorted out all parts were shade dried at room temperature (37 0C) the shade dried materials were grind powder form, and stored in room temperature.

Preparation of Plant extracts

The flowers collected carefully. Thoroughly washed flowert was allowed for shade drying under room temperature in the laboratory. The dried leaves were ground to fine powder using a blender. The Powder was preserved in an air tight bottle for further studies.

Taxonomic Classification:

Kingdom – Plantae
Subkingdom – Tracheobinota
Super Division - Spermatophyta
Division - Mangoliophyta
Class – Magnoliopsida
Sub Class - Rosidae
Order - Fabales
Family - Fabacae
Genus – Cassia
Species - fistula

Fig 1.*Cassia alata* L

Preliminary phytochemical analysis

Cassia alata L polar and non polar solvent extract of leaf was preliminary qualitatively screened for phytochemicals as per standard biochemical procedure. The crude extract was diluted with diethyl ether, chloroform, acetone to the concentration of 1mg/ml. The photochemical analysis of crude extract, were performed to determine the presence of tannin, saponin, flavonoid steroid, cardiac glycosides, alkaloids, anthraquinones.

Phytochemical Screening

Phytochemical screening was carried out on the aqueous, methanol, hydro-alcoholic and ethanolic extracts used for the qualitative determination of phytochemical constituent as described by Trease and Evans (1989). 10% of the sample to solvent was diluted and allowed to stand for 1 hour before filtration. The extracts were collected and used for the following:

(1) Test for Saponin

5mls of dilute extract of aqueous and ethanol is vigorously shaken respectively for 2mins with 10mls of water (distilled) in 2 test tubes. If frothing occurs and on addition of olive oil emulsion is formed, it indicates the presence of saponin.

(2) Test for Saponin Glycosides

To 2.5mls of the extracts, add a mixture of Fehling solution A and B. A bluish green precipitate shows the presence of Saponin glycoside.

(3) Test for Glycoside

Add 2.5ml of dilute H2SO4 to 5mls of the extract respectively in a test tube and boil for 15mins, cool and neutralize with 10% NaOH. Add 5mls of Fehling solutions A and B. A brick-red precipitation of reducing sugars indicate presence of glycosides.

(4) Test for Anthracenes

Extracts are shaken with equal volume of chloroform and allowed to separate. Brick-red precipitate is formed with anthracenes.

(5) Test for Flavonoids

A few drops of 1% NH3 solution is added to the aqueous and ethanolic extract respectively of the plant sample in test tubes. A yellow coloration is observed if flavonoid compounds are present.

(6) Test for Alkaloids

To the extracts, add a mixture of iodine in potassium iodide and shake vigorously. Deep brown precipitate indicates the presence of alkaloids.

(7) Test for Tannins

Boil 5g of each powdered sample in 50ml distilled water of 3 mins on a hot plate. Filter the content. To the filtrate add drops of 10% ferric chloride solution. A blue or green colour indicates the presence of tannins. Trease and Evans (1989)

(8) Test for Anthraquinone

To 1g of the powdered plant material, add chloroform and shake it for 5 mins. Filter the content. To the filtrate add 5ml ammonia solution and shake properly. A bright pink colour in the upper aqueous layer indicates the presence of anthraquinone.

Table 1 Phytochemical screening of *Cassia alata* flowers of various extracts

S.No	Phytochemical Test	Methanol Extract	Ethanol Extract	Hydro alcohol	Aqueous extract
1.	**Alkaloids**	+	+	+	+
2.	**Tannin**	+	+	+	+
3.	**Saponin**	_	_	+	+
4.	**Anthraquinone**	+	_	_	+
5.	**Anthocyanosides**	+	_	_	+
6.	**Phenoli**	_	_	+	+
7.	**Flavonoids**	+	+	+	+
8.	**Steroids**	+	+	+	+
9.	**Terpenoids**	+	+	+	+

(-) Absence; (+) Presence

RESULTS AND DISCUSSIONS

Alkaloids are present in higher quantities in ethyl-acetate extracts of all the six species- *Cassia alata, Cassia surratensis, Cassia occidentalis, Cassia sericea, Cassia tora, Cassia auriculata* only methanol extract of *Cassia alata, Cassia sericea, Cassia auriculata*, only ethanol extract of *Cassia alata, Cassia auriculata* and *Cassia tora*. It is moderately present in methanol extracts of *Cassia occidentalis* and *Cassia tora*; whereas in *Cassia surratensis Cassia occidentalis* and *Cassia sericea* it shows moderate amounts in ethanol extracts. Tannins reduce the risk of coronary heart diseases (**5) Anthraquinones** are present only in moderate amount in ethanol extract of *Cassia alata* and methyl extract of *Cassia surratensis.* **Anthocyanosides** are present in moderate amounts only in methanol extract of *Cassia occidentalis.* (**5)**

Phenolic compounds are one of the largest and most ubiquitous groups of plant metabolites (**6**).Natural antioxidants mainly come from plants in the form of phenolic compounds such as flavonoids, phenolic acids, tocopherols etc (**11**).

Flavonoids are also known as vitamin P or plant modifiers, present in high quantities in methanol extract of *Cassia occidentalis* and ethyl acetate extract of *Cassia auriculata.*Whereas in ethanol extract of *Cassia alata, Cassia auriculata, Cassia sericea* and methanol extract of *Cassia surratensis, Cassia auriculata, Cassia sericea, Cassia alata* and ethyl acetate extract of *Cassia surratensis* and *Cassia tora* it is found in moderate amounts.[5]

Methanol extract : The methanol extract of *S. alata* had the wider spectrum of inhibitory activity on streptomycin-resistant *E. coli* when compared to all the other organisms. It was slightly sensitive to *Alcaligenes* sp. and *P. fluorescens* (mm) (7).

Aqueous extract : The inhibitory activity was observed the very high ranging of the zone in 27-28 mm. Aqueous extracts showed very significant antimicrobial activity against the tested organisms .

Ethanol extract

The ethanol extract of *S. alata* was a wider spectrum of inhibitory activity on streptomycin. As the volume increased, the zone of inhibition was also increased. The negative control (disc having only the solvent ethanol) expressed their inability for their antibacterial activity against all the Gram-positive and Gram-negative organisms used in this study.

DISCUSSION

Traditional herbal medicines have a long history of use and are generally considered to be safer than synthetic drugs. Over 50% of all modern clinical drugs are natural products that play an important role in drug development in pharmaceutical industries The order of the phytochemical is aqueous, Hydro alcohol ethanol and methanol (Table 1). The results clearly showed that terpenoids, flanovoids, and anthraquinones which were abundantly found in water and hydro alcoholic extracts of *S. alata* flowers.

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