

Phytochemical Evaluation of Cassia Fistula Leaves – “The Golden Shower”

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Abstract- Since ancient times, the world has been a part of herbal medicinal system. Cassia species are worldwide. The plant *Cassia fistula*, which belongs to the family leguminosae has a great medicinal potential and used in the Ayurvedic system of medicine for the treatment of ailments. As phytochemicals or the secondary metabolites which are present in various parts of plants, play an important role in the biological activities, these are considered as “man-friendly medicines”. The present study aimed in evaluating phytochemical components present in the ethanolic extract of *Cassia fistula*. It was observed that the ethanolic extract of *Cassia fistula* possess the high levels of alkaloids, flavonoids, tannins, phenols, saponins, phytosterols, carbohydrates, glycosides, diterpenes, proteins and aminoacids. These phytochemicals might be the key agents responsible for the ailment of adverse effects.

Keywords- Cassia fistula, leaf extract, pharmacology, phytochemistry.

I. INTRODUCTION

Nature is a wealthy source with abundant medicinal plants containing different active constituents that are familiarised to cure disease and relieve from pain. *Cassia fistula*, a member of leguminosae family also known as Indian laburnum or Golden shower tree because of its beautiful bunches of yellow flowers is distributed in Mauritius, India, South Africa, Mexico, China, West Indies, East Africa and Brazil.^[1] In Ayurveda, *Cassia fistula* is used for adenopathy, burning sensations, leprosy, skin diseases, syphilis, and tubercular glands and in Yunani, the leaves are used for treating inflammation.^[2] Several pharmacological studies has been reported about the plant for its anti-bacterial^[3], antidiabetic^[4], hypocholesterolaemic^[5], hepatoprotective^[6], anti-tumour^[7], laxative^[8] and antioxidant effects^[9]. Besides its pharmacological properties, the plant extract is also suggested in prevention of pests and disease control agents in India.^{[10],[11] and [12].} Thus the plant has a widespread acceptance across the world.

II. MATERIALS AND METHODS

Collection of plant material

The fresh leaves of *Cassia fistula* were collected from the various parts of Palakkad District, Kerala. Washed the leaves with clean sterile water and allowed to shade dry. Using mechanical blender the shade dried leaves were ground into fine powder and then transferred into air tight container.

Preparation of Extraction

20gms of the powdered leaves of *Cassia fistula* were subjected to Soxhlet extraction at room temperature for 48 hours in 100 ml of ethanol. The filtrate solution was concentrated and evaporated and stored in a cool place.

Phytochemical screening

The preliminary phytochemical analysis of crude extract were performed for the detection of the chemical compounds present in it according to the standard procedures.^{[13], [14], [15], [16], [17] and [18]}

Test for Alkaloids

- Hager’s test: To 1 ml of plant extract, a drop or two of Hager’s reagent was added. The formation of yellow precipitate indicated the test as positive.
- Wagner’s test: Two drops of Wagner’s reagent was added to 1ml of the plant extract along the sides of the test tube. The formation of yellow or brown precipitate confirmed the test as positive for alkaloids.

Test for Flavonoids

- Alkaline reagent test: Addition of 5 drops of 5% sodium hydroxide to 1 ml of the plant extract resulted an increase in the intensity of the yellow colour which became colourless on addition of a few drops

of 2M hydrochloric acid which indicated the presence of flavonoids.

- b) Lead acetate test: A few drops of 10% lead acetate added to 1ml of the plant extract resulted in the formation of yellow precipitate confirmed the presence of flavonoids.

Test for Saponins

- a) Foam test: 5 ml of the plant extract taken in a test tube was shaken well for five minutes. Formation of stable foam confirmed the test.

Test for Phytosterols

- a) Salkowski test: In 2 ml of plant extract, 2ml of chloroform and 2 ml of concentrated sulphuric acid was added and shaken well. Chloroform layer appeared red and acid layer greenish yellow fluorescent. This confirms the presence of phytosterols.
- b) Liebermann-Burchard test: 2ml of plant extract was mixed with chloroform. 1-2 ml acetic anhydride and 2 drops of concentrated sulphuric acid from the side of the test tube was added in the mixture. First red, then blue and finally green colour indicates the presence of phytosterols.

Test for Carbohydrates

- a) Molisch's test: Plant extract was treated with 2 drops of alcoholic α -naphthol solution in a test tube and 2 ml of concentrated sulphuric acid was added carefully along the sides of the test tube. Formation of violet ring at the junction indicates the presence of carbohydrates.
- b) Benedict's test: Plant extract was treated with Benedict's reagent and heated on a water bath. Formation of an orange red precipitate indicates the presence of reducing sugars.
- c) Fehling's test: Plant extract were hydrolysed with dilute hydrochloric acid neutralized with alkali and heated with Fehlings A and B solutions. Formation of a red precipitate indicates the presence of reducing sugars.

Test for Glycosides

- a) Borntrager's test: Plant extract was treated with ferric chloride solution and immersed in boiling water for about 5 minutes. The mixture was cooled and shaken with an equal volume of benzene. The benzene layer was separated and treated with ammonia solution. Formation of rose-pink colour in the ammoniacal layer indicates the presence of anthranol glycosides.

Test for Diterpenes

- a) Copper acetate test: The plant extract is dissolved in distilled water and treated with copper acetate solution. Formation of emerald green colour indicates the presence of diterpenes.

Test for Tannins

- a) Ferric chloride test: Added a few drops of 5% ferric chloride solution to 2 ml of the plant extract. Formation of blue colour indicated the presence of hydrolysable tannins.
- b) Gelatin test: To the extract, 1% gelatin solution containing sodium chloride was added. Formation of white precipitate indicates the presence of tannins.

Test for Phenols

- a) Ferric chloride test: Plant extract was treated with few drops of ferric chloride solution. Formation of bluish black colour indicates the presence of phenols.

Test for Proteins and Aminoacids

- a) Xanthoproteic test: The plant extract is treated with a few drops of concentrated nitric acid. Formation of yellow colour indicates the presence of proteins.
- b) Ninhydrin test: The plant extract is treated with 0.25% v/v ninhydrin reagent and boiled for a few minutes. Formation of blue colour indicates the presence of aminoacids.

III. RESULTS AND DISCUSSION

The results of the phytochemicals residing in the ethanolic extract of *Cassia* is depicted in table.

Table-1:- Screening of the phytochemicals.

S.no	Phytochemical components	Results
1.	Alkaloids	++
2.	Flavonoids	++
3.	Saponins	++
4.	Phytosterols	+
5.	Carbohydrates	+
6.	Glycosides	+
7.	Diterpenes	+
8.	Tannins	++
9.	Phenols	++
10.	Proteins and aminoacids	+

(++) strongly present; (+) present;

The extract of *Cassia fistula* attributes to their primary and secondary metabolite composition. The plant organs are potent source of secondary metabolites especially leaf, stem, fruit, seed, and pods. Even the pollen grains of this plant plays a significant role in allergy due to the protein and free aminoacid composition.^[19]In the present study we found that the ethanolic extract of *Cassia fistula* possess the high levels of alkaloids, flavonoids, tannins, phenols than the other components such as saponins, phytosterols, carbohydrates, glycosides, diterpenes, proteins and aminoacids. Mainly flavonoids and phenolic compounds tends to be most commonly known with regards to antioxidant nature and also showed antitumor, antibacterial and anti-inflammatory properties.^[20]Studies shows that the *Cassia fistula* extract possess antifungal activity due to the presence of either glycosides or tannins^[21] and the tannins tend to anthelmintic properties by binding to free protein in the gastrointestinal tract of the host.^[22]According to the Indian system of medicine, *Cassia fistula* L.has a great therapeutic implication and exerts an antioxidant, anthelmintic, antipyretic, analgesic, anti-inflammatory, and hypoglycemic effects.^[23] and ^[24].

IV. CONCLUSION

The phytochemical studies of *Cassia fistula* leaf was investigated and it is clear that the plant is an important source of naturally occurring bioactive compounds such as alkaloids, phenols, tannins, flavonoids, carbohydrates and have a broad pharmacological spectrum. The study imparts the knowledge about the different medicinal properties of *Cassia fistula*. However the extract should be explored for the phytochemical

characterization and the identification of responsible bioactive compounds.

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