



## **PRELIMINARY PHYSICO-PHYTOCHEMICAL STUDY OF THE FRUIT OF A MEDICINAL PLANT *CASSIA FISTULA* L.**

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### **ABSTRACT**

*Cassia fistula* L. is a plant of family Fabaceae and has a great medicinal potential. It is used for the treatment of various diseases and ailments because of its antimicrobial, anti-inflammatory, antioxidant and antidiabetic properties. The present communication deals with the macroscopic and preliminary physico-phytochemical studies on the fruit of the plant. The macroscopical studies involved the colour, odour, taste, shape and length of the fruit. The physicochemical parameters viz. loss on drying and ash content were evaluated. Soxhlet extraction of the powdered material of the fruits was done with 90% ethanol and water and the extractive values were evaluated. The extract obtained was subjected to preliminary phytochemical screening, which indicated the presence of tannins, flavonoids, and glycosides.

**Key words:** *Cassia fistula*, Macroscopic parameters, Physicochemical properties, Phytochemical study.

### **INTRODUCTION**

Traditional and folklore medicines play an important role in health services around the globe. According to Usman et al.<sup>1</sup>, about three quarters of the world's population relies on plants and its extracts for health care. Akinpelu et al.<sup>2</sup> studied the literature reports and ethnobotanical records that suggest that plants are the sleeping giants of Pharmaceutical industry. According to Panthi and Chaudhary<sup>3</sup>, traditional methods of treatment using plants are predominant in rural societies of India. *Cassia fistula* L. is a semi-wild Indian Labrum also known as Golden Shower. *Cassia fistula* L. is one of the most widespread trees in the forest of India, usually occurring in deciduous forest. It is 8 m to 24 m in height, with greenish gray smooth bark when young and rough, dark brown when mature. Leaflets are 8-12 pairs and flowers are yellow. Seeds are light brown, hard and shiny. Ali et al.<sup>4</sup> cited in their paper that the whole plant of *Cassia fistula* L. possesses medicinal properties in the treatment of fever, heart disease, gout, ring worm, facial paralysis, thoracic obstructions,

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rheumatism, anorexia, jaundice, skin diseases and inflammatory diseases. According to Kumar et al.<sup>5</sup>, the plant possesses the properties of mild laxative suitable for children and pregnant women. It has also hypoglycemic and antibacterial activity. According to Duraipandiyar and Ignacimuthu<sup>6</sup>, the pulp of the ripe fruits has a mild, pleasant, purgative action and is also used as an anti-fungal drug. Bahorun et al.<sup>7</sup> cited in their paper that the plant extract is also recommended as pest and disease control agents in India. Biologically active compounds present in the medicinal plants have always been of great interest to scientists working in this field. These compounds are responsible for the medicinal properties of various parts of plants. According to Rizvi et al.<sup>8</sup>, the medicinal properties of *Cassia fistula* L. seems to depend on the total phenolic, proanthocyanidin and flavonoid contents of this labrum. Due to the fact that the plant of *Cassia fistula* L. has a great medicinal potential and little information is available on the compounds present in the different parts of the plant, it was thought important to investigate the preliminary physicochemical and phytochemical properties of the plant.

## EXPERIMENTAL

The fruits of the plant *Cassia fistula* L. were collected from the local area of Vidisha District (India). It was authenticated by the botanist of S. S. L. Jain P. G. College, Vidisha and a voucher specimen was produced in the herbarium record of Pest Control and Ayurvedic Drug Research Laboratory, Vidisha (India). The fruits were stored under the normal environmental conditions and the macroscopical characters were studied as per the procedure given in WHO guidelines<sup>9</sup>. Physico-chemical parameters such as loss on drying, ash values and extractive values were performed as per official standard procedures given by Bhatia et al.<sup>10</sup>

### Extraction by soxhlet method

The extraction was performed according to the method given by Edeoga et al.<sup>11</sup> The fruits of the plant were washed with water, shade dried and ground into powder by using pestle and mortar. The powder of the plant material was extracted in Soxhlet apparatus using 90% ethanol and distilled water as solvents. The extraction was done for 48 hours duration and up to 8 cycles of extraction. The crude extracts were concentrated in a Rotavapour below 40°C. After that, the crude extracts were evaporated on a water bath to get dryness. The extracts obtained with solvents were weighed and their percentages were calculated as compared to the initial weights of the plant material to get the extractive values.

### Preliminary phytochemical analysis

Preliminary phytochemical screening for the presence of tannins, alkaloids, flavonoids,

sterols, glycosides and saponins were carried out using standard procedures according to Olabiyi et al.<sup>12</sup> and Musa et al.<sup>13</sup>

### **Test for tannins**

**Ferrous chloride test:** 2 mL of ethanol extract was taken and 5 drops of ferrous chloride solution was added to it. Dirty green precipitate indicates the presence of tannins.

**Phlonatannins test:** 5 mL of 1% hydrochloric acid was added to the ethanol extract. Red precipitate indicates the presence of tannins.

### **Tests for alkaloids**

2 mL of ethanol extract was stirred with 5 mL of 1% aqueous hydrochloric acid on a steam bath. 1 mL of the filtrate was treated with 2 drops of Mayer's reagent. The second 1 ml portion was treated with Wagner's reagent. Creamy white (Mayer) and reddish brown (Wagner) precipitates indicate the presence of alkaloids.

### **Tests for flavonoids**

**Ferric chloride test:** 10% ferric chloride was added to the aqueous extract. Green precipitate shows the presence of flavonoids.

**Shinoda test:** A little amount of magnesium powder and 3 drops of concentrated hydrochloric acid were added to 4 mL of ethanol extract. Red colour indicates the presence of flavonoids.

**Sodium hydroxide test:** 4 mL of aqueous sodium hydroxide was added to 2 mL of ethanolic extract. Yellow precipitate indicates the presence of flavonoids.

### **Test for sterols**

2 mL concentrated sulphuric acid was added to 1 mL of ethanol extract. Brownish red colour shows the presence of sterols.

### **Test for glycosides**

10 mL of 50% sulphuric acid was added to 1 mL of ethanol extract. The mixture was heated on water bath for 15 min. Then 5 cm<sup>3</sup> each of Fehling solutions A and B were added and boiled. Red precipitate indicates the presence of glycosides.

### **Test for saponins**

**Frothing test:** 2 mL of ethanol extract was shaken vigorously in a test tube for 2 min.

Frothing shows the presence of saponins.

## RESULTS AND DISCUSSION

The macroscopical study of the fruit of *Cassia fistula* L. was done. For the study, the fruits were kept in the natural environment. The fruits were found to be brown in colour, characteristic odour, cylindrical shape and sweet in taste. (Table 1). The values of the physical constants like ash values, extractive values and loss on drying were determined. They are believed to be lying within the permissible limits and these values can be used for further investigations (Table 2). Preliminary qualitative phytochemical screening revealed the presence of tannins, flavonoids and glycosides (Table 3).

**Table 1: Macroscopical evaluation of *Cassia fistula* L. fruit**

Features	Observations
Colour	Brown
Odour	Characteristic
Taste	Sweet
Shape	Cylindrical and septate
Length	30-40 cm
Diameter	1-3 cm

**Table 2: Physicochemical analysis of fruits**

Physical constants	(%)
Loss on drying	9.18
Total ash	10.54
Acid insoluble ash	1.79
Water soluble ash	6.88
Sulphated ash	9.76
Extractive values	
(i) Alcohol	10.98
(ii) Water	12.34

**Table 3: Phytochemical screening results**

	<b>Group</b>	<b>Observation</b>	<b>Inference</b>
<b>Tannins</b>			
(a)	Ferrous chloride test	Dirty green precipitate	+
(b)	Phlonatannins test	Red precipitate	+
<b>Alkaloids</b>			
(a)	Mayer test	Brown colour instead of creamy white ppt	-
(b)	Wagner test	Yellow colour instead of reddish brown ppt	-
<b>Flavonoids</b>			
(a)	Ferric chloride test	Green precipitate	+
(b)	Shinoda test	Red precipitate	+
(c)	NaOH test	Yellow precipitate	+
<b>Sterols</b>			
(a)	Sulfuric acid test	Cream colour instead of brownish red ppt	-
<b>Glycosides</b>			
	Fehling test	Red precipitate	+
<b>Saponins</b>			
(a)	Frothing test	No stable froth	-

A large population of the world still depends on natural sources of medicines like plants for their primary health requirements but still the scientific data available about the medicinal plants and their properties is very less. Standardization of herbal drugs is a topic of great concern because of the great variability derived from heterogeneous sources. In the present scenario, when there is an urgent need for new sources of effective medicines with least side effects, the procedure of standardization of herbal sources will help the pharmacology to use the great variety of medicinal plants in more effective and logical way. Macroscopic and other physical values and parameters will help to identify the species of plant and the phytochemical study will reveal the presence of the compounds, which play major role in the medicinal nature of this plant. Since *Cassia fistula* L. fruit is known for its wide range of medicinal properties, the present study may be useful in respect to its identification, authentication and standardization.

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