

## REVIEW ARTICLE

# Pharmacological boon of *Cassia fistula*: A Review

Pradeep Kant Pachauri\*<sup>1</sup>, Vishal Kumar Vishwakarma<sup>2</sup>, Shravan Kumar Paswan<sup>2</sup>

## ABSTRACT

*Cassia fistula* (Aragvadhah) is an important drug used in the Indian system of medicine. It is a medium-sized deciduous tree with long and cylindrical fruits containing pulp and also with a bright yellow colored flower. The tree is found throughout India in all deciduous forests and hilly tracts. The present article gives an account of updated information on its phytochemical and pharmacological properties. The review reveals that wide numbers of phytochemical constituents have been isolated from the plant, which possesses activities like antiperiodic, diuretic, purgative, laxative, antiasthmatic, hepatoprotective, anti-allergic and various other important medicinal properties. Phytochemical and Pharmacological reviews on plants will give valuable information which will assist the scientists in getting more advanced knowledge about a plant species.

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## INTRODUCTION

*Cassia fistula* L., a very common plant known for its medicinal properties, is a semi-wild Indian Labernum known as the golden shower. It is distributed in various regions, including Asia, South Africa, China, West Indies, and Brazil.<sup>1,2</sup>

## Traditional Medicinal Use

The Indian subcontinent is a vast repository of medicinal plants that are used in traditional medical treatments.<sup>3,4</sup> Traditional and alternative medicine is extensively practiced in the prevention, diagnosis, and treatment of various illnesses in Table 1. It has attracted increasing public attention over the past 20 years as this type of medicine is easily accessible in some regions.<sup>5,6</sup>

<sup>1</sup>Department of Pharmacy, Ram-Eesh Institute of Vocational & Technical Education, Greater Noida, Uttar Pradesh, India.

<sup>2</sup>Department of Pharmacology, All India Institute of Medical Sciences, New Delhi 110029, India.

**Corresponding Author:** Pradeep Kant Pachauri, Assistant Professor of Pharmacology, Department of Pharmacy, Ram-Eesh Institute of Vocational & Technical Education, Greater Noida, Uttar Pradesh, India. Mob.: +91-8218560512, E-mail: 1993.pachauri@gmail.com

## Ayurvedic Preparations

It is one of the ingredients of the preparation, which is known as Constivac, a bowel regulator, relieves constipation. It is also one of the ingredients of the preparations known as Pilex, Purian for piles and detoxifier respectively.<sup>7</sup>

## Morphological Characters

*Cassia fistula* Linn. (*Cassia*) family Caesalpinaceae commonly known as Amaltas is one of the most widespread trees in India up to an altitude of 1300m in the sub-Himalayan tract and the outer Himalayas. The plant is cultivated as an ornamental throughout India. *Cassia fistula* is a deciduous, medium-sized tree up to 24m in height and 1.8 m in girth, with a straight bole up to 15 m, found both wild and cultivated almost throughout India. Its bark is grey, smooth, exfoliating in small, woody scales upto 1.5 cm thick; leaves 20-40 cm, rachis and petiole glands, 4-8 pairs, distinctly stalked, 5-15 cm long, ovlong or ovate, clothed with young, caduceus, silvery pubescence; flowers bright yellow, shiny Corolla 3.8 cm across, yellow; stamens all antheriferous, in axillary, pendulous lax racemes :pods cylindrical pendulous ,smooth ,hard dark brown or black indehiscent, with numerous (40-100) horizontal seeds immersed in a dark coloured sweetish pulp (Figure 1). Seeds broadly ovate, 8mm. long, slightly less in breadth, and 5mm thick.<sup>8,9</sup> Drugs occurs in flat or curved thick pieces; outer surface smooth to rough with warty patches; greenish-grey to red; inner surface rough, reddish with parallel striations; fracture, laminate, odor, sweet and characteristic; taste, astringent. The fruit pods are 40-70 cm long and 20-27mm in diameter, straight or slightly curved, smooth but finely striated transversely, the striations appearing as fine fissures the rounded distal ends bear a small point marking the position of the style. The dorsal suture appears as a single vascular strand and the ventral suture

**Table 1:** Parts of *Cassia fistula* and their uses

S.N	Part of plant	Traditional Uses
1	Flower	Purgative, febrifuge
2	Leaves	Reduce mutagenicity, Skin disorder, backward fever, laxative
3	Roots	Common cold, fever, tonic, astringent
4	Fruit	Cathartic, snake bite, Asthma
5	Bark	Laxative, Anthelmintic, Emetic, Febrifuge, Diuretic

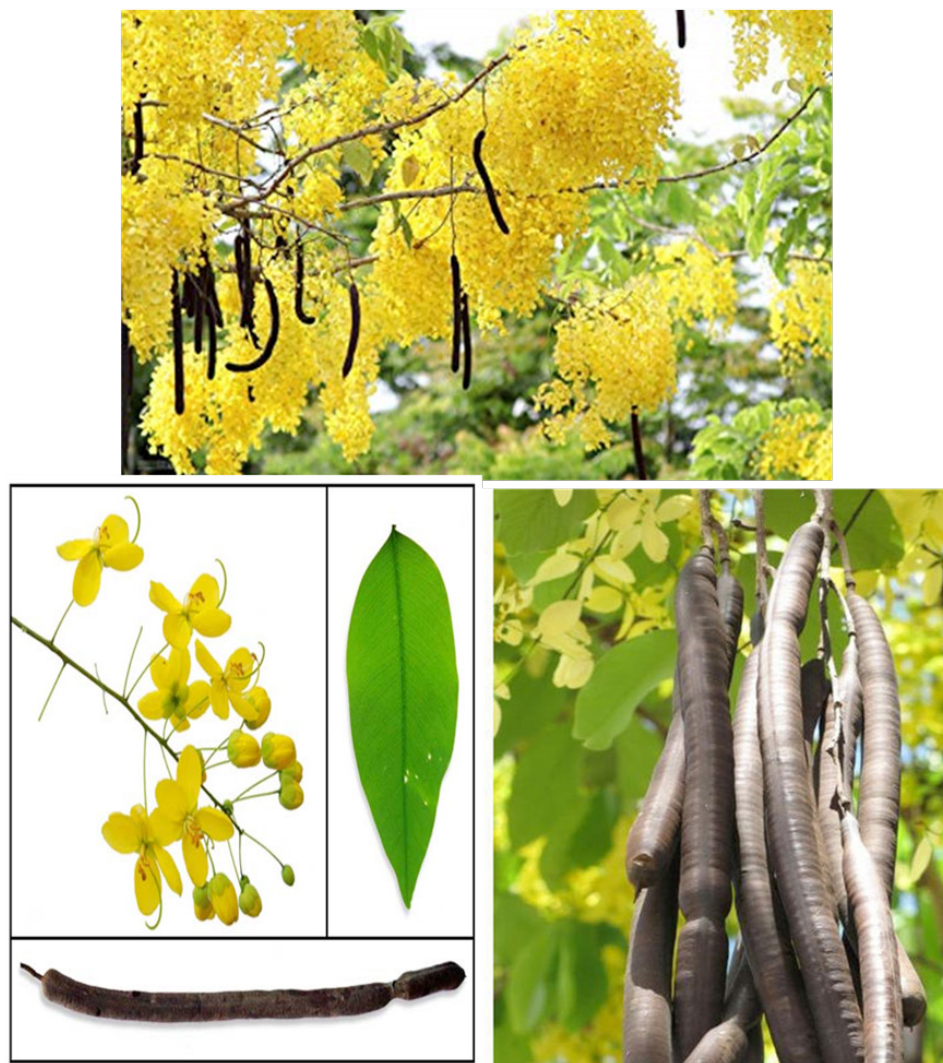


Figure 1: Plant of *Cassia fistula*

as two closely applied strands. Internally the pod is divided by thin, buff-colored, transverse dissepiments at intervals of about 0.5cm. Each compartment contains one seed, which is flat, oval, reddish-brown with a well-marked raphe. The seed contains a whitish endosperm in which the yellowish embryo is embedded.<sup>10</sup>

#### Reported chemical constituents of *Cassia fistula*

A comparative study of secondary metabolites was reported for<sup>11</sup> using qualitative tests were performed on *Cassia spectabilis*, *Cassia siamea*, *Cassia fistula*, *Cassia biflora*, and *Cassia hirsuta*. Qualitative analysis was done for various phytoconstituents like alkaloids, tannins, saponins, anthraquinones, anthocyanosides, phenolic flavonoids, flavonoids, carbohydrates, proteins, steroids, terpenoids, cardiac glycosides, and phlobatannins. The ethanol, methanol, and ethyl acetate leaf extracts were prepared to detect the presence of the active components. The phytochemical screening revealed the presence of all the above chemical constituents except anthraquinones, anthocyanosides and phenolic flavonoids.

Pharmacognostic and phytochemical evaluation of leaves of *Cassia fistula* was reported for 12 Diagnostic characters of powder include unicellular covering trichomes, anomocytic and paracytic stomata, xylem vessels with reticulate thickening and prism-shaped calcium oxalate crystals. Phytochemical analysis showed the presence of important classes of phytoconstituents like anthraquinone glycosides, flavonoids, phenolic compounds, and carbohydrates. This would help in the isolation of phytoconstituents, therapeutic investigations, and standardization of formulations containing leaf material of *Cassia fistula*.

#### PHARMACOLOGICAL ACTIVITIES OF DIFFERENT PARTS OF *CASSIA FISTULA*

##### Hepatoprotective activity

The hepatoprotective activity of the n-heptane extract of *Cassia fistula* leaf in rats. Hepatotoxicity inducing was with carbon tetrachloride: liquid paraffin mixture (1:1). The extract has been shown to possess significant protective

effect by lowering the serum levels of transaminases (SGOT and SGPT), bilirubin, and alkaline phosphatase (ALP) at a dose of 400 mg/kg which was comparable to that of a standard hepatoprotective agent.<sup>13</sup>

### Antitumor activity

The antitumor effects of methanolic extract (ME) of *Cassia fistula* seed on the growth of Ehrlich ascites carcinoma (EAC) and on the life span of tumor-bearing mice were studied. The results of the present study suggest that ME of *Cassia fistula* seed has antitumor activity.<sup>14,15</sup>

### Antifertility effect

Petroleum ether extract of seeds of *Cassia fistula* was screened for the antifertility activity; the results of the present study indicate that the petroleum ether extract of *Cassia fistula* seeds possesses pregnancy terminating effect by virtue of anti-implantation activity.<sup>16,17</sup>

### Antioxidant activities

The antioxidant activities of phenolic, proanthocyanidin, and flavonoid components in extracts of *Cassia fistula* and fresh vegetative and reproductive organs of *Cassia fistula* harvested at different stages of growth were determined using the Trolox equivalent antioxidant capacity and ferric reducing antioxidant power assays. The antioxidant activities of reproductive parts were higher than those of the vegetative organs, with the pods having a highest total phenolic, proanthocyanidin, and flavonoid contents and antioxidant potentials.<sup>18,19</sup>

### Antibacterial and antifungal activity

Various extracts like hexane, chloroform, ethyl acetate, methanol and water extracts from the flower of *Cassia fistula* (an ethnomedicinal plant) were tested against bacteria and fungi. All the extracts exhibited antibacterial activity against Gram-positive organisms with minimum inhibitory concentrations between 0.078 and 2.5 mg/mL.<sup>20</sup>

### Antiulcer activity

The ethanol leaf extract of *Cassia fistula* Linn. was evaluated for antiulcer activity against pylorus ligation-induced gastric ulcer. Four hours after pyloric ligation, the gastric juice was collected for evaluation of various parameters results were found that extract exhibits significant antiulcer activity.<sup>21,22</sup>

### Antiparasitic activity

The antiparasitic activity of biochanin A, an isolated isoflavone from the dichloromethane extract of *Cassia fistula* fruits. This compound showed a 50% effective concentration (EC<sub>50</sub>) value of 18.96 microg/mL against

promastigotes of *Leishmania* (L.) *chagasi* results contribute with novel antiprotozoal compounds for future drug design studies.<sup>23</sup>

### Immunomodulatory activity

Modulation of humoral immunity by *Cassia fistula* and amoxycassia in mice. Immunomodulatory effect of fruit of *Cassia fistula*, a traditional medicinal plant and its synergistic antimicrobial combination with amoxicillin named Amoxy-cassia studied on the humoral immune system of BALB/c mice. Rising antibody titer was observed in all animals but Amoxy-cassia treated mice serum had the highest HA titer throughout the experiment suggesting its therapeutic usefulness.<sup>24</sup>

### CONCLUSION

The extensive literature survey revealed that *Cassia fistula* is an important medicinal plant with diverse pharmacological spectrum. The plant shows the presence of many chemical constituents which are responsible for the varied pharmacological and medicinal property. The evaluation needs to be carried out on *Cassia fistula* in order to uses and formulation of the plant in their practical clinical applications, which can be used for the welfare of mankind.

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