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***Short Review Paper***

# *Cassia fistula* Linn (*Khiyar Sambhar*): A traditional Unani medicine with different pharmacological activities

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## Abstract

*Cassia fistula is also well-known as Linn Golden shower. Since ancient times, it used as a medicine in the healthcare system. In the Unani system of medicine, it was used to get rid of evil spirits and has been used to cure the root cause of diseases hence it was termed as a sky. This article attempts to search and accumulate the diverse traditional Unani properties of Cassia fistula and to report till date its pharmacological actions. It is a tree of 6-9m.high that belongs to the Fabaceae family. Different part of this tree such as bark, leaves, pod, fruit pulp, and flower are used in various diseases. It is extensively cultivated in Brazil, East Africa, Mexico, and South Africa. In traditional Unani medicine, it is used in various diseases of central nervous, respiratory, cardiovascular, gastrointestinal, urogenital, integument and locomotor systems. It is useful in headache, leprosy, syphilis, arthritis, fever, dysmenorrhoea, post dated pregnancy, constipation, pharyngitis, and eye diseases. Classically, it has emmenagogue, abortifacient, anti-inflammatory, carminative, analgesic, and laxative actions. Currently, it's pharmacologically and biologically activities in animal models such as antibacterial, antifungal, antidiabetic, anti-inflammatory, antioxidant, hepatoprotective, antifertility, wound healing and anticancerous properties are proven. Further, clinical trials are suggested to prove its aforementioned pharmacological activities in humans.*

**Keywords:** Anti-inflammatory, *cassia fistula* linn, emmenagogue, *khiyar sambar*, traditional medicine.

## Introduction

*Cassia fistula* Linn (*Khiyar sambhar*) is also well-known as the golden shower. Since ancient times, it used as a medicine in the healthcare system. In the Unani system of medicine, it was used to get rid of evil spirits[1] and has been used to cure the root cause of diseases; hence it was termed as sky[2].

**Etymology:** It is derived from the Greek word *Kasia*, meaning to cut off or strip off bark[3].

**Botanical name***: Cassia fistula* Linn
**Kingdom**: Plantae
**Family**: Fabaceae
**Genus**: *Cassia*
**Species**: *fistula*[4,5]

**Vernacular names:** Arabic: *Khiyar sambhar*; English: Golden shower, Indian labrum; Bengali: Amultash, Sondal, Sonali; Gujrathi: Girmala; Hindi: Bandarlathi, Bharva, Suvarnaka; Kannada: Kakki; Marathi: Bahava; Malayalam: Tengulli, Rajah; Sanskrit: Argwadha, Rajtaru, Survanaka; Punjabi: Amaltaas, Girdnalee, Kaniyaar; Oriya: Sunaari; Tamil: Kavani, Tirukontai, Raelachettu, Sarakkonne; Telugu: Kakkemara; Urdu: *Amaltas*[4,5].

**Description in Unani Medicine:** It is one of the famous trees of medicinal importance. It resembles the tree of apricot but the leaves are smaller than apricot leaves, comparatively the edges are sharp and hard, flowers are beautiful and dark yellow in colour[6].

Its pod is cylindrical, pendulous, indehiscent, smooth, hard, dark brown or black, transversely divided into numerous seeded chambers by brittle ligneous dissepiments. Seeds flat broadly ovate, embedded in soft black sweetish pulp[4].

**Parts used:** Bark, leaves, flower, pod, fruit pulp, flower[7].

***Mizaj* (Temperament):** ***Poste amaltas:*** Hot and dry in 2 degree[4].

***Maghze amaltas*:** Hot and cold in 1 degree[1].

***Afa'l* (Actions):** *Mudirr-i-hayd* (emmenagogue)[4]; *Musqit* (abortificient)[4]; *Mushil* (purgative)[1,8]; *Muhallil-i-awram* (antiinflammatory)[1,9]; *Mushil-i-akhlat thalatha*[10]; *Musakkin-i-awram-i-har*[10]; *Musakkin-i-alam*(analgesic)[1]; *Munaffith-i-balgham* (expectorant)[1,7]; *Mulayyin–i-sadr*[7]; *Mukhrij-i-janin wa musheema*[1,10,11]; *Muffattih-i-sudad* (deobstruent)[1]; *Dafi-i-humma* (antipyretic)[1,12]; *Dafi-i-riyah* (carminative)[2]; *Mullayyin-i-taba*[1,6].

## *Istemal* (Uses)

**Effect on central nervous system and eyes:** Internally, it can be used to relieve headache and migraines[1]. It is used in ophthalmia and skin diseases[1,8].

**Effect on the respiratory system and ear, nose, and throat:** When it is used with *kishneez*, it helps to cure diphtheria because of its *mushil* (purgative) action[1]. Gargling with pulp of *amaltas* with coriander and *luabe asapghol* is effective in diphtheria, pharyngitis, and tonsillitis[1,9]. The paste of the root of *amaltas* with rice water is used externally in mumps[1]. The decoction of leaves of *amaltas* is poured in the ear in case of otalgia and otorrhoea[1]. When it is used with *turbud* it helps to expel the *balgham*[9]. It is used in the form of *gulqand* in dry cough[1,9].

**Effect on the cardiovascular system:** The roasted leaves or pulp of *amaltas* are used with rice to treat palpitation[1,8,13]. The pulp cooked in milk is used to treat anemia and palpitation[1,13].

**Effect on the gastrointestinal tract:** It relieves the intestinal obstruction when used with *bihidana, isapghol, reshae khitmi* and *roghane badam*[1]. It helps to cure obstruction in the liver and jaundice when used with *kasni*, *tukhme kathoos,* and *mako*[2]. It is useful in colitis[2]. The flowers of *amaltas* have laxative action and help to relieve constipation[2]. The inhalation of flowers of *amaltas* also has laxative effect[1]. *Amaltas* can be used in the form of the suppository to relieve constipation[6]. It helps to cure intestinal obstruction and liver obstruction[1]. It relieves constipation due to its laxative action[1,8].

**Effect on the urogenital system and excretion:** *Post amaltas* is useful in *ihtibas al-tamth* and *usr-i-tamth* in the form of *joshanda* either separately or with other medicines, as it possesses *mudirr-i-hayd* property[14]. It is useful in *'usr al-wilada* (dystocia) as it helps in the easy delivery of the baby and placenta[1,14]. Ten gram of *joshandae post amaltas* is used for induction of labour as it eases dystocia and placental expulsion[1,14]. The decoction of the flower of *amaltas* is used to treat hysteria[13]. *Post amaltas* helps to eliminate all the three humours[6,8,10], when it is used with *imli* it helps to eliminate excessive *safra* from the body, along with *turbud* it eliminates *balghami khilt*[6]. When it is used with *bisfaij* it eliminates abnormal *sawda* from the body[10].

**Effect on the locomotor system:** Owing to its *muhallil-i-awram* property the leaves of *amaltas*, is used in the form of a paste in gouty arthritis, joint pains, and hard swellings. It is used to cure inflammation of joints and internal organs, as it has anti-inflammatory property[6].

**Effect on integument:** The root and paste of pulp of *amaltas* is useful in skin diseases like leprosy[1,15]. The juice of leaves is useful in erysipelas[15]. The syphilitic ulcers are cured when it is washed with decoction of *amaltas* leaves[1].

**Effect on Fever:** The pulp and seeds of *amaltas* has antipyretic action[1,8].
***Muzir***: *Mida; Anth;*[1] *Musqit*[4]
***Musleh***: *Roghan mastagi*; *Roghan badam*[1,6]
***Badal***: *Turbud*[1]
***Miqdar*:** *Post amaltas*-6-12 gms[4]
***Murakabat:*** *Itrifal muqil mullaiyan*[11]
*Lauqe khiyar sambhar*[14]
*Matbookh mudirr-i-hayd*[4]

**Ethnobotanical description:** The tree *C. fistula* Linn is 6-9m is high. The trunk is straight and bark of the trunk is smooth when it is young the colour of the bark is pale grey and as the bark grows older the colour changes to dark brown. The branches are slim, scattered, and leaves are 23-40cm long. The flowers are lax racemes of 30-50 cm, long, pedicels are 38-5.7cm long, slender, "*glabrous or pubescent, calyx is 1cm, divided to the base, pubescent, segment oblong and obtuse"*. Corolla is 3.8cm across and yellow. The petals are obviated, sub-equal, shortly clawed and veined. The pods are 30-60cm long and 2-2.5cm in the diameter, brown-black, cylindric, shining, smooth, pendulous, straight, and indehiscent. The pods contain dark coloured sweetish pulp in which 40-100 horizontal seeds are wrapped up and separated by transverse dissepiments. The seeds are 8mm long and 5mm in thick, slightly less in the breath and broadly ovate[15].

**Chemical constituents:** Most of the biological effects are because of primary and secondary metabolite composition of *C. fistula* extracts. The stem bark has been reported for the source of lupeol, ß-sitosterol, and hexacosanol[16]. Flowers contain "*ceryl alcohol, Kaempferol, rhein, and a bianthraquinone glycoside and fistulin*"[8]. The flower's pollen detailed biochemical analysis was suspected to play a noteworthy allergenic role and showed 12% protein composition with substantial amounts of free amino acids such as glutamic acid, methionine, phenylalanine, and proline[5]. The edible fruit tissue has been reported to be a affluent resource of iron, calcium, and manganese compared to apricot, pear, apple, peach, and orange fruit[5,16]. The pods contain 5-nonatetracontanone, and 2-hentriacontanone[13]. "*Proanthocyanidins containing flavan-3-ol (epiafzelechin and epicatechin) units with an abnormal 2S-configuration have also been observed in pods together with the common flavan-3-ols and proanthocyanidins like catechin, epicatechin, procyanidin B-2,* and *epiafzelechin"*[5,16]. The pulp contains sucrose, fructose and high concentration of potassium[13]. In the seeds, one of the main carbohydrates was galactomannan that consist of 8 different types of sugar moieties as reported in the earlier study[16]. The seeds are enriched with glycerides, the major fatty acid such as oleic, linoleic, palmitic, and stearic acids with traces of caprylic and myristic acids[16].

## Scientific studies

**Antibacterial activity:** The antibacterial effect of *Cassia fistula* Linn leaves and bark has been described[17].

**Anti-cancerous activity:** The methanolic extract of *C. fistula* L seed rhein exhibited cytotoxic activity at 200 micrograms, the colo 320 dm cells treated with rhein showed the characters of apoptosis. The methanolic extract of *C. fistula* has showed anti-mitotic activity[5]. The methanolic extract of *C. fistula* treated prostate cancer cell showed fragmentation of geomic DNA, which indicates its anticancer activity[18].

**Antifungal activity:** Bhalodia et al have described that the hydroalcoholic and chloroform extracts of fruit pulp of *C fistula* were found to be active on some isolated microorganism and fungi as compared to standard drugs[19]. Furthermore, Jyothi et al., have described the anticandidal activity of the seeds as a promising remedy for the development of anti candidal agents in the future[17,19].

**Antidiabetic effect:** The extracts and fraction of the stem bark of the plant have appreciable anti diabetic activity and it decreases the serum glucose level and other complications of diabetes[20].

**Anti fertility Activity:** *Cassia fistula* seeds (petroleum ether) extract showed anti fertility activity by anti-implantation effect and causes pregnancy termination.

**Anti-inflammatory effect:** The methanolic extract of fruit inhibits the 5-Lipooxygenase mediated peroxidation of arachidonic acid free radical induced lipid peroxidation and hence inhibited leukotrienes biosynthesis which inhibits prostaglandin synthesis by inhibiting inflammatory mediators[21].

**Antioxidant activity:** Antioxidant potential of *Cassia fistula* extract confirmed the highest reducing power in the methanolic extract of pulp and seeds however, did not considerably reduce the free radicals under *in-vitro* studies[22]. The stem bark (methanolic extracts), leaves (ethanolic extracts), flowers, and pulp showed antioxidant property. The antioxidant activity power was high in stem bark followed by leaves, flowers and pulp. Thus the stem bark had the higher antioxidant activity for inhibition of peroxidation and DPPH radical scavenging ability[19].

**Hepatoprotective effect:** The ethanolic leaf extracts and alcoholic root extract of *Cassia fistula* showed hepatoprotective effect[5,23].

**Wound healing activity:** The alcohol extract of *C. fistula* leaves has got the wound healing property[5,24].

## Conclusion

*C. fistula* L. is herbal plant used in Unani and other traditional systems of medicines since ancient times for the different ailments of central nervous, respiratory, gastrointestinal, locomotor, and urogenital systems. This plant pharmacological activity has been confirmed on the scientific parameters, which are accredited to its phytochemical constituents. Current researches have shown that it have numerous activities such as antioxidant, antiviral, antifungal, anti-cancerous, antidiabetic, antifertility and hepatoprotective properties. However, clinical research studies are suggested to confirm aforementioned properties.

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