

The Therapeutic Applications of *Cassia fistula* Linn.: A Review

Dr. Deepak Devilal Pardhe

Head and Research Guide, Department of Botany, Sant Dnyaneshwar Mahavidyalaya, Tal. Soegaon, Dist. Chhatrapati Sambhaji Nagar, Maharashtra, India

Email: [deepgis2000\[at\]gmail.com](mailto:deepgis2000[at]gmail.com)

Abstract: *Cassia fistula* Linn., also known as golden shower, purging cassia, Indian laburnum, Kani Konna or pudding-pipe tree is a flowering plant in the family Fabaceae. The species is native to the Indian subcontinent and adjacent regions of Southeast Asia. It is the official state flower of Kerala state in India. *Cassia fistula* Linn. used in therapeutics applications since ancient times. *Cassia fistula* Linn. is employed in the management of different human health conditions and also relieving the symptoms of asthma, leprosy, ringworm, heart related disorders and fever. Extracts of *Cassia fistula* Linn. are used as laxative as well as in constipation management. Several findings based on the research have confirmed the medicinal applications and efficacy of *Cassia fistula* Linn. for human health improvements. This review reveals additional information about *Cassia fistula* Linn. benefits in the human health management.

Keywords: *Cassia fistula* Linn., Golden shower plant, Therapeutic applications, Human health management etc.

1. Introduction

Cassia fistula Linn. is a medium sized tree with elongated and rod-shaped fruits having pulp and has bright yellow flowers, earning the name 'Golden Shower'. *Cassia fistula* Linn. is medium-sized tree up to 24 m in height as well as 1.8 m in girth and it is cultivated in almost all over India (Rajagopal *et al.*, 2013). *Cassia fistula* Linn. is a deciduous tree with greenish gray bark, leaves are compound, leaflets are each 5–2 cm long pairs (Danish *et al.*, 2011) and it contains around three to eight pairs of

opposite leaflets. Medicinal plant species contain vast and unexploited riches of chemical substances with high medical potential making these plant species valuable. *Cassia fistula* Linn. is an important medicinal plant used in many traditional medicinal systems including Ayurveda and Chinese traditional medicines.

Active Ingredients

Various plant species possess an assortment of photochemical, which have been applied in the fields of human medicine, agriculture and veterinary.



Figure 1: *Cassia fistula* linn. flowers and fruits

The *Cassia* species have abundant metabolites capable of causing explicit physiological effects on the animals, humans and plants. The researchers have cited that most *Cassia* plant species have hepatoprotective, anti-inflammatory, antibacterial, antitussive, antifungal and wound healing properties. Most of these species are rich in

tannins, flavonoids, glycosides, carbohydrates, stearic acids, oleic, oxalic, linoleic, oxyanthraquinones and anthraquinones derivatives (A.Mondal, 2014). All the plant organs of *Cassia fistula* Linn. richly possess most of the active phytochemicals including the leaves, stems, roots, flowers as well as fruits (Nagpal *et al.*, 2011). The

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researchers have reported that stem bark of *Cassia fistula* Linn. is a chief source of lupeol, β -sitosterol, and hexacosanol (Sen A.B. *et al.*, 1968). Fruits and flower of *Cassia fistula* Linn. are a source of important ingredients and those ingredients show role in health management. A compound such as 1,8-dihydroxy-3-anthraquinone derivative isolated from the fruit pulp (G. Martinez-avila *et al.*, 2018) and compound isolated from the flowers are kaempferol, leucopelargonidin tetramer, rhein, fistulin, and triterpenes (P. Chandra *et al.*, 2012). An important study reported that seeds of *Cassia fistula* Linn. are rich in glycerides with linoleic, oleic, stearic, and palmitic acids as chief fatty acids and also contains traces of caprylic and myristic acids (G. Nusko *et al.*, 2000).

Anthraquinones such as rhein, chrysophanol, and physcion were isolated from the leaves of the *Cassia fistula* Linn. (H. Deshpande and S. Bhalsing, 2013) and galactomannan constitutes of different type of sugar moieties are also reported from the seeds (A. Sakulpanich *et al.*, 2012).

Therapeutic Applications: *Cassia fistula* Linn. is employed in the management of different conditions including relieving the symptoms of asthma, leprosy, ringworm, heart related disorders and fever. Extracts from *Cassia fistula* Linn. are used as laxative as well as in constipation management; root is employed in treating of flu and cold whereas the leaves are employed in relieving pain, edema, and reducing skin irritation as result of swelling. Additionally, extracts of the stem bark and fruits are used in eliminating toxins from the blood (Jung *et al.*, 2017). *Cassia fistula* Linn. exhibits many applications in therapy particularly in the traditional medicine system. Seeds from this species are used as medicine for treating gastritis and diarrhoea; they are likewise used as an insect repellent. The seeds are as well used to treat biliousness in addition to improving appetite. The roots are used in the treatment of skin disorders, syphilis, leprosy, and tuberculosis (Pawar *et al.*, 2017). Root extracts are also used to relieve burning sensations. The fruits treat throat disorders, inflammation, liver complications, chest problems, asthma, and rheumatism. In traditional medicine in Thailand, the ripe fruits of *Cassia fistula* Linn. are used as a laxative medicine.

Antioxidants are the compounds that neutralize the attack of free radicals and, therefore, reduce the risk of disorders (Rice *et al.*, 2017). Antioxidant activity of natural source has proven therapeutic role in the prevention of various pathogenesis due to the rich source of antioxidant. Medicinal plants contain several valuable ingredients such as tocopherol, flavonoids, and polyphenols, some essential amino acids and all these constituents show a role in health care. Another study was performed to analyze the antioxidant activity based on *Cassia fistula* Linn. bark, stem, leaf, and root, and results showed that bark extracts from different age classes showed high antioxidant activity (Lai & Liew, 2013).

Inflammation is a normal physiological process in response to tissue injury, infection, and various other factors also involve in this process and cause various pathological alterations. Safe and natural remedies are needed to control the inflammatory process via modulation of pro-

inflammatory cytokines and other factors involve in the chronic inflammation. Flavonoids is an ingredient present in the various medicinal plants including *Cassia fistula* Linn. shows role as anti-inflammatory process due to the rich source of antioxidant.

It has been recognized that flavonoids show a role in the inhibition of several enzymes that are activated in the inflammatory process (Kwon *et al.*, 2005). Medicinal plants have an ancient history in cancer treatment via traditional medicine such Ayurveda and Chinese. Various plants and their constituents such as dates, olive, black seed have shown a role in cancer prevention via modulation of biological activities. There are many effective cancer chemotherapeutic drugs that have been derived from the natural source (K.H.Lee, 2010). An important study was performed to check the effects of methanolic extract of *Cassia fistula* Linn. seed on the growth of Ehrlich ascites carcinoma and on the life span of tumor bearing mice and results revealed that extract increase life span, and a decrease in the tumor volume and viable tumor cell count (Gupta *et al.*, 2000).

Diabetic mellitus is a metabolic disease and also a major health problem worldwide. Drugs based on allopath used to treat the diabetes and its complications but these drugs show adverse complications. Most of plants have various constituents such as glycosides, alkaloids, terpenoids, flavonoids, carotenoids that are commonly implicated as anti-diabetic activity (Malviya *et al.*, 2010) and has a role in diabetes control since ancient time. The study based on the preparation of aqueous extract and synthesis of gold nanoparticles was performed to evaluate the hypoglycemic effects, and results confirm that *Cassia fistula* Linn. gold nanoparticles have promising antidiabetic properties (Daisy and Saipriya, 2012).

Stem barks of *Cassia fistula* Linn. was evaluated for anti-hyperglycemic effect in alloxan-induced diabetic rats and results revealed that a significant decrease in blood glucose level in diabetic rats treated (Agnihotri and Singh, 2013). Diseases related to microbes infections are one of the major causes in the morbidity and mortality worldwide especially in the developing world. Nowadays, treatment based on antibiotics is effective in diseases control but also causes drug-resistant. A range of plants and its constituents have proven pivotal role in the control of infectious diseases through the breakdown of bacterial cell wall. However, *Cassia fistula* Linn. shows a pivotal role in the management of infectious diseases especially due to their inhibitory effect on various types of the pathogen. The antibacterial and antifungal activities of hydroalcohol extracts of leaves of *Cassia fistula* Linn. were tested against Gram-positive, Gram-negative, fungal strains, and results showed that significant inhibition of the bacterial growth was shown against the tested organisms. (Bhalodia and Shukla, 2011).

An important study was made to evaluate the antibacterial and antifungal activities of extracts of *Cassia fistula* Linn. against Gram-positive, Gram-negative human pathogenic bacteria and fungi and crude extracts showed moderate to strong activity against most of the bacteria tested (Bhalodia *et al.*, 2012).

2. Conclusion

The *Cassia fistula* Linn. medicinal plant is more suitable to treat and prevent many diseases. The exact mechanism of action in the diseases prevention is not fully understood so more biochemical and molecular research should be made to confirm the exact mechanism of action of *Cassia fistula* Linn. in the treatment and prevention of many diseases.

References

- [1] Rajagopal P.L., Premaletha K., Kiron S.S., Sreejith K.R. Phytochemical and pharmacological review on *Cassia fistula* Linn. the golden shower. Int. J Pharm Chem Biol Sci., 2013;3:672-9.
- [2] Danish M, Singh P., Mishra G., Srivastava S., Jha K.K., Khosa R.L.. *Cassia fistula* Linn. (Amulthus) – An important medicinal plant: A review of its traditional uses, phytochemistry and pharmacological properties. J. Nat. Prod. Plant Resour., 2011;1:101-18.
- [3] A. Mondal, Phenolic constituents and traditional uses of *Cassia* (Fabaceae) plants: an update, J. Org. Biomol. Chem. 3 (2014), 93–141.
- [4] M.A. Nagpal, N. Nagpal, S. Rahar, G. Shah, G. Swami, R. Kapoor, Phytochemical investigation of methanolic extract of *Cassia fistula* leaves, Pharmacogn. J., 3 (26) (2011) 61–69.
- [5] Sen A.B., Shukia Y.N., Chemical examination of *Cassia fistula*. J. Indian Chem. Soc., 1968;45:744.
- [6] G. Martinez-avila, C. Castro-I'opez, R. Rojas, G.C.G. Martínez, Science screening of the *Cassia fistula* phytochemical constituents, Ann. Nutr. Food , 2 (2) (2018) 1–3.
- [7] P. Chandra, R. Pandey, B. Kumar, M. Srivastva, P. Pandey, J. Sarkar, B.P. Singh, Are anthranoid laxatives effective in chronic constipation? Nutrafoods 11 (4) (2012) 131–136.
- [8] G. Nusko, B. Schneider, I. Schneider, C. Wittekind, E.G. Hahn, Anthranoid laxative use is not a risk factor for colorectal neoplasia: results of a prospective case control study, Gut 46 (5) (2000) 651–655.
- [9] H. Deshpande, S. Bhalsing, Recent advances in the phytochemistry of some medicinally important *Cassia* species: a review, Int. J. Pharma Med. Biol. Sci. 2 (3) (2013) 60–78.
- [10] A. Sakulpanich, S. Chewchinda, P. Sithisarn, W. Gritsanapan, Standardization and toxicity evaluation of *Cassia fistula* pod pulp extract for alternative source of herbal laxative drug, Pharmacogn. J. 4 (28) (2012) 6–12.
- [11] H.A. Jung, M.Y. Ali, J.S. Choi, Promising inhibitory effects of anthraquinones, naphthopyrone, and naphthalene glycosides, from *Cassia obtusifolia* on α -glucosidase and human protein tyrosine phosphatases 1B, Molecules, 22 (1) (2017) 28–43.
- [12] A.V. Pawar, S.J. Patil, S.G. Killedar, Uses of *Cassia fistula* Linn. as a medicinal plant, Int. J. Adv. Res. Dev. 2 (3) (2017) 85–91.
- [13] Rice-Evans CA, Miller NJ, Paganga G. Structure-antioxidant activity relationships of flavonoids and phenolic acids. Free Radic Biol Med 1996;20:933-56.
- [14] Lai T.K., Liew K.C., Total phenolics. Total tannins and antioxidant activity of *Cassia fistula* L. extracts of bark, stem, leaf and root under different age classes. Asian J. Pharm. Res. Health Care 2013;5:52-7.
- [15] Kwon K.H., Murakami A., Tanaka T., Ohigashi H., Dietary rutin, but not its aglycone quercetin, ameliorates dextran sulfate sodium-induced experimental colitis in mice: Attenuation of pro-inflammatory gene expression. Biochem Pharmacol 2005; 69:395-406.
- [16] Lee K.H., Discovery and development of natural product-derived chemotherapeutic agents based on a medicinal chemistry approach, J. Nat. Prod. 2010;73:500-16.
- [17] Gupta M., Mazumder U.K., Rath N., Mukhopadhyay D.K., Antitumor activity of methanolic extract of *Cassia fistula* L. seed against Ehrlich ascites carcinoma. J Ethnopharmacol 2000;72:151-6.
- [18] Malviya N., Jain S., Malviya S, Antidiabetic potential of medicinal plants. Acta. Pol. Pharm. 2010;67:113-8.
- [19] Daisy P., Saipriya K., Biochemical analysis of *Cassia fistula* aqueous extract and phytochemically synthesized gold nanoparticles as hypoglycemic treatment for diabetes mellitus, Int. J. Nanomedicine 2012;7:1189-202.
- [20] Agnihotri A., Singh V., Effect of *Tamarindus indica* Linn. and *Cassia fistula* Linn. stem bark extracts on oxidative stress and diabetic conditions. Acta Pol. Pharm. 2013;70:1011-9.
- [21] Bhalodia N.R., Shukla V.J., Antibacterial and antifungal activities from leaf extracts of *Cassia fistula* L.: An ethnomedicinal plant, J. Adv. Pharm. Technol. Res. 2011;2:104-9.
- [22] Bhalodia N.R., Nariya P.B., Acharya R.N., Shukla V.J., *In vitro* antibacterial and antifungal activities of *Cassia fistula* Linn. fruit pulp extracts. Ayu. 2012;33:123-9.