CHAPTER 04

The Golden Shower (*Cassia fistula*): ornamental, ethnomedicinal, pharmacological, and ecological significance

Bhagwati Prashad Sharma[1], Sachin Somalal Choudhari[2], Reagan[3], Sanjeet Kumar[4] and Sweta Mishra[4*]

[1]Department of Botany, Sidharth Government College, Nadaun, Himachal Pradesh, India
[2]Department of Botany, Rashtrapita Mahatma Gandhi Arts, Commerce and Science College, Saoli, Maharashtra, India
[3]Victor, Bungalow No. 2, Silver Beach Estate, Juhu, Mumbai, Maharashtra, India
[4]Ambika Prasad Research Foundation, India
***Email ID:** swetamishra.aprf@gmail.com

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ABSTRACT

Cassia fistula L., commonly known as the Golden Shower Tree, is a prominent member of the family Fabaceae, renowned for its vibrant yellow inflorescences and multifaceted significance across South and Southeast Asia. This species holds ornamental, ethnomedicinal, pharmacological, and ecological importance. Traditionally, *C. fistula* is used to treat constipation, skin diseases, fever, diabetes, and cardiac disorders. Phytochemical analysis has revealed the presence of diverse bioactive compounds, including anthraquinones, flavonoids, phenolic acids, alkaloids, glycosides, and tannins, many of which exhibit potent antioxidant, antimicrobial, anti-inflammatory, hepatoprotective, and anticancer properties. Ecologically, the species contributes to soil fertility, serves as a nectar source for pollinators, and provides habitat for avian species. This review highlights the morphology, traditional uses, pharmacological relevance, and ecological role of *C. fistula* and emphasizing its importance as a therapeutic resource.

KEYWORDS: Golden Shower, bioactive compounds, traditional medicine, pharmacology, ecology

INTRODUCTION

Plants of the genus *Cassia* have long held an esteemed place in traditional systems of medicine and ornamental horticulture. Among them, *Cassia fistula*, commonly called the Golden Shower or Indian Laburnum, stands out as one of the most cherished species in the Indian subcontinent for its aesthetic value and therapeutic potential. This medium-sized deciduous tree is native to South Asia but has spread widely across tropical and subtropical regions, including Sri Lanka, Thailand, Myanmar, and Malaysia (Rahmani 2015; Mwangi et al. 2021). *C. fistula* is the state flower of Kerala and symbolizes prosperity and purity (Mishra et al. 2024). It thrives in a wide range of soil conditions, from sandy to loamy, and is often cultivated along roadsides and gardens for its striking pendulous racemes of bright yellow flowers that appear in late spring. Beyond its ornamental role, this species has immense ethnomedicinal significance. The Charaka Samhita and Sushruta Samhita describe its medicinal properties for treating various diseases and disorders, including fever, skin disorders, and wound healing (Singh et al. 2023). Modern phytochemical studies validate these traditional claims, identifying anthraquinones such as rhein and chrysophanol, flavonoids like quercetin, kaempferol, and luteolin, and phenolic compounds that exhibit notable bioactivities (Rathore et al. 2022; Konar and Ghosh 2023). Pharmacologically, *C. fistula* has been recognized for anti-inflammatory, antimicrobial, antioxidant, and antidiabetic properties (Ali 2014; Sanoria et al. 2020). Ecologically, *C. fistula* enriches ecosystems by soil fertility, supporting pollinators like bees and butterflies, and offering food and shelter to birds. Thus, this species exemplifies the interconnection between ornamental value, ethnobotanical utility, and ecological balance.

MORPHOLOGY

C. fistula typically attains a height of 10–20 meters and forms a spreading crown with drooping branches. The bark is smooth and greyish brown in young trees, becoming rough and dark with age (Sanoria et al. 2020; Gupta 2021; Figure 1).

Leaves: The leaves are alternate, pinnate, and deciduous, with 4–8 pairs of opposite leaflets. Each leaflet is ovate-lanceolate, 8–15 cm long and 4–6 cm wide, glabrous on both surfaces, with entire margins and an acute apex.

Flowers: The flowers, arranged in long pendulous racemes up to 40 cm long, are golden yellow, showy, and fragrant. Each flower has five free petals and

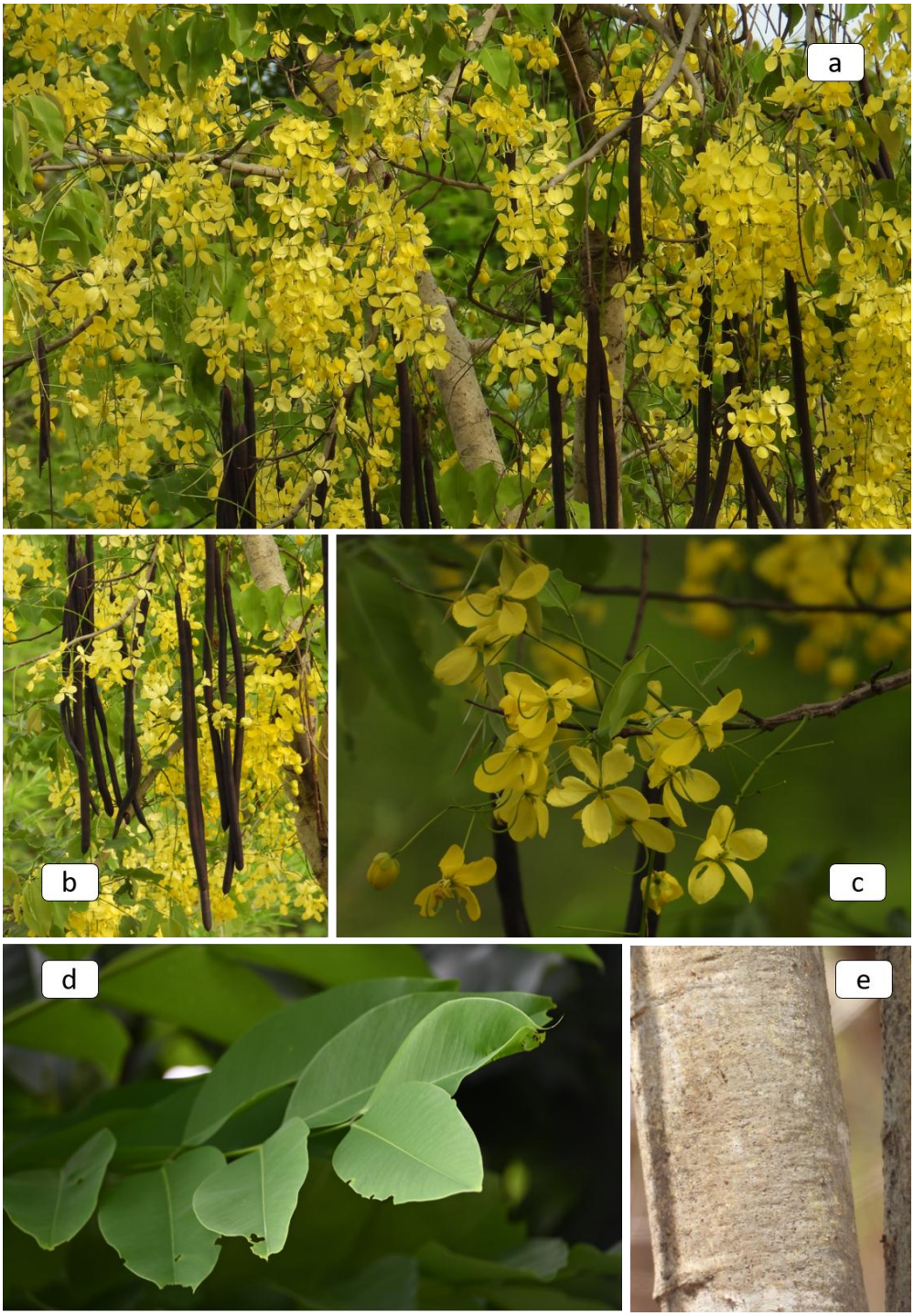


Figure 1: Vegetative parts of *C. fistula*; a) Canopy; b) Fruit, c) Flowers, d) Leaves, e) Bark

ten stamens, with the lower three fertile. The flowering period is from April to June.

Fruits: The pods are cylindrical, 30- 60 cm long and 1.5-2.5 cm thick, dark brown when mature, containing numerous seeds separated by transverse septa embedded in a blackish pulp.

Seeds: Seeds are flat, oblong, and brown, encased in a hard testa, and are viable for several years.

TRADITIONAL MEDICINAL USES

C. fistula has a well-documented history of ethnomedicinal applications across India, Sri Lanka, and Southeast Asia. In Ayurveda, it is known as "Aragvadha," meaning "disease killer." Different plant parts like pods, leaves, bark, flowers, and roots are used to treat various ailments (Keshari et al. 2025). The pulp of the fruit pod serves as a gentle purgative and is included in classical formulations like Triphala and Avipattikara churna. It is effective against chronic constipation and abdominal disorders (Kumar et al. 2017).

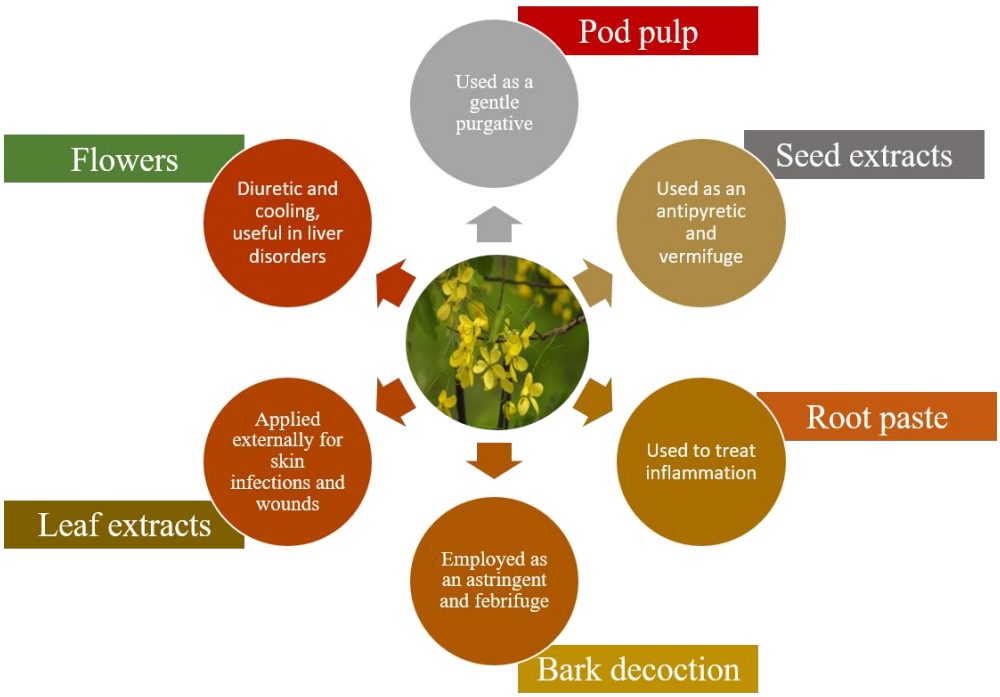


Figure 2: Traditional medicinal uses of *C. fistula*

The bark decoction is employed as an astringent and febrifuge, while leaf extracts are used externally for skin infections, ringworm, and wounds (Kumar et al. 2012). Leaves are crushed to prepare a thick paste and mixed with coconut oil. This paste is applied over the burnt skin twice a day (Bhalerao and Kelkar 2012). The flowers are diuretic, cooling, and useful in managing liver disorders and gout (Atarzadeh et al. 2017). In rural medicine, the root paste is applied to treat inflammation, while the seed extract is used as an antipyretic and vermifuge. Traditional healers use pod pulp with honey to treat jaundice and urinary disorders. In Sri Lanka and Thailand, infusions of *C. fistula* bark and leaves are used to control fever and promote wound healing (Danish et al. 2011; Figure 2).

BIOACTIVE COMPOUNDS

Phytochemical analysis of *C. fistula* reveals a rich composition of bioactive metabolites that account for its pharmacological activities. The major constituents include anthraquinones, flavonoids, alkaloids, glycosides, saponins, and tannins (Dhamal and Thorat 2024). Anthraquinones such as rhein, chrysophanol, emodin, and physcion are mainly concentrated in the pods and contribute to laxative, hepatoprotective, and antimicrobial actions (Mwangi et al. 2021). Flavonoids like quercetin, luteolin, kaempferol, and apigenin confer antioxidant and anti-inflammatory properties. Phenolic compounds such as gallic acid, caffeic acid, and ferulic acid are abundant in leaves and flowers, enhancing free-radical scavenging potential (Singh et al. 2023). Triterpenoids (lupeol, β-sitosterol) and alkaloids (fistulaines) are also detected in bark and roots, showing analgesic and cytotoxic properties. Phytochemical screening of methanolic extracts confirms the presence of saponins and glycosides with hypoglycemic activity (Kumari et al. 2025).

PHARMACOLOGICAL USES

Anti-inflammatory and analgesic activity: Ethanolic extracts of *C. fistula* pods and bark exhibit dose-dependent inhibition of carrageenan-induced paw edema and prostaglandin synthesis (Maqsood et al. 2020).

Antioxidant potential: The methanolic extract of flowers and leaves demonstrates strong DPPH (2,2-diphenyl-1-picrylhydrazyl) and FRAP (Fluorescence Recovery after Photobleaching) radical scavenging activity due to high phenolic and flavonoid content (Verma 2016).

Antimicrobial activity: Extracts show inhibitory action against Staphylococcus aureus, E. coli, and Candida albicans (Ali 2014).

Antidiabetic properties: Aqueous extracts reduce fasting blood glucose levels in streptozotocin-induced diabetic rats by enhancing insulin secretion and glycogen synthesis (Mahesh et al. 2020).

Hepatoprotective effect: The methanolic bark extract protects against CCl_4 induced liver damage by restoring serum enzyme levels and antioxidant status (Mwangi et al. 2021).

Anticancer potential: Rhein and chrysophanol exhibit cytotoxic effects against MCF-7 and HeLa cancer cell lines through apoptosis induction and ROS generation (Kumar et al. 2017).

ECOLOGICAL SIGNIFICANCE

C. fistula plays a notable ecological role in tropical ecosystems. It enriches soil fertility through leaf litter decomposition and nitrogen-fixing bacterial associations in root nodules (Ramakrishna and Khatija 2024). Its profuse flowering provides nectar for honeybees, butterflies, and birds, enhancing local pollinator populations. The dense canopy and long pods offer shelter and food for avian species like myna and barbet. In degraded landscapes, the tree acts as a pioneer species in afforestation and erosion control due to its drought tolerance and adaptability to poor soils (Singh et al. 2023). Its potential to control air pollution makes it suitable for urban greening and roadside plantations, contributing to carbon sequestration and microclimate regulation (Figure 3).

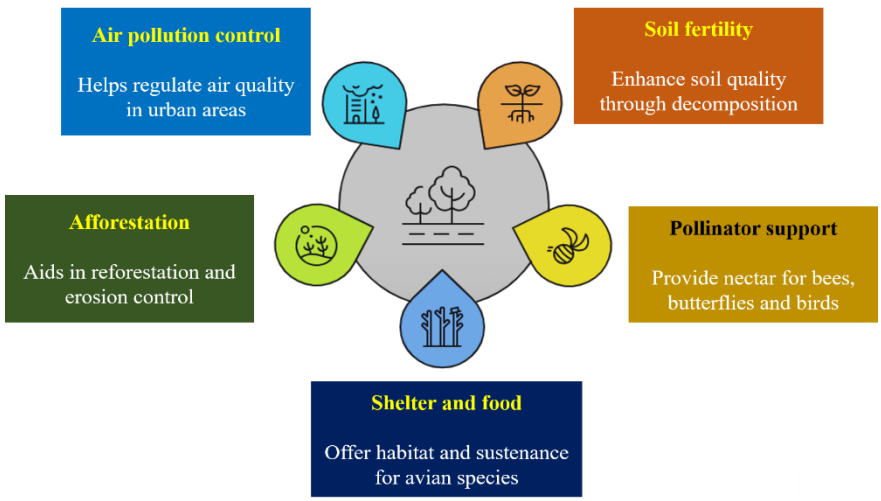


Figure 3: Ecological significance of *C. fistula*

CONCLUSION

The Golden Shower tree, epitomizes the convergence of aesthetic beauty, traditional knowledge, and pharmacological promise. Its widespread use in indigenous medicine for gastrointestinal, hepatic, and inflammatory disorders has been substantiated by modern phytochemical and pharmacological studies. Moreover, its ecological services, which support biodiversity and improve soil quality, highlight its environmental relevance. Further research should emphasize isolation of novel compounds, in vivo toxicity testing, and sustainable utilization to balance its ornamental, medicinal, and ecological functions. As both a cultural emblem and a source of therapeutic potential, *C. fistula* remains a quintessential tree bridging ethnobotany and modern plant sciences.

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