

Comprehensive review on *cassia auriculata*: traditional uses, phytochemistry, pharmacology, and safety

Shantha Sheela N*¹, Rathish Elangovan², Sanjaykumar Sargunan³, Priya
Mariyappan⁴, Sivadurga Veerabaskar⁵, Vishalarohini Manoharan⁶

Department of Pharmacognocny, Sir Issac Newton College of Pharmacy, Nagapattinam, Tamil Nadu – 611
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Corresponding Author:

Mrs. Shantha Sheela N, M. Pharm,
Associate Professor,
Department Of Pharmacognosy,
Sir Issac Newton College of Pharmacy,
Pappakovil, Nagapattinam,
Tamil Nadu – 611102.
E-mail: sheelacut0809@gmail.com

ABSTRACT:

Medicinal plants have played a crucial role in traditional healthcare and remain a valuable source for modern drug discovery. *Cassia auriculata* L. (syn. *Senna auriculata*), commonly known as Tanner's Cassia or Avaram Senna, is an evergreen shrub widely distributed in India, Sri Lanka, and folk medicine for treating diabetes, liver ailments, skin diseases, urinary infections, and digestive disorders. Almost all parts of the plant flowers, leaves, bark, seeds, and roots possess medicinal importance.

Phytochemical investigations reveal the presence of flavonoids (quercetin, kaempferol, rutin), tannins, glycosides, alkaloids, saponins, anthraquinones, steroids, and unique compounds such as auriculataosides. These secondary metabolites account for its wide spectrum of pharmacological activities. Experimental evidence has confirmed antidiabetic, antioxidant, anti-inflammatory, hepatoprotective, nephroprotective, antimicrobial, anticancer, cardioprotective, wound-healing, and immunomodulatory properties. Mechanistic studies highlight actions such as α -glucosidase inhibition, free radical scavenging, modulation of cytokines, and enhancement of antioxidant defense.

Toxicological studies indicates that the plant is generally safe at therapeutic doses, with no significant acute or sub-chronic toxicity observed in animal models. However, some reports of antifertility effects from seed extracts at high doses necessitate caution in reproductive-age populations. Despite strong preclinical evidence, human clinical trials remain limited, and further studies are required to establish standardized formulations, safe dosages, and clinical efficacy.

In conclusion, *C. auriculata* is a culturally significant medicinal plant with validated pharmacological potential. With further scientific exploration and sustainable utilization, it holds great promise for phytopharmaceutical development, particularly in the management of diabetes and oxidative stress related disorders.

KEYWORDS: *Cassia auriculata*, phytochemicals, pharmacological activities, traditional medicine, toxicity.

INTRODUCTION:

Medicinal Plants:

Medicinal plants have been used since ancient times as the primary source of health care. The World Health organization (WHO) estimates that more than 80% of the population in developing countries relies on herbal medicine for treating various ailments due to their low cost, accessibility, and safety compared to synthetic drugs. These plants are rich in bioactive compounds such as alkaloids, flavonoids, glycosides, tannins, terpenoids, and phenolic compounds, which contribute to their therapeutic potential. Traditional system of medicine like Ayurveda, Siddha, Unani, and Chinese medicine have documented thousands of plants for the management of disease ranging from infections to chronic conditions such as diabetes, cancer, and cardiovascular disorder.

In addition to their role in traditional health care, medicinal plants also contribute significantly to modern drug discovery. Nearly 50% of pharmaceutical in current use are derived from natural sources, demonstrating the importance of phytochemicals as leads for novel drug development.

Cassia auriculata:

Among the numerous medicinal plants, *Cassia auriculata* L. (*syn. Senna auriculata*), commonly known as Tanner's Cassia, Avaram Senna, or Ranawara, holds a special place in both folk and traditional medicine. It belongs to the family Fabaceae (Caesalpinaceae) and is an evergreen shrub widely distributed in tropical regions such as India, Sri Lanka, Myanmar, and parts of Africa. The plant typically grows in dry zones, open forests, and wastelands, reaching about 1-1.5 meters in height. It is characterized by bright yellow flowers, paripinnate green leaves, and flat leguminous pods containing 7-10 seeds.

C. auriculata is deeply valued in Ayurveda and Siddha medicine, where it is referred to as "Avartaki" and traditionally used for its Pramehahara (antidiabetic) property. Almost every part of the plant has medicinal value:

Flowers – Prepared as herbal tea for diabetes, eye health, and skin glow.

Leaves & Bark - used in decoctions for jaundice, liver disorders, urinary infections, and skin ailments.

Seeds – employed for constipation, indigestion, and flatulence

Roo Scientific studies have confirmed many of these ethnomedicinal claims. Extracts of *C. auriculata* show antidiabetic, antioxidant, anti-inflammatory, hepatoprotective, nephroprotective, antimicrobial, anticancer, cardioprotective, and immunomodulatory activities. Its pharmacological potential is attributed to a diverse phytochemical composition including flavonoids, tannins, glycosides, alkaloids, saponins, anthraquinones, phenols, steroids, and fatty acids. Nutritionally, the plant also provides proteins, carbohydrates, crude fiber, vitamins, and minerals such as calcium, iron, and zinc. Toxicological studies indicate that *C. auriculata* is generally safe, through further clinical trials are needed for dosage standardization and safety in humans. However, its increasing use and indiscriminate harvesting demand conservation and sustainable cultivation. Thus, *Cassia auriculata* is not only a culturally important medicinal plant but also a scientifically validated herb with great potential for developing novel phytopharmaceuticals, particularly for the management of diabetes and oxidative stress related disorders. Its leaves & Bark used in rheumatism, ulcers, and gonorrhoea.



Figure 1. *Cassia auriculata*

TAXONOMICAL CLASSIFICATION OF *Cassia auriculata*:

Kingdom: Plantae

Clade: Angiosperms

Clade: Eudicots

Order: Fabales

Family: Fabaceae (Leguminosae) –formerly placed in Caesalpiniaceae

Genus: Cassia (syn. Senna)

Species: *Cassia auriculata* L. (syn. *Senna auriculata* (L.) Roxb.)

COMMON NAMES:

English – Tanner’s Cassia, Avaram Senna, Mature Tea Tree

Tamil – Avaram

Hindi – Tarwar, Awal

Sanskrit – Avartaki, Pitapuspa

Sinhala (Sri Lanka) – Ranawara

BOTANICAL DESCRIPTION:

Habit:

Cassia auriculata is perennial, evergreen shrub growing about 1-1.5 meters in height. It is branched, hardy, and thrives in dry zones, roadsides, wastelands, and open forests across India, Sri Lanka and Myanmar.

Stem and Bark:

The stem is strong, brown, and woody with several branches. The bark is brown, rough, and lenticellate, used traditionally for treating ulcers, rheumatism, and liver ailments.

Leaves:

Leaves are paripinnate, stipulate, dull green, and pubescent with 16-24 pairs of narrow, rectangular leaflets. Each leaflet is about 20-25 mm long and 10-13 mm wide with a vertical gland between them.

Flowers:

Flowers are bright yellow, large (4-5 cm), bisexual, and zygomorphic. They are borne in axillary racemes (clusters of 2-8 flowers). Petals are free, imbricate, and unequal. Stamens are 10, with the lower three being fertile, while others are often sterile. These attractive flowers bloom throughout the year and are widely used in traditional tea preparations for diabetes and eye disorder.

Fruits:

The fruit is a flat, cylindrical, green to brown legume, measuring about 7-11 cm in length and 1.5 cm in width. It contains 10-20 seeds; each lodged in separate compartments.

Seeds:

Seeds are flattened, brown, and ovoid in shape, usually numbering 7-10 per pod. They are used in traditional medicine for digestive disorders like constipation, indigestion and flatulence.

Roots:

Roots are woody and fibrous, used in ethnomedicine for rheumatism, gonorrhoea, ulcers, and skin diseases.

DISTRIBUTION:

C. auriculata is native to India, Sri Lanka, and Myanmar, but it is also naturalized in Africa, Malaysia, and Australia. It grows well in dry deciduous forest, stony hills, wastelands, and along roadsides, tolerating, poor soils and drought conditions.

TRADITIONAL USES OF *Cassia auriculata*:

Plant Part	Traditional Use	System of Medicine
Flower	Used as tea for diabetes, cooling agent, skin health	Siddha, Ayurveda
Leaf	Paste for wound healing, anti-inflammatory use	Siddha
Seed	Antidiabetic, antifertility uses in folk medicine	Folk, Siddha
Root	Decoction for fever and body pain	Ayurveda, Folk
Bark	Used in skin diseases, antimicrobial applications	Ayurveda

Table 1. Traditional uses

MACROSCOPIC CHARACTERS OF *Cassia auriculata*:

PARTS	DESCRIPTION	IMAGE
Leaves	Paripinnate, stipulate, dull green, with 16-24 pairs of narrow oblong leaflets. Leaflets are 20-25 mm long, 10-13 mm wide, thin and pubescent, with a vertical gland between pairs.	
Flowers	Bright yellow, large (4-5cm), zygomorphic and bisexual. Occur in axillary racemes (2-8 flowers). Petals are free, imbricate and unequal.	
Fruits	Flat, cylindrical legumes, 7-11 cm long and 1.5 cm wide, containing 10-20 seeds in separate compartments.	
Seeds	Ovoid, brown, flattened, usually 7-10 per pod.	
Bark	Brown, rough, lenticellate, used for medicinal decoctions.	
Roots	Woody, fibrous, used in ulcers, skin ailments, and gonorrhea.	

Table 2. Macroscopic characters

PHARMACOLOGICAL ACTIVITIES OF *Cassia auriculata*:

A wide range of pharmacological studies have confirmed the ethnomedicinal uses of *Cassia auriculata*. Almost all parts of the plant flowers, leaves, seeds, bark, and roots have been investigated for their bioactivities. The following section summarizes the major activities with supporting evidence.

1. Antidiabetic and Antihyperlipidemic Activity:

C. auriculata is traditionally used as an antidiabetic herb, particularly flower tea (“Avarampoo tea”). Ethanolic and aqueous extracts of flower and leaves show significant reduction in blood glucose, serum cholesterol, triglycerides, and LDL levels in experimental diabetic models. Mechanism involves α -amylase and α -glucosidase inhibition, improved insulin secretion, and protection of pancreatic β -cells. Seed extracts improve lipid profile and restore liver glycogen in diabetic rats.

2. Antioxidant and Free Radical Scavenging Activity:

Methanolic flower extracts possess strong DPPH, ABTS, and nitric oxide radical scavenging activity. Flavonoids (quercetin, kaempferol, rutin) and phenolic compounds contribute to antioxidant effect. Helps in preventing oxidative stress-related disease such as diabetes complications, cardiovascular disease, and cancer.

3. Anti-inflammatory Activity:

Leaf and flower extracts significantly inhibit carrageenan-induced paw edema and cotton pellet granuloma in animal models. Flavonoids and triterpenoids act by reducing prostaglandin and cytokine release.

4. Hepatoprotective Activity:

Ethanolic leaf and flower extracts protect against CCl_4 and paracetamol-induced liver damage. Observed effect: restoration ALT, AST, ALP, bilirubin, and histopathological architecture. Attributed to antioxidant flavonoids and tannins.

5. Nephroprotective Activity:

Ethanolic flower extracts reduce gentamicin and cisplatin-induced nephrotoxicity in rats. Improvement in serum creatinine, urea, and renal histology.

6. Antimicrobial and Antifungal Activity:

Methanolic extracts show activity against *Staphylococcus aureus*, *Escherichia coli*, *Pseudomonas aeruginosa*, and *Candida albicans*. Oleanolic acid and anthraquinones play a major role in antimicrobial effect. Seed and bark extracts also show antifungal activity dermatophytes causing skin infections.

7. Anticancer and Antimutagenic Activity:

Methanolic flower extract exhibits cytotoxicity against HeLa, MCF-7, and HepG2 cell lines. Apoptosis induction and ROS modulation are suggested mechanisms. Seeds and bark extracts reduce mutagenicity in Ames test.

8. Wound Healing Activity:

Leaf paste and flower decoctions are traditionally applied on wounds. Ethanolic leaf extract enhances epithelialization, wound contraction, and tensile strength in rat excision and incision models.

9. Cardioprotective Activity:

Flower extract shows protective effects in isoproterenol-induced myocardial infarction models. Improves ECG, cardiac enzyme levels, and prevents oxidative damage.

10. Dermatological and Cosmetic Applications:

Flower powder is used in traditional bath powders for skin glow and acne prevention. Antioxidant and antimicrobial properties justify its use in skincare formulations.

11. Other Reported Activities:

Antiulcer activity – flower extracts protect gastric mucosa against ethanol- and aspirin-induced ulcers.

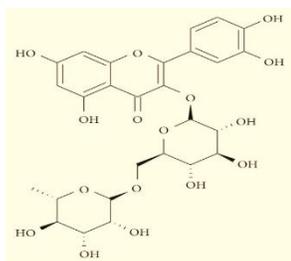
Antifertility activity – seed extracts reported to influence reproductive hormones in animal studies.

Immunomodulatory activity – aqueous extracts enhance antibody response and phagocytic index in mice.

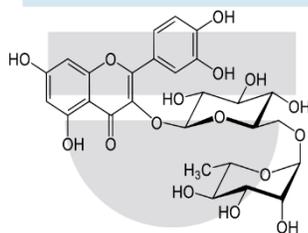
PHYTOCHEMICAL COMPOSITION OF *Cassia auriculata*:

Plant Organ	Major Phytochemicals
Leaf	Quercetin, Kaempferol, Rutin, Oleanolic acid
Flower	Aloe-emodin, 5-O-methylquercetin-7-O-glucoside
Seed	Procyanidin B1, Epicatechin, Auriculataosides
Bark	Kaempferol-3-O-rutinoside, Rutin, Luteolin
Pod Husk	Chrysophanol, Emodin, Rubiadin, β -sitosterol
Root	Anthraquinone glycosides, Flavone glycosides

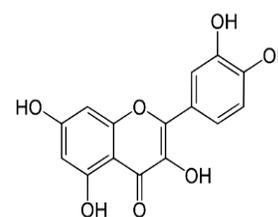
Table 3. Phytochemical composition



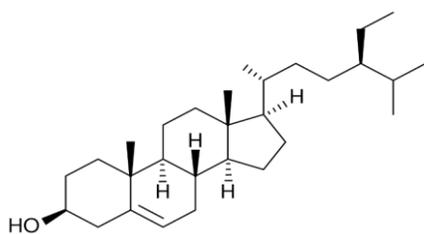
Kaempferol-3-O-rutinoside



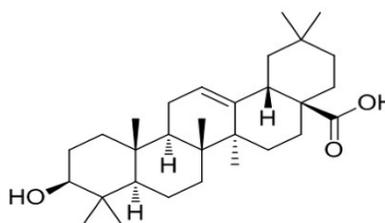
Rutin



Quercetin



B-sitosterol



Oleanolic acid

TOXICOLOGICAL AND SAFETY PROFILE:

Safety evaluation of medicinal plants is an essential step in validating their therapeutic use. Although *Cassia auriculata* is widely consumed in traditional medicine, modern pharmacological research has investigated its toxicity profile through preclinical studies.

Acute Toxicity Studies:

Oral administration of aqueous and ethanolic extracts of *C. auriculata* flowers and leaves up to 2000 mg/kg body weight in experimental animals did not show mortality or behavioral changes, indicating a high margin of safety. No abnormality was observed in food intake, body weight, respiration, or locomotor activity during acute exposure.

Sub-acute and Chronic Toxicity:

Repeated dose studies (28-60 days) with flower and seed extracts revealed no significant alterations in hematological parameters (RBC, WBC, Hb) and biochemical markers (ALT, AST, ALP, creatinine, urea) at therapeutic dose ranges. Histopathological examination of liver, kidney, and heart tissues showed no signs of necrosis, fatty changes, or inflammation at lower to moderate doses. However, very high doses (>3000 mg/kg) showed mild hepatic congestion and changes in renal tissue in animal studies.

Toxicological Observations:

Liver safety: Ethanolic flower extract provided hepatoprotective effects against hepatotoxins, with no evidence of liver injury at normal doses.

Kidney safety: Flower extracts were nephroprotective against cisplatin and gentamicin toxicity; no renal damage was observed in non-stressed animals.

Reproductive system: Some seed extract studies suggested antifertility effects in male rats at high doses, with reduced sperm count and altered testosterone levels. This indicates caution in reproductive-age populations.

CNS and behavior: No CNS toxicity or behavioral abnormalities were reported.

CONCLUSION:

Medicinal plants remain a cornerstone of traditional health care and continue to inspire the discovery of novel drugs. Among them, *Cassia auriculata* (Avaram Senna) occupies a prominent place due to its wide distribution, cultural importance, and validated pharmacological properties. Traditional system of medicine such as Ayurveda and siddha have long used different parts of the plant flowers, leaves, seeds, bark, and roots for the treatment of diabetes, liver and kidney disorders, skin diseases, and reproductive health problems. Modern scientific investigations have confirmed many of these uses, particularly its antidiabetic, antioxidant, anti-inflammatory, hepatoprotective, nephroprotective, antimicrobial, anticancer, cardioprotective, and wound-healing activities. These pharmacological effects are largely attributed to its rich phytochemical profile, which includes flavonoids (quercetin, kaempferol, and rutin), tannins, saponins, anthraquinones, triterpenes, and unique glycosides.

Pharmacognostical studies provide baseline standards for proper identification and quality control, preventing adulteration with other Senna/*Cassia* species. Toxicological evaluation suggest that the plant is generally safe at traditional therapeutic doses, with no significant acute or sub-chronic toxicity reported in preclinical studies. Its long-standing ethnomedicinal use as a daily herbal tea in South India and Sri Lanka further strengthens its safety profile. However, certain high-dose seed extracts have shown antifertility effects in animal models, highlighting the need for caution in reproductive-age populations until more clinical evidence is available. Despite its broad pharmacological potential, research gaps remain. Clinical studies on human populations are still scarce, and there is a need for standardized dosage forms, validated formulations, and well-designed clinical trials to establish efficacy and safety in specific disease conditions. In addition, isolation of bioactive

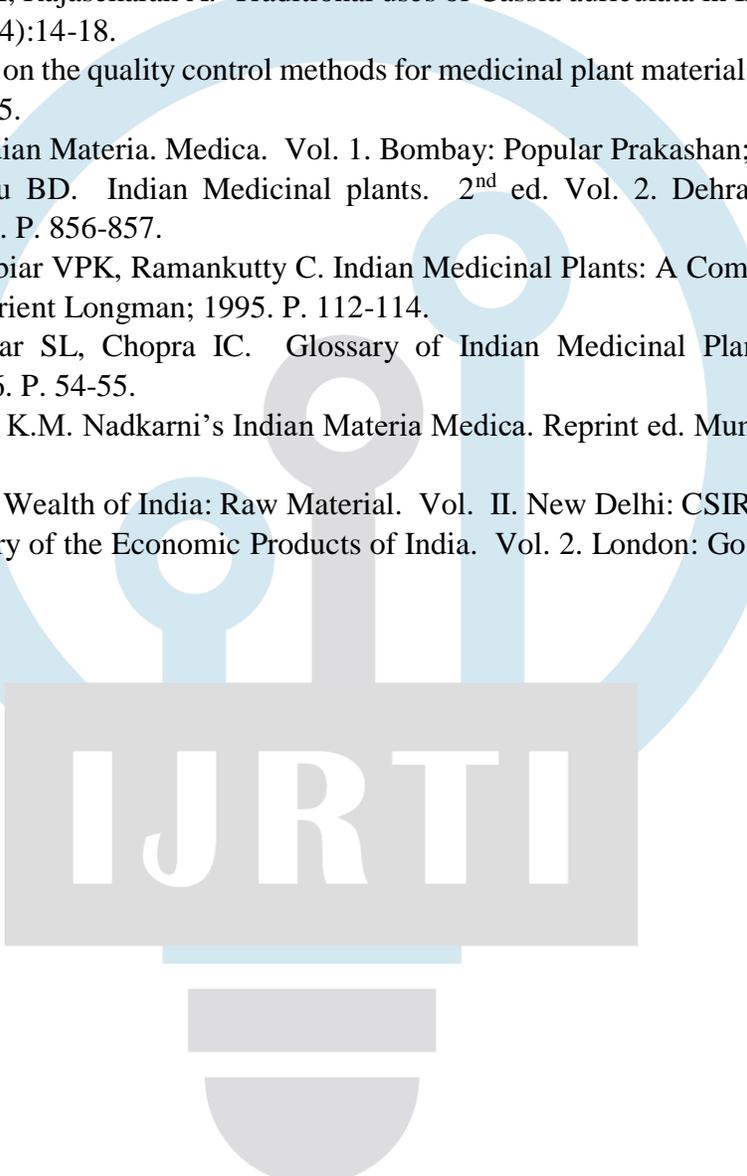
compounds such as auriculataosides, procyanidins, and anthraquinones presents opportunities for the development of novel phytopharmaceuticals. Advances in biotechnology and nanotechnology could also be applied to improve bioavailability and targeted delivery of *C. auriculata* extracts.

From a conservation perspective, over-harvesting for commercial and traditional use may threaten natural populations. Hence, cultivation practices, sustainable harvesting, and inclusion of this species in conservation programs are essential to ensure its long-term availability. In conclusion, *Cassia auriculata* is a multifaceted medicinal plant with strong ethnopharmacological relevance and proven pharmacological actions. With further clinical validation and scientific exploration, it holds promise as a valuable source of phytomedicine, especially in the management of diabetes, oxidative stress-related disorders, and chronic inflammatory conditions.

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