

REVIEWER'S REPORT

Manuscript No.: IJAR-54709

Title: A Comprehensive Review on Phytochemicals, and Medicinal Applications of *Cassia auriculata* (L.)

Recommendation:

Accept as it is

Rating	Excel.	Good	Fair	Poor
Originality		√		
Techn. Quality			√	
Clarity			√	
Significance		√		

Reviewer Name: Dr. Manju M

Detailed Reviewer's Report

Main Objective

To comprehensively review *Cassia auriculata* L., a medicinal shrub traditionally used for diabetes, skin, eye, and inflammatory disorders. The study aims to:

- Summarize phytochemical constituents across different plant parts.
- Collate pharmacological activities including antidiabetic, antioxidant, hepatoprotective, anti-inflammatory, antimicrobial, and anticancer effects.
- Identify knowledge gaps in standardization, bioavailability, and mechanistic studies.
- Emphasize the need for clinical validation of preclinical findings.
- Guide future research toward drug discovery and safe therapeutic applications.

Plant Identity and Classification

- Scientific name: *Cassia auriculata* L.
- Family: Fabaceae (formerly Caesalpinaceae)
- Common name: Tanner's cassia
- Description: Deciduous shrub, 1–3 m tall, with pinnate leaves and yellow flowers

Ethnobotanical and Traditional Uses

- Traditionally used in Ayurveda and folk medicine in South Asia for:
 - Diabetes, urinary disorders, skin diseases, eye ailments, fever, and wound healing
- Cultural and medicinal significance extends to tropical regions including India, Fiji, Indonesia, Malaysia, Brazil, and parts of Africa
- Traditional use has driven phytochemical and pharmacological investigations

Plant Parts Studied

- Commonly investigated plant parts: flowers, leaves, seeds, roots, and bark

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- Different solvents (aqueous, ethanol, methanol, petroleum ether) produce variable phytochemical profiles, contributing to differences in reported biological activities

Phytochemical Profile

- Flowers: phenols, flavonoids (rutin, quercetin-like compounds), tannins, phytates, saponins, quinines, coumarins, oxalates
- Leaves: alkaloids, flavonoids, phenols, saponins, tannins, terpenoids, glycosides
- Seeds: alkaloids, phenols, flavonoids, tannins, phytosterols, anthraquinones
- Roots: flavones (7,4-dihydroxy flavone-5-O-beta-D-galactopyranoside), anthraquinones, rutinoid
- Major bioactive compounds in leaves: α -Tocopherol- β -D-mannoside (14.22%), Resorcinol (11.80%), 1,2,3,4-Tetrahydroisoquinolin-6-ol-1-carboxylic acid (1.98%)

Pharmacological Activities

- Antidiabetic/Antihyperglycemic: reduces blood glucose, improves lipid profiles, enhances insulin markers, inhibits carbohydrate-hydrolyzing enzymes
- Antioxidant: strong in vitro (DPPH, FRAP) and in vivo oxidative stress reduction due to flavonoids and phenolics
- Anti-inflammatory & Analgesic: ethanolic extracts reduce protein denaturation and inflammation in vivo
- Hepatoprotective: protects against chemically induced liver injury; lowers ALT/AST, improves histology
- Antimicrobial & Antifungal: leaf and flower extracts inhibit various bacterial and fungal pathogens; efficacy linked to tannins, flavonoids, saponins
- Anticancer/Cytotoxicity: preliminary in vitro studies show growth inhibition of cancer cell lines; mechanisms largely unexplored
- Other activities: antipyretic, wound-healing, anti-obesity, ocular-protective effects

Mechanisms of Action

- Antioxidant/free radical scavenging
- Inhibition of carbohydrate-digesting enzymes
- Modulation of inflammatory mediators (cytokines, prostaglandins)
- Membrane stabilization
- Hepatoprotective enzyme modulation

Safety, Toxicity, and Pharmacokinetics

- Acute toxicity: relatively wide safety margin in rodents
- Chronic/reproductive toxicity: limited data
- Pharmacokinetics: absorption, distribution, metabolism, and excretion of active compounds largely unstudied

Limitations and Knowledge Gaps

- Heterogeneity of extraction methods, doses, and plant parts complicates cross-study comparisons
- Most evidence is preclinical; few studies isolate and test pure bioactive compounds
- Lack of mechanistic molecular work, standardization, and GMP-grade preparations

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Conclusions and Implications

- Cassia auriculata L. has diverse pharmacological properties (antidiabetic, antioxidant, anti-inflammatory, hepatoprotective, antimicrobial) underpinned by its rich phytochemistry
- Preclinical studies indicate strong therapeutic potential; clinical evidence is limited
- Standardization and formulation studies are essential for safety and efficacy
- The plant is a promising source for novel drug development
- Future research should focus on mechanistic studies and human trials

Recommendations

- Conduct detailed clinical trials to confirm safety and efficacy
- Standardize extracts for consistent therapeutic results
- Perform toxicological and long-term safety studies
- Encourage collaboration between researchers for drug development and awareness