RESEARCH PAPER

Exploring the Phytochemical Diversity and Therapeutic Potential of *Delonix regia* and *Jacaranda mimosifolia*: A Review

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ABSTRACT:

Delonix regia and *Jacaranda mimosifolia* are widely cultivated ornamental plants that have attracted considerable attention due to their diverse phytochemical constituents and medicinal properties. *D. regia*, commonly known as Gulmohar or flame tree, belongs to the family Fabaceae, while *J. mimosifolia*, commonly known as blue jacaranda, belongs to the family Bignoniaceae. Different parts of *D. regia*, including leaves, flowers, bark, seeds and roots, contain flavonoids, phenolic compounds, tannins, glycosides, alkaloids, anthocyanins, carotenoids and sterols. Similarly, *J. mimosifolia* contains flavonoids, phenolic compounds, tannins, glycosides, alkaloids, saponins and terpenoids. Important phytoconstituents reported from *J. mimosifolia* include quercetin, kaempferol, rutin, chlorogenic acid, gallic acid, oleanolic acid, acteoside and jacaranone. The phytoconstituents present in these plants are associated with several pharmacological activities. *D. regia* has demonstrated antioxidant, anti-inflammatory, antimicrobial, antidiabetic, antidiarrheal, hepatoprotective, anthelmintic and wound-healing activities. *J. mimosifolia* has been reported to possess antioxidant, anti-inflammatory, antimicrobial, neuroprotective, anxiolytic, wound-healing, anticancer and antidiabetic properties. The present review summarizes the major phytoconstituents, traditional uses and reported pharmacological activities of both plants and highlights their potential as sources of bioactive natural products. Further investigations are required to establish their mechanisms of action, safety and therapeutic applications.

Keywords: *Delonix regia*, *Jacaranda mimosifolia*, phytoconstituents, flavonoids, phenolic compounds, antioxidant, anti-inflammatory, antimicrobial, medicinal plants.

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INTRODUCTION ABOUT *DELONIX REGIA*:

Synonyms: Flame tree, Gulmohar, Royal Poinciana, Peacock Flower tree.

Biological source: It consists of the leaves, flowers, seeds, bark and pods of *Delonix regia*.

Family: Fabaceae (Leguminosae)

Geographical sources: It is found in warm climates and is commonly planted along roadsides in India, Sri Lanka, Africa, South Africa and other tropical regions. [1]



Fig. 01(Gulmohar plant)[02]

Basic Introduction:

Delonix regia (Boj. ex Hook.) Raf., widely known as Gulmohar or the royal poinciana, belongs to the family Fabaceae (subfamily Caesalpinioideae) [1]. The genus name Delonix derives from the Greek words delos (visible) and onyx (claw), referring to the distinct claw-like petals [1]. The plant is medium-sized, deciduous, and renowned for its spectacular floral display [2]. Morphologically, it bears bipinnate leaves, a flat woody pod, and numerous oblong seeds [2].

Traditionally, Gulmohar has been employed for managing fever, rheumatic pain, inflammation, and respiratory ailments [3,4]. Scientific investigations have confirmed that its extracts possess multiple bioactivities, including antioxidant, antimicrobial, antidiabetic, hepatoprotective, and wound-healing effects [4–6]. These pharmacological properties are linked to secondary metabolites such as flavonoids, phenolics, alkaloids, and tannins [5,6].

Distribution:

Delonix regia was originally found in Madagascar, but over time it has spread to many tropical and subtropical regions across the world [6]. In India, it is commonly grown along roadsides and in gardens across states such as West Bengal, Tamil Nadu, Kerala, Karnataka, Maharashtra and Andhra Pradesh [6,7].The tree prefers well-drained sandy or loamy soils, full sunlight, and altitudes up to 1000 m above sea level [7,8]. Its fast growth, drought resistance, and large canopy make it ideal for avenue planting and ecological restoration projects [8].

Cultivation:

Propagation is mainly through seeds [7]. Mature, healthy seeds are soaked for 24 hours in warm water (≈20 °C) to soften the seed coat and improve germination [7,8]. Alternatively, scarification with a knife shortens soaking time [8]. Germination usually occurs within 2–3 weeks in moist soil [8]. Vegetative propagation using 30 cm cuttings in humid, well-drained media is also possible [7]. Soil rich in organic matter, with adequate drainage and moderate watering, supports optimal growth [8].

Taxonomical Classification:

Taxonomic Rank	**Classification**
Kingdom	Plantae
Subkingdom	Tracheobionta(Vascular plants)
Super division	Spermatophyta(Seed plants)
Division	Magnoliophyta (Flowering plants)
Class	Magnoliopsida (Dicotyledons)
Sub-class	Rosidae
Order	Fabales
Family	Fabaceae
Subfamily	Caesalipinioideae
Genus	*Delonix*
Species	*Delonix regia*

(Table-01)[8]

Morphological characters, Chemical constituents, Uses:

Parts	**Description**	**Major Chemical Constituents/ Phytoconstituents**	**Medicinal uses**
Root	Woody taproot with branched laterals. [16]	Tannins, phenolic compounds. [9]	Used for rheumatism, anti-inflammatory and antioxidant activity. [19]
Stem/Bark	Greyish-brown, smooth in young trees, rough with age.[17]	Tannins, phenolics, flavonoids (quercetin), β-sitosterol. [10,11]	Anti-inflammatory, wound h ealing, antimicrobial, a nd astringent.[20]
Leaves	Bipinnate, bright green, numerous small leaflets. [18]	Flavonoids (luteolin, apigenin), glycosides, phenolic acids. [12,13]	Antioxidant, an ti-inflammatory, antidiabetic ac tivity. [21-23]
Flowers	Large, scarlet to orange-red, zygomorphic with five petals. [10,13,14]	Delonixins A & B, flavonoids, anthocyanins, glycosides. [10,13,14]	Used for fever, inflammation, and rheumatic pain; antioxidant and analgesic. [24-25]
Fruits(Pods)	Long, woody, dehiscent pods with many seeds.[17]	Carbohydrates, tannins, saponins. [11,12]	Used as purgative and in traditional medicine for constipation. [26]
Seeds	Hard, glossy, brown.[15]	Proteins, amino acids, fatty oils. [14,15]	Reported to have antidiabetic and antimicrobial potential. [27,28]

(Table-02)

Organoleptic characters:

Organoleptic characters	Description
Colour	The flowers are bright red or orange-red; leaves are green; bark is greyish-brown; seeds are brown and hard
Odour	Flowers have a mild, pleasant fragrance; other parts (bark, leaves) are odourless or have a faint characteristic smell.
Taste	Leaves and bark have an astringent, slightly bitter taste. Seeds are bland in taste.
Texture	Bark is rough and fibrous; leaves are delicate and bipinnate (fern-like); flowers are soft and smooth; seeds are hard and

	glossy.
Appearance	A medium to large ornamental tree with large, showy flowers, feathery compound leaves, and long flat pods containing hard seeds.

(Table-03)[29]



Roots



Stem



Leaves



Flowers



Fruits



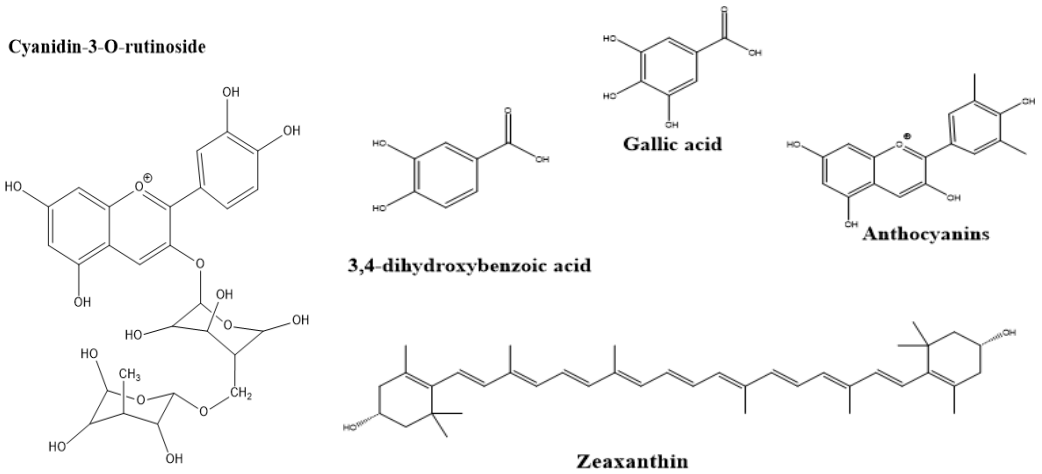
Seeds

Fig.02 Parts of the Gulmohar plant: a) the roots; b) the stem; c) the leaves; d) the flowers; and e) the fruits, f) the seeds. Gulmohar is an attractive tree that blooms. Gulmohar trees are typically 10–15 (up to 18) meters tall. Whether spreading, ascending, erect, or decumbent, every stem is woody. Stems and twigs that are young have little to no elaboration. large trunk facing the base that is inclined and buttressed. [29,30]

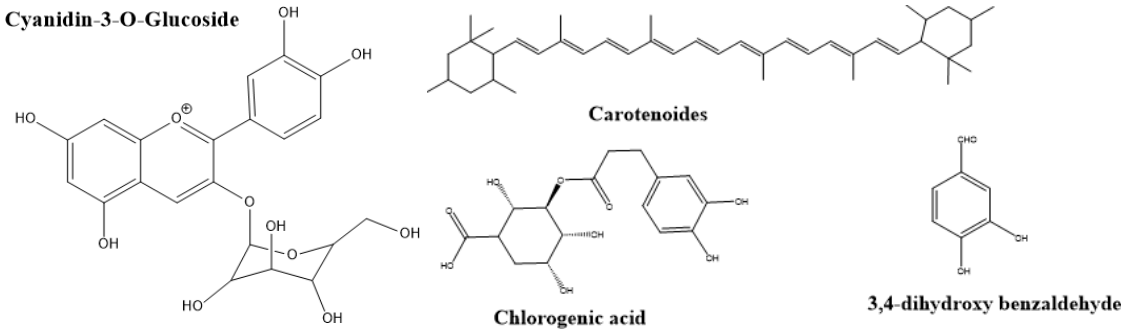
Phytoconstituents:

Plant part investigated	**Chemical constitutents isolated**	**References**
Flower	Anthocyanins, Cyanidine 3-o-glucoside,	
	Cyanidine 3-o-rutinoside, Pelargonidine3-o-rutinoside,	31
	Zeaxanthin,	32
	Carotenoids and	33
	Natural dyes.	34
Floral parts	1,2-Benzene dicarboxylic acid.	35
Seeds	Lectin, Fatty acid,	36,37
	Protein and free amino acid	38
Fruit	Activated carbon	39
Misc.	Phytotoxins-4-hydroxybenzoic acid, Chlorogenic acid, 3,4-dihydrobenzoic acid, Gallic acid, 3,4-dihydroxycinnamic acid, 3,5-dinitrobenzoic acid, L-azetidine-2-carboxylic acid and 3,4-dihydroxybenzaldehyde.	40

Structures:



Active Constitutents:

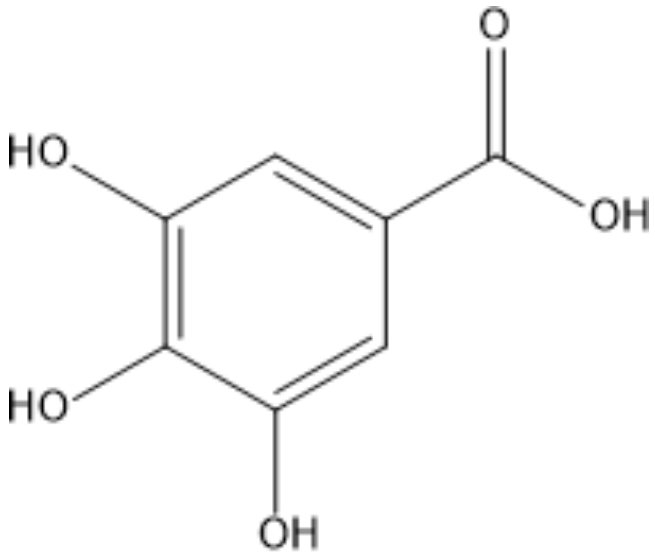


1. Flavonoids & Phenolic compounds:

The leaves and flowers of *Delonix Regia* (Gulmohar) are rich in flavonoids and phenolic compounds. [41] Flavonoids are well known plant secondary metabolites with potent anti-oxidant properties. It means they can neutralize free radicals, protect cells from oxidative stress, and reduce inflammation. In fact, some studies of Gulmohar extracts show significant anti-oxidant activity in lab assays. [42] Since oxidative stress plays a role in aging and many long term diseases, the flavonoids and phenolic compounds in plant may help explain why it has been traditionally used for reducing inflammation, healing wounds and offering overall protection to the body. [43]

Example: [ChemDraw]

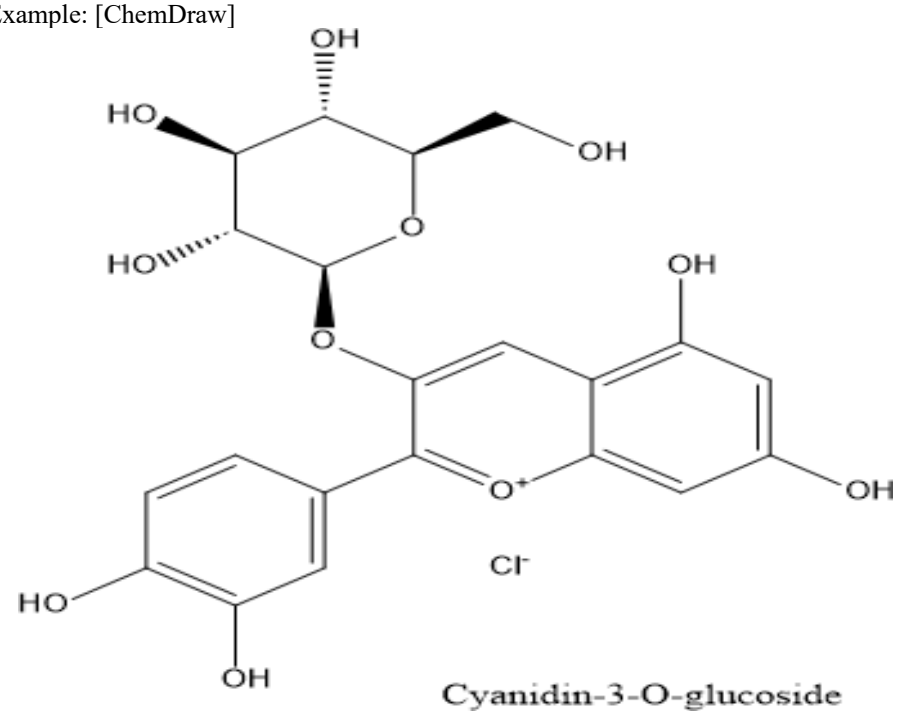
2. Anthocyanins:



Gallic acid

Gulmohar flowers contain natural anthocyanin pigments like cyanidin-3-O-glucoside and other related cyanidin and delphinidin compounds that give the flowers their bright reddish-orange colour. [44] These pigments do more than add beauty anthocyanins are strong antioxidants. In fact, one study found that the flower pigment extract (DRPE) could neutralise about 92% of DPPH free radicals in laboratory tests.[44] The same extract also showed the ability to fight harmful bacteria and even slow the growth of certain cancer cells in vitro. [44] This means that the anthocyanin is the rich part of Gulmohar may play an important role in its antioxidant, antimicrobial, and possible anticancer properties, supporting its traditional medicinal uses. [43]

Example: [ChemDraw]



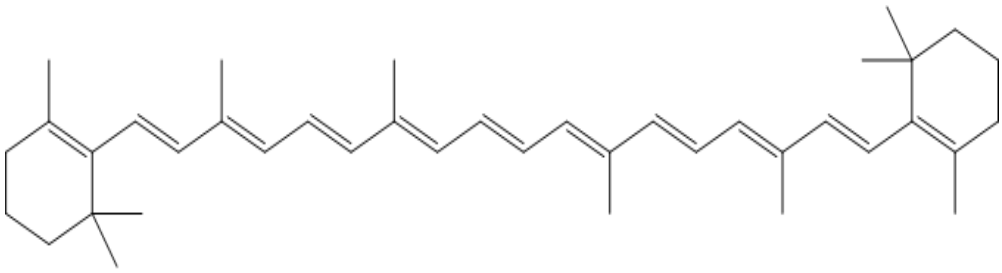
Cyanidin-3-O-glucoside

3. Carotenoids:

Researchers have identified several carotenoids in different parts of Gulmohar flowers such as the petals, sepals, filaments, and anthers. These include β-carotene, zeaxanthin, lycopene, phytoene, phytofluene, and others. [45] Carotenoids are fat-soluble pigments known for their strong antioxidant properties, and many of

them also serve as vitamin A precursors or help protect cells from oxidative damage. [45] Their presence in Gulmohar may support the overall antioxidant profile of the plant and may help explain its various health-related benefits, including its ability to shield tissues from oxidative stress. [43]

Example: [ChemDraw]

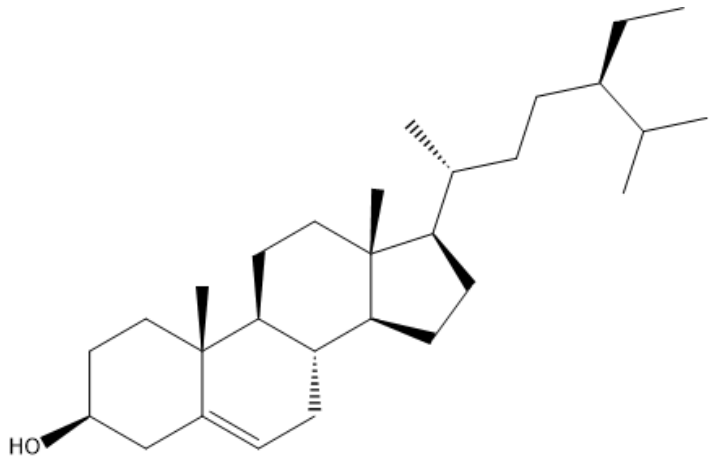


β-Carotene

4. Sterols and Triterpenes:

Gulmohar, especially its leaves and bark, contains several sterols and triterpenes such as β-sitosterol, lupeol, campesterol, and stigmasterol. [45] These natural compounds have been linked to different pharmacological activities. For example, extracts from the leaf part of plant have shown anti-inflammatory effects in animal studies, and researchers believe that sterols and triterpenes particularly lupeol play a major role in this activity. [23] These molecules may also support antimicrobial and other protective actions in the body. Because these compounds are non-polar and lipid-soluble, their variety helps explain why different parts of the plant (like bark, leaves, and seeds) can exert diverse biological effects. [46]

Example: [ChemDraw]

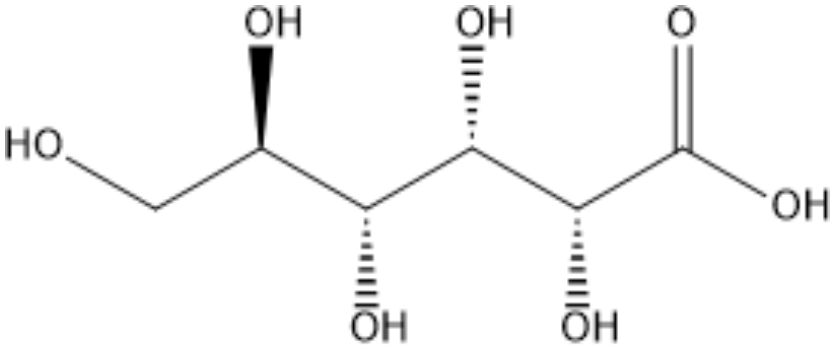


β-Sitosterol

5. Polysaccharides and Proteins:

Research has also revealed the presence of important polysaccharides in Gulmohar flower extracts, including sugars such as mannose, galactose, glucose, arabinose, and gluconic acid. [44] Along with these, scientists have isolated a protein-based compound called a lectin from the seeds, commonly referred to as DR-lectin. [36] This small protein (around 12 kDa) has a unique amino-acid makeup and was found to agglutinate rat red blood cells, although it did not react with human ABO blood groups in the study. [36] Plant polysaccharides and lectins are often studied for their potential immunomodulatory and antimicrobial effects. Although research on Gulmohar is still developing, these findings suggest that the plant may have additional biological activities beyond its antioxidant and sterol-related effects.

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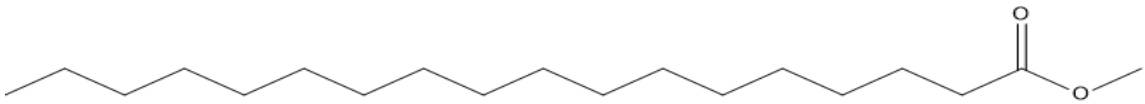


Gluconic acid

6. Fatty Acids and Fatty-Acid Derivatives:

Chemical analysis of Gulmohar seed oil using GC-MS has identified several fatty-acid methyl esters, including derivatives of linoleic acid, oleic acid, palmitic acid, and stearic acid. [47] The seed oil also contains valuable lipophilic compounds such as tocopherols (vitamin E), phospholipids, sterols, and terpenoids. [48] Together, these constituents may contribute to the nutritional or cosmetic value of the seed oil. They may also offer mild biological benefits such as antioxidant protection or membrane-stabilizing effects when used in suitable formulations.

Example:[ChemDraw]

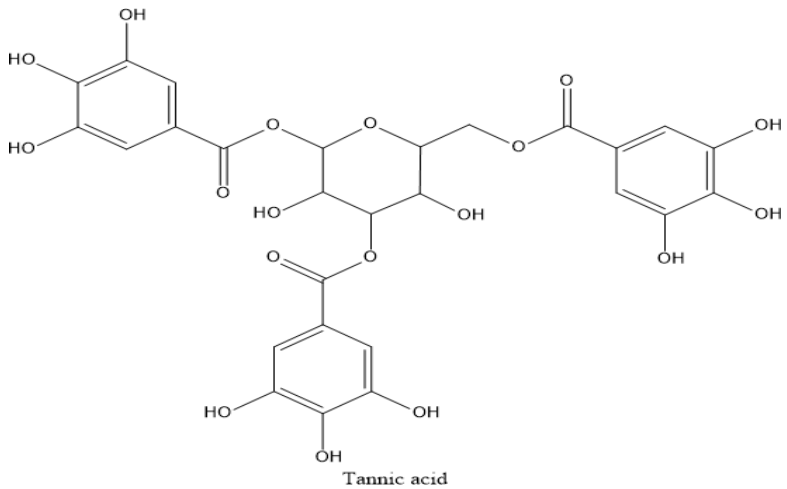


Methyl stearate

7. Tannins, Alkaloids, and Other Secondary Metabolites:

Phytochemical studies on different parts of Gulmohar, its flowers, leaves, and bark have consistently reported the presence of tannins, alkaloids, saponins, glycosides, and various phenolic compounds. [43] While not all of these molecules have been individually identified, their combined presence helps explain many of the plant's traditional uses. These secondary metabolites are known for activities such as reducing inflammation, fighting microbes, aiding wound healing, and helping with digestive issues like diarrhea. Their broad biological profile makes Gulmohar a plant of significant medicinal interest. [43]

Example: [ChemDraw]



Tannic acid

Pharmacological Properties of Gulmohar Plant:

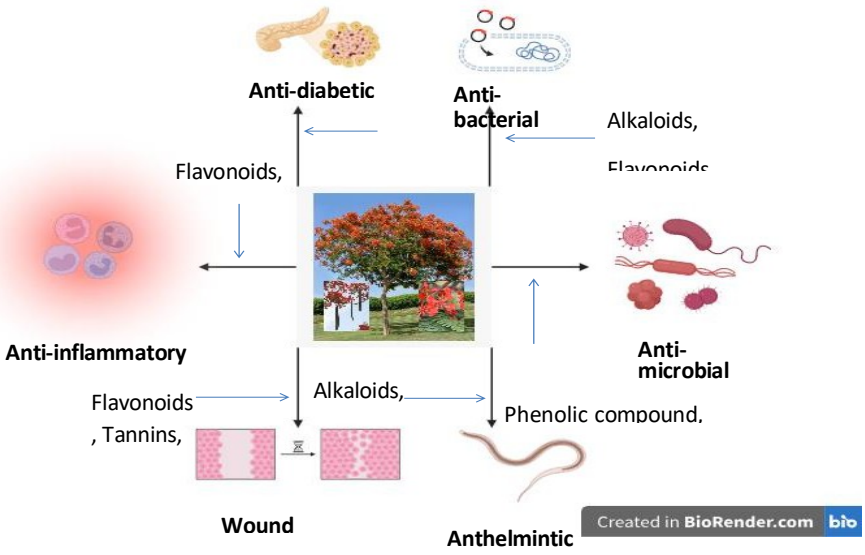


Fig.03 Pharmacological activities of Gulmohar plant

1. **Anti-Diabetic Activity:** In mice with induced hyperglycemia, a study employing a leaf methanol extract demonstrated a significant oral hypoglycemic effect. [49]

2. **Antibacterial Activity:** Gulmohar has antibacterial properties. S. epidermis and S. subtitles are the most susceptible bacteria. The methanol extracts work better than the aqueous extracts. [49]

3. **Anti-Diarrheal Activity:** Ethanol extract of Gulmohar showed anti-diarrhea activity in rats with prostaglandin, charcoal-induced motility tests, and artificially generated diarrhea. Gulmohar demonstrated antidiarrheal properties that were dose dependant. Induce enter pooling to evaluate the anti-diarrheal effectiveness in vivo. [49]

4. **Cytotoxic and Hepatoprotective Activity:** The study's findings showed that an ethanolic extract of Gulmohar separated three sterols (Ãþ-sitosterol, stigmasterol, and its 3-O-gucoside), an amino acid, and four flavonoids (quercitrin, quercetin, rutin, and iso quercitrin). The results of this study showed cytotoxic activity. Gulmohar has also demonstrated hepatoprotective benefits by employing flavonoids to scavenge free radicals. [49]

5. **Antimicrobial Properties:** The methanolic extract of Gulmohar showed a noticeable ability to fight against a variety of microorganisms. It demonstrated good activity by slowing down the growth of Staphylococcus aureus, Streptococcus species, and Candida albicans. These findings suggest that Gulmohar possesses natural compounds that can act as effective antimicrobial agents. [49]

6. **Anti-Inflammatory Activity:** Researchers evaluated the anti-inflammatory potential of Gulmohar using several standard animal models, including paw edema induced by carrageenan and cotton pellet granuloma. Across these models, the extract significantly reduced swelling and inflammation, showing that it has a strong natural anti-inflammatory effect. [49]

7. **Activity for Wound Healing**: Both ethanolic and aqueous extracts of Gulmohar flowers were tested for their ability to promote wound repair. In excision and incision wound models, the treated animals showed faster wound closure and better tensile strength compared to untreated groups. The extracts also improved epithelialization time, indicating enhanced tissue regeneration. Overall, Gulmohar noticeably supported the wound-healing process. [50]

8. **Gastrointestinal-Protective Activity:** The flower extract of Gulmohar also showed promising protection for the gastrointestinal system. In experimental ulcer models, the extract reduced the severity of stomach ulcers produced by various irritants. It helped maintain the integrity of gastric tissue and lowered ulcer scores, suggesting that Gulmohar possesses strong gastroprotective effects. In a dosage-dependent model, the ethanolic extract of Gulmohar demonstrated

gastroprotective properties. [51]

9. **Anthelmintic Action:** The aqueous and methanolic versions of the Gulmohar flower extract were extracted at three distinct concentrations: 25, 50, and 100 mg/ml. It was said that the paralysis and death periods of the worms were known. Distilled water served as the control, and piperazine citrate (10 mg/ml) was administered as the standard treatment. Both the aqueous and methanolic extracts show notable anthelmintic activity, although the methanolic extract has the highest anthelmintic activity. [52]

10. **Activity of Antioxidants:** Leaf and flower extracts were tested for their ability to scavenge radicals by measuring their effect on the DPPH [1, 1- diphenyl-2-picrylhydrazyl] free radical. Three milliliters of DPPH solution (0.004% methanol) and one milliliter of different extract concentrations were mixed together in labeled tubes. Following a half-hour dark incubation period at room temperature, the optical density at 517 nm was measured using a UV-visible spectrophotometer. [53]

Traditional uses of Gulmohar plant:

1. **Joint Pain and Rheumatism:** The leaves of Gulmohar are used as a remedy for painful, inflamed joints. A paste made from the leaves and bark is applied to swollen or rheumatic area is used to give relief from inflammation. [54]
2. **Fever, Inflammation and Body Pain:** The Gulmohar plant is used to reduce fever and treat general body aches. The decoction of leafs are taken for their anti-inflammatory effects. [55]
3. **Respiratory Ailments:** The bark of Gulmohar plant is used as an antipyretic and anti-periodic agent. The leaves are also used in traditional medicine for bronchitis and respiratory discomfort. [54]
4. **Diabetes / High Blood Sugar:** The leaves of Gulmohar plant are used in for lowering blood sugar. This traditional use is supported by experimental studies: for example, a methanolic extract of the leaves showed a strong blood-sugar-lowering effect in a mouse model. [56]
5. **Gynaecological Disorder:** The flowers of Gulmohar are used in traditional medicine to treat menstrual problems and other women's health issues. In some folk systems, the flowers are also used for their "binder" property. [58]
6. **Digestive Problems:** Flowers are used for treating diarrhoea in traditional medicine. In some cultures, the plant is believed to help with constipation. [59-60]
7. **Skin & Wound Healing:** The pastes of leaves are applied externally to treat wounds or skin problems. The bark and other parts have also been used for skin infections or to help heal sores. [61]
8. **Fever, Malaria, & Blood Disorders:** Some traditional systems report using Gulmohar for fever and malaria. Also used for anaemia (low blood) in certain folk traditions. [57]
9. **Diuretic / Detox Uses:** Parts of the plant are used as diuretics (to increase urine) and to cleanse or "detoxify" in traditional medicine. [58]

Part used	Traditional uses
Leaves	Traditional medicine uses leaves as an analgesic, anti-inflammatory, and antibacterial; fever, gastrointestinal issues, and respiratory issues are all treated with leaf decoction. [54-56]
Barks	Bark extracts are used to treat rheumatic pain and inflammations because they have long been utilized as an astringent, antidiarrheal, and anti-helminthic. [56,57]

Flowers	Blooms employed in traditional treatments as an anti-inflammatory and cooling agent, as well as in folk medicines for bronchitis, constipation, and liver problems. [59,60]
Seeds	Seed paste is occasionally administered externally to minimize swelling and is used to treat rheumatism, arthritis, and joint discomfort.[61]
Pods/Fruits	In local medicine, it is occasionally used to treat diabetes and has long been used as a purgative and for stomach issues. [61,62]
Roots	Origins In certain areas, it is used as a treatment for fever, joint inflammation, and malaria.[62,63]

Introduction about Jacaranda mimosifolia

Synonyms: Blue Jacaranda, Black Poui, Fern Tree; Jacaranda mimoso and Azul are reported names in Brazil.

Biological source: The leaves of Jacaranda mimosifolia D. Don, belonging to the family Bignoniaceae.

Family: Bignoniaceae

Geographical source: The plant is native to South America, particularly Argentina, Paraguay and Bolivia, and is cultivated in tropical and subtropical regions, including India. [64–67]

Basic Introduction: Jacaranda mimosifolia is an ornamental tree recognized for its bluish-purple to lavender flowers and delicate, fern-like bipinnate leaves. The tree is described in the supplied thesis as reaching approximately 10–20 m, with a greyish-brown bark and rounded or spreading canopy. The leaves are opposite and bipinnately compound, with numerous small leaflets. The plant has attracted medicinal interest because different parts contain biologically active phytoconstituents and have been associated with antioxidant, anti-inflammatory, antimicrobial, anticancer and neuroprotective activities. [64–67]

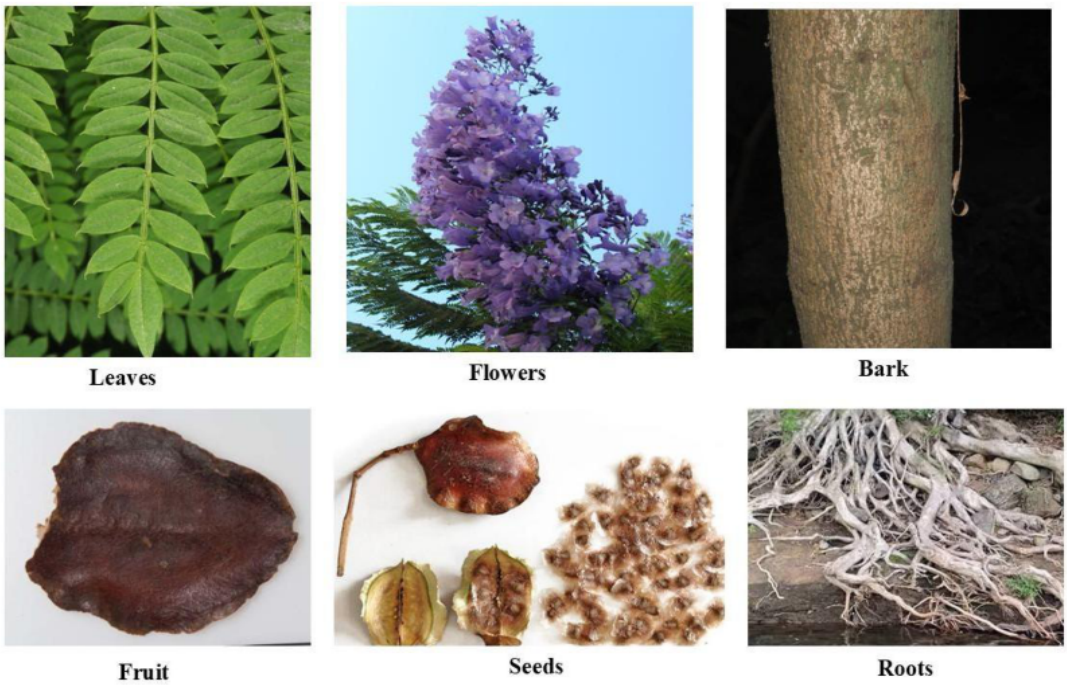


Fig. 4. Different parts of Jacaranda mimosifolia

Distribution and Botanical Description

Jacaranda mimosifolia is principally a South American species and is now cultivated in tropical and subtropical regions. The plant is a fast-growing, semi-

deciduous ornamental tree with a broad spreading crown. The stem is woody, erect and branched, while the bark is greyish-brown and becomes rough with age. The leaves are soft green, fern-like and bipinnately compound. Flowers are bluish-purple to lavender, trumpet-shaped and arranged in large terminal panicles. Fruits are woody, dry and flattened capsules containing numerous winged seeds, and the roots are spreading and well developed. [65–70]

Taxonomical Classification

Taxonomical rank	**Classification**
Kingdom	Plantae
Subkingdom	Tracheobionta
Division	Magnoliophyta
Class	Magnoliopsida
Sub-class	Asteridae
Order	Lamiales
Family	Bignoniaceae
Genus	Jacaranda
Species	Jacaranda mimosifolia D. Don
Clade	Angiosperms – Eudicots

Table 4. Taxonomical classification of Jacaranda mimosifolia. [65]

Vernacular Names

Language	**Name**
English	Blue Jacaranda, Black Poui, Fern Tree
Hindi	Neel Gulmohar
Punjabi	Jaikaranda
Sanskrit	Neela Kusuma Vriksha

Table 5. Vernacular names of Jacaranda mimosifolia

Organoleptic and Morphological Characters of Leaves

Character	**Description**
Colour	Soft green to green leaflets in the fresh state.
Odour	Characteristic mild plant odour.
Taste	Not specifically standardized in the supplied thesis.

Texture	Soft and delicate when fresh; dried leaves become brittle.
Shape	Fern-like, bipinnately compound leaf with numerous small leaflets.
Microscopic features	Lignified fibres, mesophyll fragments, epidermal cell fragments, calcium oxalate crystals, stomata and trichomes were reported in powder microscopy.

Table 6. Organoleptic and microscopic features of J. mimosifolia leaves.

Phytoconstituents

Phytochemicals are naturally occurring bioactive constituents that contribute to plant defence, growth and biological activity. The supplied thesis reports flavonoids, phenolic compounds, tannins, glycosides, quinones, terpenoids, alkaloids, saponins and steroids in different parts of J. mimosifolia. Chromatographic approaches including TLC, HPLC and GC-MS have been used for chemical investigation. Reported compounds include quercetin, kaempferol, rutin, cyanidine-3-O-glucoside, chlorogenic acid, gallic acid, 4-hydroxybenzoic acid, 3,4-dihydroxybenzoic acid, oleanolic acid, acteoside and jacaranone. [71–74]

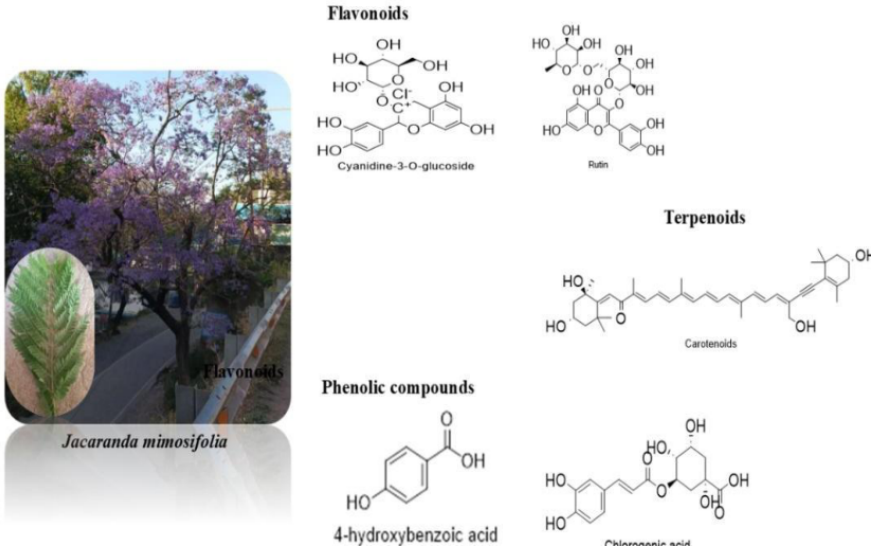


Fig. 5. Phytoconstituents reported in Jacaranda mimosifolia, including flavonoid and phenolic structures

Important Phytoconstituents and Their Significance

Class	Constituents reported in the thesis	Reported significance
Flavonoids	Quercetin, rutin, cyanidine-3-O-glucoside, kaempferol	Antioxidant, anti-inflammatory and other protective activities.
Phenolic compounds	Chlorogenic acid, gallic acid, 4-hydroxybenzoic acid, 3,4-dihydroxybenzoic acid	Free-radical scavenging and antioxidant contribution.
Terpenoids/triterpenes	Oleanolic acid, carotenoid-type constituents and related terpenoids	Reported antioxidant and anti-inflammatory contribution.

Phenylethanoid glycoside	Acteoside	Reported biological activity; investigated for antidiabetic/antioxidant potential.
Quinones	Jacaranone and related compounds	Cytotoxic and other experimental pharmacological interest.
Other secondary metabolites	Tannins, alkaloids, saponins, glycosides, steroids	May contribute collectively to antimicrobial, wound-healing and other activities.

Table 7. Major phytoconstituents reported for J. mimosifolia

Pharmacological Properties of Jacaranda mimosifolia

Jacaranda mimosifolia has been investigated for several pharmacological properties. According to the literature summarized in the supplied thesis, the most relevant activities include antioxidant, anti-inflammatory, antimicrobial, neuroprotective /anxiolytic, wound healing, anticancer and antidiabetic effects. The activities are generally attributed to the combined presence of flavonoids, phenolic compounds, tannins, alkaloids, terpenoids, glycosides and quinone-type constituents. [72–78]

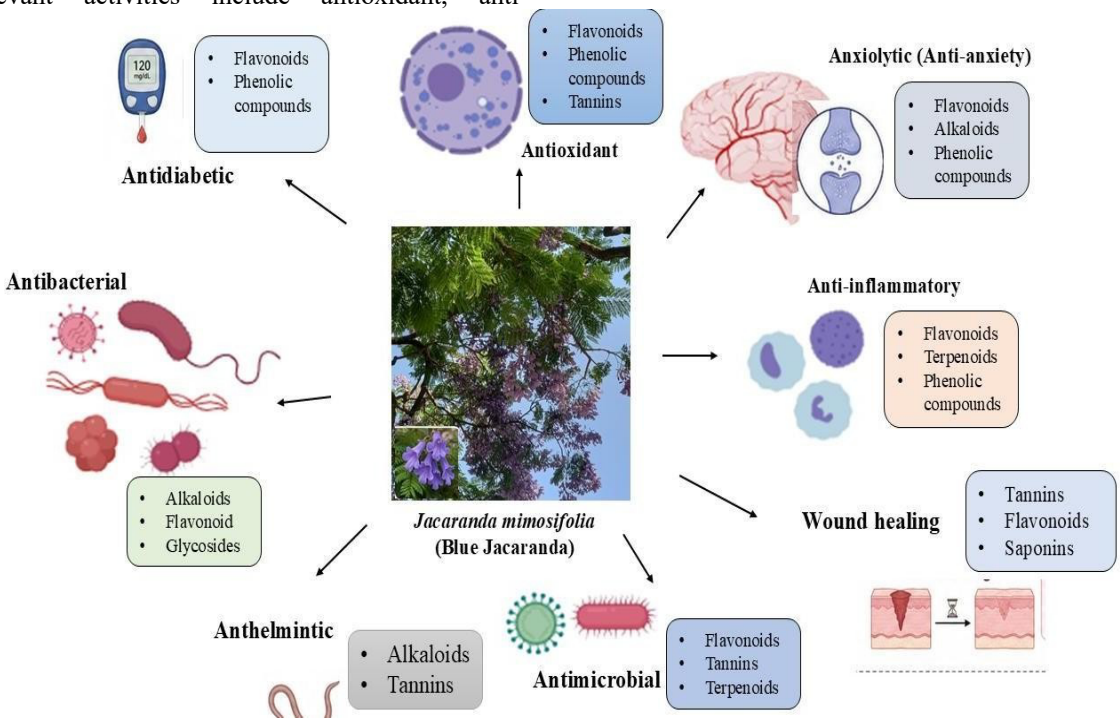


Fig. 6. Pharmacological activities of Jacaranda mimosifolia

1. Antioxidant Activity

Methanolic and ethanolic extracts of J. mimosifolia have been reported to exhibit antioxidant activity. The thesis attributes this activity mainly to flavonoids and phenolic compounds, which can participate in free-radical scavenging and reduction of oxidative stress. A detailed study of methanolic leaf extract and fractions evaluated DPPH, hydrogen peroxide, hydroxyl and superoxide radical-scavenging activity and also quantified polyphenolic constituents. The study therefore supports the importance of the leaf as a source of antioxidant phytochemicals. [72,76]

2. Anti-inflammatory Activity

Anti-inflammatory potential has been associated with inhibition of inflammatory mediators and reduction of oxidative damage. Flavonoids and terpenoids are identified in the thesis as important contributors. Leaf extract and fractions have been evaluated using lipoxygenase inhibition as an experimental model of anti-inflammatory potential. The 2025 study cited in the thesis further investigated flavonoids and other constituents of J. mimosifolia using in-vitro analysis, molecular docking and molecular dynamics to explore antioxidant and anti-inflammatory mechanisms. [72,76]

3. Antimicrobial Activity

Leaf and bark extracts of J. mimosifolia have demonstrated antibacterial and antifungal activity against several microorganisms. The thesis describes activity associated with tannins, quinones and phenolic compounds. In the study by Naz et al., methanolic leaf extract and fractions were tested against Bacillus subtilis, Klebsiella pneumoniae, Pseudomonas aeruginosa and Staphylococcus aureus, while antifungal activity was assessed against Aspergillus fumigatus, Aspergillus flavus and Fusarium oxysporum. [72,77]

4. Wound Healing Activity

J. mimosifolia has been reported to possess wound-healing potential. The thesis attributes this activity to flavonoids, phenolic compounds, alkaloids, tannins and terpenoids, which may contribute through antioxidant, anti-inflammatory and collagen-promoting mechanisms. Because some evidence cited in the thesis relates to Jacaranda species other than J. mimosifolia, species-specific confirmation is necessary before assigning the activity specifically to J. mimosifolia leaves. [79]

5. Anticancer Potential

Jacaranone and related quinone derivatives have attracted attention because of cytotoxic effects observed in experimental studies. The thesis also cites work on Jacaranda species and related constituents showing anticancer potential. Such findings are useful for natural-product drug discovery, but cytotoxicity in cell-based experiments cannot by itself establish clinical anticancer activity or therapeutic safety. [80]

6. Antidiabetic Activity

The antidiabetic potential of J. mimosifolia has been associated with flavonoids, phenolic compounds, tannins and terpenoids. The thesis describes possible mechanisms including antioxidant protection, improvement of glucose utilization and inhibition of α-amylase and α-glucosidase. A 2025 study specifically evaluated bark, flower and leaf extracts for in-vitro antioxidant and antidiabetic activity, providing recent support for continued investigation of the species. [81]

Traditional Uses

The supplied thesis reports traditional or ethnopharmacological uses associated with different parts of J. mimosifolia. Leaves are reported for wound healing and skin disorders; bark for fever and pain relief; flowers for respiratory and digestive ailments; fruits for traditional treatment of infections; and the whole plant for general health promotion. Leaves/extracts are also described in relation to traditional management of stress and anxiety. [83]

Plant part	Traditional / ethnopharmacological use
Leaves	Wound healing, skin disorders
Bark	Fever and pain relief
Flowers	Respiratory ailments, digestive disorders
Fruits	Traditional treatment of infections
Whole plant	General health promotion
Leaves / extract	Management of stress and anxiety (traditional use reported in thesis)

Table 8. Traditional uses of J. mimosifolia [83]

CONCLUSION:

Delonix regia and *Jacaranda mimosifolia* possess considerable phytochemical diversity and promising pharmacological potential. The presence of flavonoids, phenolic compounds, tannins, glycosides, alkaloids and terpenoids provides a possible basis for many of their reported biological activities. *D. regia* has shown antioxidant, anti-inflammatory, antimicrobial, antidiabetic, hepatoprotective, antidiarrheal and wound-healing activities, whereas *J. mimosifolia* has demonstrated antioxidant, anti-inflammatory, antimicrobial, anxiolytic, neuroprotective, wound-healing, anticancer and antidiabetic potential. The available literature indicates that both plants can serve as valuable sources of naturally occurring bioactive compounds and may have potential applications in pharmaceutical and traditional medicine. However, most of the reported evidence is based on experimental and preclinical investigations. Therefore, further studies involving standardized extraction, identification and quantification of active constituents, mechanism-based investigations, toxicity evaluation and clinical studies are necessary to confirm their therapeutic efficacy and safety. Overall, the phytochemical richness and broad pharmacological profile of *D. regia* and *J. mimosifolia* justify continued scientific investigation of these plants for the development of potential natural therapeutic agents.

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