



PHYTOCHEMICAL SCREENING OF THE PLANT EXTRACTS OF *DELONIX ELATA*

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ABSTRACT

The present study was done with an intention to explore the phytochemical constituents of the root extract of *Delonix elata*. In pharmaceutical and food industries plants are widely used due to their biological importance. Among the plant parts, leaves, stem, roots and bark are widely studied for their biological properties. The study was carried out to compare the phytochemical activities of ethanolic root extracts of *Delonix elata* with the leaf and bark extracts. The results showed all the three extracts contain phytochemical activities.

KEYWORDS: *Delonix elata*, phytochemical screening, biological properties.

INTRODUCTION

In the ancient India, medicinal plants were used to prevent various critical diseases.^[1] Even in recent years, there has been an increasing awareness about the importance of medicinal plants. Generally, herbal drugs are easily available, safe, less expensive, efficient, and rarely have side effects. According to World Health Organization, medicinal plants would be the best source to obtain variety of drugs.^[2] Medicinal plants contain some organic compounds which provide definite physiological action on the human body and these bioactive substances include some of the examples like tannins, alkaloids, carbohydrates, terpenoids, steroids, flavonoids and phenols. The bio-active phytoconstituents are synthesized by primary or rather secondary metabolism of living organisms. Secondary metabolites are chemically and taxonomically extremely diverse compounds with obscure function. They are widely used in the human therapy, veterinary, agriculture, scientific research and countless other areas. Medicinal plants containing active chemical constituents with high antioxidant property play an important role in the prevention of various degenerative diseases and have possible benefits to the humanity.^[3]

Delonix elata is commonly known as white gulmohur belonging to the family of Fabaceae and subfamily Caesalpinoidae. *Delonix elata* is not a classical Ayurvedic drug, but found included in Shodhala Nighantu under the Sanskrit name of ‘-Siddeshwara-’ during 12century AD. The medical usefulness of the tree is acknowledged by people living in the villages who take a decoction of the leaves and barks to get relief from

rheumatic problems like pain and stiffness of the joints, especially affecting the knees. It was observed that local people and Siddha practitioners in Tamil Nadu, India use the *Delonix elata* bark and leaves for treating inflammation and arthritic conditions. Extensive pharmacological studies on *D. elata* and vegetative parts exhibited anti-inflammatory, anti-arthritic, immune modifying potentials, anti-oxidant, anti-diabetic, anti-microbial, larvicidal, anti-diarrhoea, anti-pyretic, hepatoprotective activities.^[4,10]

PLANT PROFILE

- Botanical Name : *Delonix elata* (L.) Gamble
- Synonym : *Poinciana elata*
- Family : Fabaceae
- Sub Family : Caesalpinaceae
- Common Name : White Gulmohur, White poincian.

Vernacular Name

- Tamil - Vadhanarayanan, Perungondrai
- English - Yellow Gulmohur, Tiger bean, Creamy peacock flower
- Telugu - Chinnaseibiseri, Chittikeshwaramu
- Kannada - Nirangi, Vatanarayana
- Hindi - Waykaran, Sandeshra
- Marathi - Sanchaila, Sankasura
- Sanskrit - Siddhesvara

Taxonomic Classification

- Kingdom - Plantae
- Phylum - Tracheophyta
- Class - Magnoliopsida
- Order - Fables

- Family - Fabaceae
- Genus - Delonix
- Species - *Delonix elata* (L.) Gamble
- Habitat – Terrestria.

Distribution: The species is globally distributed in tropical areas like Africa, Egypt, Arabia to India (Kathiawar and South India).

Description: *Delonix elata* is a perennial, medium-sized, deciduous tree about 2.5-15 meter tall with a spreading, rather rounded crown and very attractive white fragment flowers. Crooked poor stem form and drooping branches. Bark smooth, shining; sometimes flaking.



Fig. 1: Whole plant.

Leaves: 3-6 or more, bipinnate; pinnae usually 4-6 pairs; leaflets 10-14 pairs oblong or oblanceolate-oblong, 0.6-1.2 cm long. Leaflets 1.25-4 mm wide.



Fig. 2: Leaves of *Delonix elata*.

Flowers: Terminal corymbs; stalks pubescent, lowest flowers stalks longest. Flowers open one at a time. Sepals 1.8 cm long, with a broadly ovate or rotundate-cuneate lamina narrowing into a distinct claw. Petals rounded in outline and crisped on margins 1.6-3.8 cm long, 1.8-4.2 cm wide; upper one smaller than rest, pale yellow; the remainder white; later all turning apricot. Staminal filaments pale brown or reddish, hairy at the

base, 5-10 cm long; pedicels up to 3.75 cm. Ovary pubescent or tomentose all over.



Fig. 3: Flower of *Delonix elata*.

MATERIALS AND METHODS

Collection of plant

The leaf, root and barks of *Delonix elata* were collected from different parts of Coimbatore and Namakkal. Taxonomic authentication of the plant was done by Dr. M. U. SHARIEF, Botanical survey of India, Coimbatore.

Preparation of plant extracts

The extraction of the *Delonix elata* leaves, bark and root were carried out using known standard procedures.^[11,12] The collected plant materials were cleaned, dried in shade and powdered in a mechanical grinder. About 60g of fine dried powdered leaf, flower and root of *Delonix elata* were mixed with 150mL of ethanol (75%) using an Ultra Turax mixer for 1min and soaked overnight at room temperature. The samples were then filtered through Whatman No.1 paper in Buchner funnel. The filtered solutions were kept in a rotavator at 40°C, then the dried powder filtrate of the leaf, flower and root of *Delonix elata* dissolved using solvent were stored inside a freezer below 10°C for the further investigation.

Phytochemical Studies

Phytochemical screening of *Delonix elata* leaf, bark and root extracts were assessed by standard method as described by Savithamma et al and Selvaraj et al.^[13,14]

Test for Tannins: One mL of the leaf extract was added to 1 mL of 5% ferric chloride. Formation of dark blue or greenish black indicates the presence of tannins.

Test for Flavonoids: One mL of the leaf extract was added to 1 mL 2N sodium hydroxide. Formation of yellow color indicates the presence of flavonoids.

Test for Alkaloids: One mL of the leaf extract was added to 2 mL of concentrated hydrochloric acid. Then few drops of Mayer's reagent was added. Presence of green color or white precipitate indicates the presence of alkaloids.

Test for Glycosides: One mL of the leaf extract was added to 3 mL chloroform and 10% ammonium solution.

Formation of pink color indicates the presence of glycosides.

Test for Phenols: One mL of the leaf extract was added to 2 mL distilled water followed by few drops of 10% FeCl₃. Formation of blue/green color indicates the presence of phenols.

Test for Coumarins: One mL of the leaf extract was added to 1 mL 10% NaOH. Formation of yellow color indicates the presence of coumarins.

FT-IR Studies

This method tries to assess functional groups present in a compound. Knowledge of the functional group helps in defining the physical and chemical properties of a given compound. Also, single, double, and multiple bonds were identified through this process. The technique involves passing an organic compound through infrared radiation, which is absorbed in certain frequencies. Liquid samples are identified using sodium chloride plates, whereas solids samples are determined using potassium bromide milled together and compressed into a thin pellet. The result is recorded as a spectrum that is percentage transmittance. Lastly, the spectra are analysed; the peaks

obtained at certain wave number were compared with standard reference.

RESULTS AND DISCUSSION

Phytochemical Screening

Phytochemical screening was the basic strategy for identifying the bioactive compounds present in the various parts of the plant *Delonix Elata L*. The compounds such as alkaloids, flavonoids, and saponins act as a good anti-microbial, anti-cancer anti-oxidant properties. It was previously reported that the plant *Delonix Elata L* was used for cure jaundice, bronchial and rheumatic problems. It also having anti-fungal, anti-viral, hepatoprotective, wound healing, and analgesic activity. So that the chosen plant would possess enough characteristics for anti-microbial activity. The results of phytochemical screening were recorded in the table 1, (+) indicates the presence of phytochemicals and (-) indicates the absence of phytochemicals.

The phytochemical test with ethanolic extract of *Delonix elata* leaf, bark and root, manifest the presence of various phytoconstituents like alkaloids, glycosides, tannins, flavonoids, phenols, coumarins.

Tab. 1: Results of Phytochemical screening of *Delonix elata L*.

S. No	Test	Ethanolic Extract of Root	Ethanolic Extract of Leaf	Ethanolic Extract of Bark
1	Test for Tannins	+	+	+
2	Test for Flavonoids	+	+	+
3	Test for Alkaloids	+	+	+
4	Test for Glycosides	+	+	+
5	Test for Phenols	+	+	+
6	Test for Coumarins	+	+	+

FT-IR Spectrum Analysis

The IR spectrum of various extracts of plant *Delonix elata* were studied by using FT-IR spectroscopy by KBr

disk method. The results obtained from FT-IR shows the presence of functional group present in the extracts.

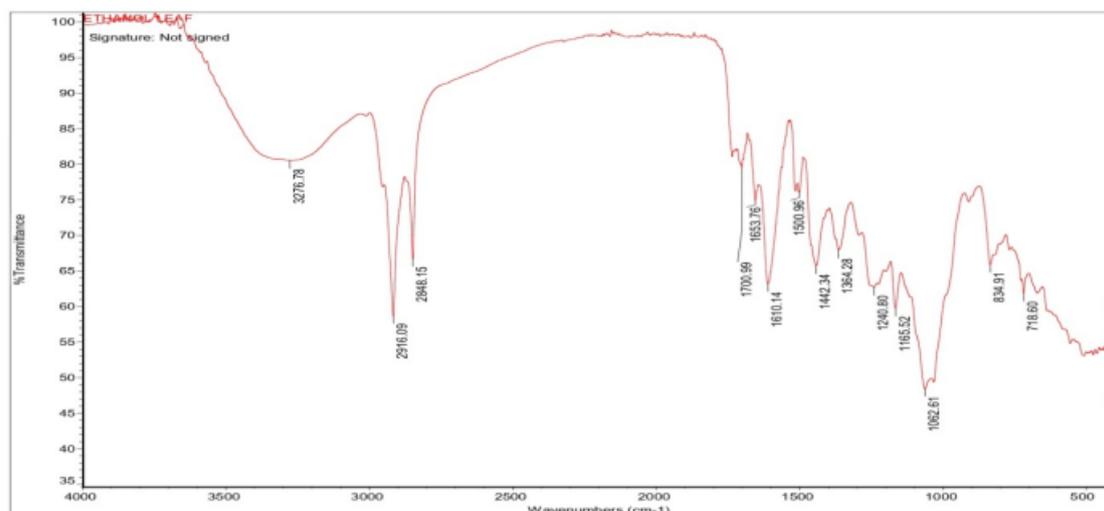


Fig. 4: FT-IR spectrum of Ethanolic Leaf extract of *Delonix elata*.

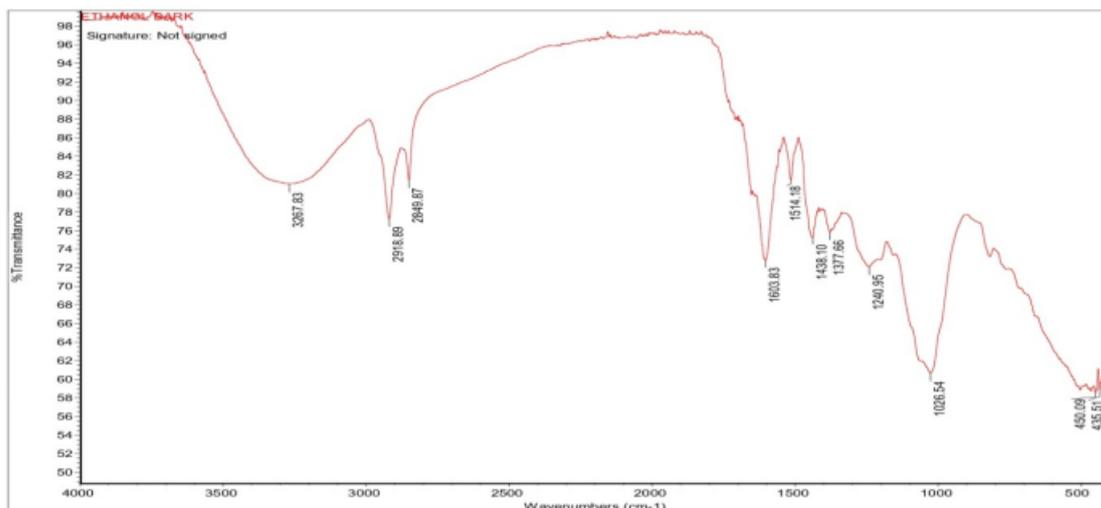


Fig. 5: FT-IR spectrum of Ethanollic Bark extract of *Delonix elata*.

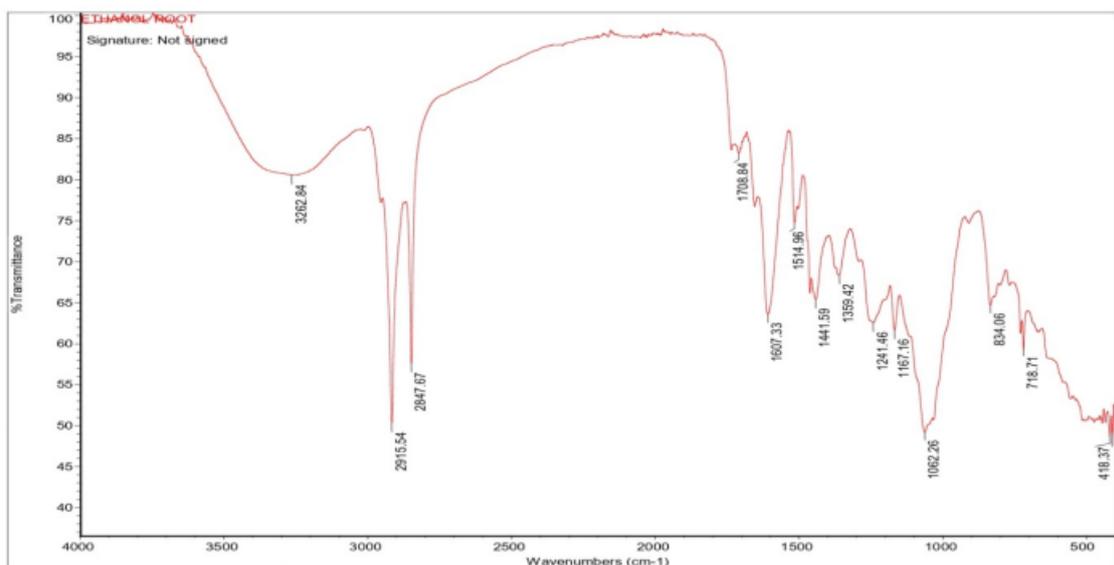


Fig. 6: FT-IR spectrum of Ethanollic Root extract of *Delonix elata*.

CONCLUSION

In the present study the ethanolic extract of *Delonix elata* leaf, bark, root manifested the presence of various phytoconstituents in the phytochemical screening of extracts. The results obtained from FT-IR also shows the presence of functional groups present in the extracts. Further studies should be carried out to isolate the active ingredients present in the leaf extracts which may possess potential pharmacological activities.

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