

Quantification of Total Phenol and Flavonoid Content of *Delonix regia* Flowers

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Abstract: *Delonix regia* (family: Legminosae, sub family: fabaceae) commonly called as gulmohor in Hindi, is reported to contain rich content of β -sitosterol, tannins, saponins, flavonoids, steroids, alkaloids and carotene hydrocarbons. The carotenoids and perhaps non-nutrients like dietary fibers and other phenolic components (flavonoids, tannins and terpenoids) can influence the enzyme involved in the activation and detoxification of xenobiotics including carcinogens. Similarly many such herbs are known to protect the organs and organ systems from the environmental, chemical and occupational changes. Therefore, the present investigation was undertaken for quantification of the 70% alcoholic extract (AE) of total phenolic (TPC) and flavonoidal content of the plant. Catechol and Quercetin reagents were used as standards for calibration of total phenolic and flavonoids content respectively. The AE of total phenolic and flavonoidal content were found 34.44mg/g and 30.45mg/g respectively. The study indicates that the flowers of *Delonix regia* to be contain rich source of potentially useful natural antioxidants like poly phenol and flavonoids.

Keywords: Total phenolic content, flavonoids, Quercetin, Catechol, *Delonix regia* flower.

Introduction

Plants have been used for health and medicinal purpose since thousand years. They are one of the rich and important sources of medicine since human civilization. Now a day, it is preferred to use plant based medicines over synthetic medication for the treatment of different diseases because of their safety and cost effectiveness. Herbal medicines are particularly used by traditional practitioners since ancient times, inspite of their poor scientific data. Moreover continues exposure to stressful conditions generates free radicals, which may over power the inbuilt protective mechanisms and cause tissue damage. There are reports that plants possessing free radical scavenging activity are known to have organ protective effect. Many scientists are reported that, flowers and green leaves of the plant are useful as medicines.^{1,2}

The plant *Delonix regia* (family: leguminosae, sub family: fabaceae) also known as royal Poinciana. May flower plant or Flamboyant, is many branches, broad, spreading, flat crowned deciduous tree and well known for its brilliant display of red-orange bloom, literally covering the tree from May to June³. The *Delonix regia* will provide fullest flowering and best growth when planted in full sun location⁴. The literature survey reveals that *Delonix regia* bark contain β -sitosterol, saponins, alkaloids, carotene, hydrocarbons phytotoxins and flavonoids. Flowers of *Delonix regia* also contain carotenoides⁵, tannins, saponins, flavonoids, steroids, alkaloids⁶ and β -sitosterol⁷ seed consists of saponins⁸, galactomannon⁹. The leaves of the plant contain rich content of lupeol and β -sitosterol. Quantification of the total phenolic and flavonoidal has not been undertaken as on today.

Hence the present study an attempt is made to quantitative estimation of total phenolic and flavonoidal content from flowers of this plant.

Fig 1: Photograph of *Delonix regia* flower



Material and Methods

Collection of Plant material and preparation of extracts

The flowers of *Delonix regia* were collected in the month of May from the surrounding fields of Harapanahalli and authenticated by Professor K. Prabhu, Department of Pharmacognosy, S.C.S College of Pharmacy, Harapanahalli. The powder obtained was subjected to successive soxhlet extraction with the solvents with increasing order of polarity i.e. pet.ether (60-80), chloroform and 70% alcohol.

The extracts were concentrated under reduced pressure and stored in airtight container in refrigerator below 10°C.

Preliminary phytochemical screening

The preliminary phytochemical investigation was carried out for pet. Ether (60-80), chloroform, 70% alcoholic and aqueous extracts of flowers of *Delonix regia* for the detection of various phytoconstituents by following standard methods as described in practical Pharmacognosy by K.R.Khandelwal¹⁰. The results were shown in Table No. 1.

Table No. 1: Qualitative Phytochemical Tests

Tests for phytoconstituents	70% hydro alcohol extract
Test for reducing sugar	
1) Fehling's test	++
2) Benedicts test	++
Test for proteins	
1) Biuret test	+++
2) Xanthoprotein test	++
3) Million's test	++
Test for amino acid	
1) Test for tyrosine	+++
Test for cardiac glycoside	
1) Baljet's test	+++
Test for flavonoids	
1) Shinoda test	++
2) Lead Acetate test	++
3) Sodium hydroxide test	++
Test for alkaloids	
1) Dragendroff's test	+++
2) Mayer's test	++
3) Hager's test	++
4) Wagner's test	++
Tests for tannins & polyphenolics	
1) Acetic acid test	++
2) Bromine water	++
3) Pot. Dichromate	++
4) Dil. Iodine	+
5) Dil. HNO ₃	+

Note: '+++' indicates highly significant, '++' indicates significant, '+' indicates presence.

Experimental

Determination of Total Phenolic content (TPC)

The total phenolic contents of flower extracts of *Delonix regia* were determined¹¹. Using aliquots of the extracts were taken in a 10 ml glass tube and made up to a volume of 3 ml with distilled water. Then 0.5 ml Folin ciocalteau reagent (1:1 with water) and 2 ml Na₂CO₃ (20%) were added sequentially in each tube. A blue color was developed in each tube because the phenols undergo a complex redox reaction with phosphomolibdic acid in folin ciocalteau reagent in alkaline medium which resulted in a blue colored complex, molybdenum blue. The test solutions were warmed for 1minute, cooled and absorbance was measured at 650 nm using known concentrations of Catechol. The solutions were warmed for 1minute, cooled and absorbance was measured at 650 nm using known concentrations of

Catechol. The concentrations of phenols in the test samples were calculated from the calibration plot and expressed as mg Catechol equivalent of phenol per gram of sample.

Total Flavonoidal content (FC)

To determine the total flavonoidal content, stock solutions of extract (AE: 20mg/ml) was prepared with ethanol to a suitable concentration for analysis, for the determination of flavonoidal content¹². Aliquots of each extract (AE) was pipetted out in series of test tubes and volume was made upto 0.5ml with distilled water; sodium nitrate (5% : 0.3ml) was

added to each tube & incubated for 5 min. at room temperature; Aluminium chloride solution (10%; 0.06ml) was added and incubated for 5 min, at room temperature; Sodium hydroxide (1M; 0.25ml) was added and total volume was made to 1ml with distilled water. Absorbance was measured at 510 nm against a reagent blank using Shimadzu model 1700 double beam spectrophotometer and concentration of flavonoids in the test sample was determined and expressed as mg equivalent per gram of sample.

Table 2: Total phenolic and flavonoidal content of extract

Particulars	Phenolic content	Flavonoidal content
Standard curve	Catechol	Quercetin
Absorbance	650 nm	510 nm
Amount of content in 70% alcoholic extract per gram	34.44 mg/g	30.45mg/g
R ² value	0.997	0.989

Fig 3: Catechol Calibration Curve

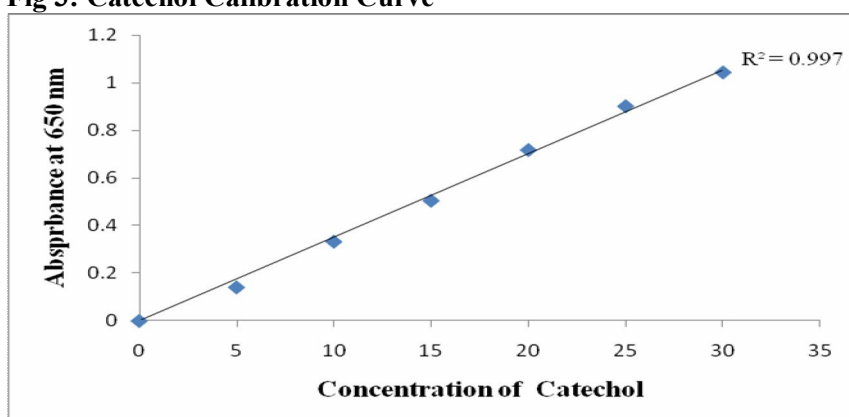
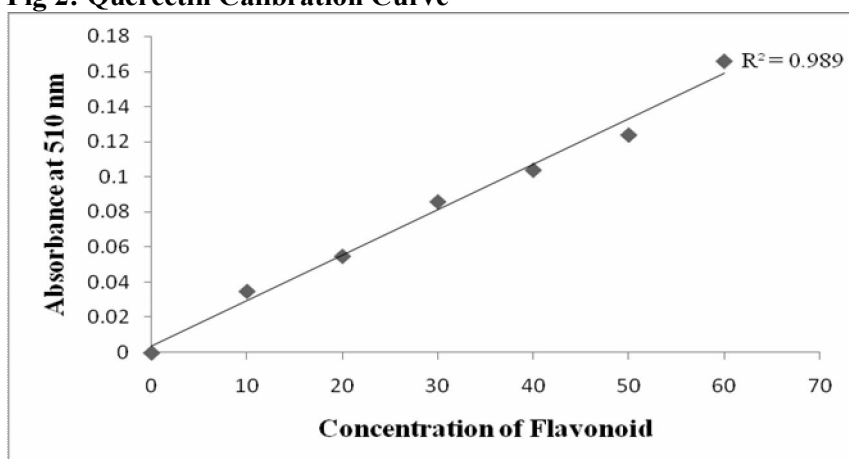


Fig 2: Quercetin Calibration Curve



Results and Discussion

There are reports that polyphenolic compounds like flavonoid and tannins are known antioxidant. These antioxidant are reported to have organ protective role and hence in this study, a widely grown plant *Delonix regia* was selected for quantification of total phenolic and flavonoidal content.

The preliminary phytochemical screening of AE extract shown that they contain proteins, amino acids, cardio glycoside, alkaloids, flavonoids, tannins, and phenolic compounds. However it was observed that the TPC was found to be very much higher than the flavonoidal content. The result of preliminary phytochemical screening is compiled in table No. 1.

Total phenolic and flavonoidal content were found to be 34.44mg/g and 30.45mg/g in 70% alcoholic extract respectively. The standard curve of total phenolic and flavonoidal content is given in

figure no.2 and 3 respectively. The total phenolic and flavonoidal content of the plant were given in table no.2

Conclusion

The present investigation revealed that the flowers of *Delonix regia* contain significant amount of phenols and flavonoids. This constituent may play pivotal role as antioxidant and organ protective properties.

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