ANTIOXIDANT ACTIVITY OF AERIAL PARTS *OF DELONIX REGIA*

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Summary

Delonix regia (Caesalpiniaceae) is commonly called as gulmohar in India. It is an ornamental plant and having lot of traditional application. It is useful in the treatment of dysmenorrhoea and used as antiperiodic, febrifuge, emetic, CNS depressant, antimalerial, antibacterial, antirheumatic and spasmogenic. Present work was undertaken to estimate antioxidant potential of the plant by DPPH scavenging assay and nitric oxide scavenging assay. IC_{50} value of methanol extract of aerial part in above mentioned assay was found to be532 ug/ml and 172 ug/ml respectively.

Keywords: *Delonix regia*, Caesalpiniaceae, DPPH, Nitric Oxide.

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Introduction

Delonix regia (Caesalpiniaceae) is an stirringly ornamental medium sized tree planted in garden in all the warmer and damper parts of India, native to Madagascar. It is commonly known as Gulmohar.[1] The plant has been claimed to be useful in the treatment of dysmenorrhoea[2], as antiperiodic, febrifuge, emetic, CNS depressant[3], antirheumatic, spasmogenic[1], antioxidant[4] , larvicidal[5], antibacterial, antifungal,[6] anti-inflammatory, analgesic,[7] nutritional[8] and antimalerial.[9] Its aqueous and alcoholic extracts were active against roundworm. The Bark contains leucocyanidin, lupeol, tannin, β-sitosterol and free hydroxyproline as major amino acid. Flower anthers are a rich source of zeaxanthin. Leaves contain tannins, lupeol and β-sitosterol.[1]

Aim of the present work is to estimate antioxidant potential of *D. regia* aerial parts by using in-vitro methods.

Materials and Methods

Plant Material

The aerial parts of *D. regia* were collected from Ahmednagar (M.S) region and authenticated at Botanical Survey of India, Pune (Voucher specimen number **JA-1**).

Extraction

The aerial parts were dried under shade and then powdered. The dried powdered material was subjected to extraction with methanol in Soxhlet apparatus.[10] The extract was vacuum dried to yield 33.182 % w/w.

Drugs and Chemicals

The following drugs and chemicals were used. Drugs: DPPH, Sodium nitroprusside, Phosphate buffer solution, Butyl Hydroxy Toluene (BHT) (RL, India), Methanol AR (PCL, India.)

Evaluation of Antioxidant activity

DPPH Assay: [11]

The different concentrations of extracts (50 µg/ml-250 µg/ml) were treated with same concentration of DPPH for 5 min. The reaction mixture consisted of 1 ml of 0.1 mM DPPH in methanol, 1 ml of methanol and varying concentrations of extract. The absorbance of the mixture was measured at 517 nm exactly 30 seconds after adding DPPH. The experiments were performed in triplicate and percentage of scavenging activity was calculated using formula.

$$\% \text{ Inhibition} = \frac{\text{Absorbance of Blank} - \text{Absorbance of Extract}}{\text{Absorbance of Blank}}$$

IC_{50} value was calculated from equation of line obtained by plotting a graph of Concentration (µg/ml) verses % inhibition.

Nitric oxide scavenging activity: [11]

Sodium nitropruside (5 µg) in standard phosphate buffer solution was incubated with different concentrations of the test extracts (50µg/ml-250 µg/ml) was suspended in 1% w/v of carboxy methyl cellulose (CMC) and tubes were incubated at 25^0C for 5 hrs. 0.5 ml of incubation solution was removed and diluted with Griess reagent. The absorbance of chromophore formed was read at 546 nm. The control experiment was also carried out in similar manner using CMC in place of extracts. The experiment was performed in triplicate and percentage scavenging activity was calculated using the formula.

$$\% \text{ Inhibition} = \frac{\text{Absorbance of Blank} - \text{Absorbance of Extract}}{\text{Absorbance of Blank}}$$

IC_{50} value was calculated from equation of line obtained by plotting a graph of Concentration (µg/ml) verses % inhibition.

Results and Discussion

Reactive oxygen species (ROS) are involved in the pathogenesis of various diseases. Uncontrolled oxidation is caused by free radicals. Free radicals oxidize all major classes of biomoleculs. The products of these oxidation reactions diffuse from the original site of attack and spread the damage all over the body and produces serious damage to almost all the cells. Some important biomoleculs susceptible to free radical oxidation are Lipids, Proteins, Nucleic acids and Carbohydrates. Thus the need of antioxidant therapy arises.

In DPPH test the ability of a compound to act as donor for hydrogen atom or electron was measured spectrophotometrically. In nitric oxide scavenging activity, the sodium nitropruside solution spontaneously generates nitric oxide which reacts with oxygen to produce nitric ions that can be estimated using Griess reagent. Scavengers of nitric oxide compete with oxygen leading to reduce production of nitric ions. Result showed that IC_{50} value of methanol extract in DPPH assay and NO scavenging assay was found to be 532 µg/ml and 172 µg/ml respectively. The IC_{50} values in both of these *in vitro* assays were found to be significantly reduced for methanol extract compared with the standard Butyl hydroxyl Toluene (Figure 1 & 2). Hence it can be concluded that phenolic compounds from aerial parts of *D. regia* may be responsible for antioxidant activity.

Figure 1. Antioxidant activity of methanol extract of aerial parts of *D. regia* by DPPH assay method.

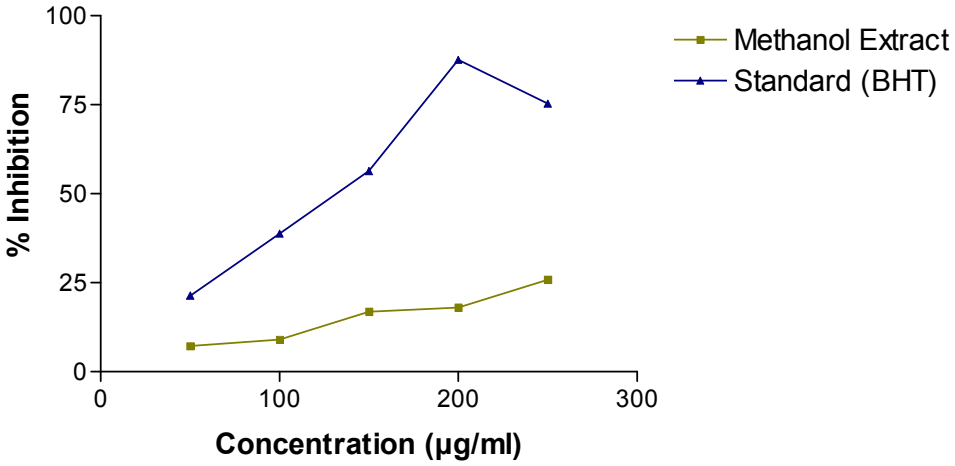
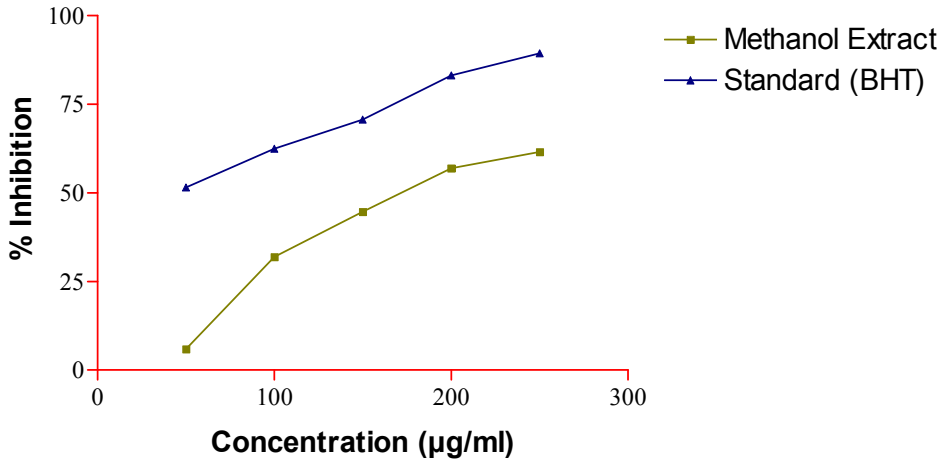


Figure 2. Antioxidant activity of methanol extract of aerial parts of *D. regia* by Nitric Oxide Scavenging assay method.



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