

ANTI – DIABETIC POTENTIAL OF DELONIX REGIA

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ABSTRACT

Gulmohar (*Delonix regia*) is a well known for its nutritional and medicinal properties in all over world. This research was undertaken to test the effect of gulmohar leaves extract on the diabetic of rat. Gulmohar leaves extract (100 mg/kg, 200 mg/kg) was administered orally to rat with the help of oral feeding needle. A total of 84 rats divided in 14 groups were employed in this study. Alloxan induced diabetes model was used in whole study. serum total cholesterol, serum triglyceride, total protein, was also estimated before and after administration of leave extract. leave extract was significantly ($p < 0.001$) reduce blood glucose level in alloxan induced diabetic rats. leave extract was significantly ($p < 0.001$) reduce total cholesterol level it also decrease ($p < 0.001$) triglyceride level. This drug was also increase ($p < 0.001$) total protein level.

KEYWORD

Diabetes, Alloxan, gulmohar, cholesterol, blood glucose.

INTRODUCTION

Gulmohar (*Delonix regia*) is a deciduous, large tree with fern-like leaves¹. Gulmohar (*Delonix regia*) is also known as flame tree or royal Poinciana or the peacock flower tree². It is mostly planted for their shade-giving properties and as an ornamental tree³. Phytochemical screening yielded sterols, phenolic compounds, triterpenoids and flavonoids⁴. The major medicinal properties of *Delonix regia* include Anti-microbial, Anti-diarrhea, Hepatoprotective, Anti-inflammatory, Antioxidant, Antidiabetic, Antibacterial and carminative⁵. It is used for the diabetes treatment in Bangladesh folk medicine⁶. Diabetes mellitus is a chronic metabolic disorder. It is characterized by high blood glucose, caused by insulin deficiency, often combined with insulin resistance. Phenolic and flavonoid compounds are reported to have antidiabetic property.

OBJECTIVE

The present study was undertaken to explore the effect of extract of *Delonix regia* leaves on diabetes using alloxan induced diabetes model.

MATERIALS AND METHODS

PLANT MATERIAL

Fresh leaves of Delonix regia were collected from street of Bhopal in the month of march, and got authenticated from department of botany Dr. H. S. Gour University, sagar (m.p),India (refer no.295,herbarium no.bot/her/2014). Extract of delonix regia leaves was administered in different concentration (100 mg and 200 mg per kg b.wt.) daily for duration of 15 days to rats with the help of an oral feeding needle.

ANIMAL

Wistar rat (150-200g) were group housed (n=6) under a standard 12 h light/dark cycle and controlled condition of temperature and humidity (25±2°C) ⁹. Rats received standard rodent chow and water ad libitum. Rats were acclimatized to laboratory conditions for 7 days before carrying out the experiments. All the experiments were carried in a noise free room between 08.00 to 15.00 h. separate group (n=6) of rats was used for each set of experiments. The animal studies were approved by the Institutional Animal Ethics Committee (IAEC), constituted for the purpose of control and supervision of experimental animal by Ministry of Environment and Forests, Government of India, New Delhi. Ethical clearance no is TIT/IAEC/831/pcol/2014/29.

DRUG

Alloxan monohydrate, Normal saline, Glibenclamide and Delonix regia . Normal saline (0.5 ml distilled water/day/rat), Glibenclamide(600 ug/kg) and Delonix regia extract (100 mg and 200 mg per kg body.wt) were administered for 15 successive days to rats. Biochemical studies were carried on after 15 day of treatment.

EXPERIMENTAL DESIGN

Hypoglycemic Activity in rats –Animal were divided into three groups of 6 rats each group.

Group I: Rats served as normal-control and received the vehicle (0.5 ml distilled water/day/rat).

Group II: Rats (normal) were administered DR (100 mg/kg.body wt/day) in distilled water as a fine aqueous suspension orally for 7 days.

Group III: Rats (normal) were administered DR (200 mg/kg body wt/day) in distilled water as a fine aqueous suspension orally for 7 days.

INDUCTION OF EXPERIMENTAL DIABETES IN RATS

After fasting diabetes was induced by a single intraperitoneal injection of 120 mg/kg. body weight of ‘Alloxan monohydrate’ in distilled water. The animals were allowed to drink 5% glucose solution overnight to overcome the drug-induced hypoglycemia. These animals were tested for diabetes after 15 days and animals with blood glucose (fasting) were selected for experimentation.

EXPERIMENTAL DESIGN

Animals were divided into five groups of 6 rats each.

Group I: Rats served as normal-control and received the vehicle (0.5 ml distilled water/day/rat).

Group II: Rats served as diabetic-control and received the vehicle (0.5 ml distilled water/day/rat).

Group III: Rats (Diabetic) were administered Delonix Regia (100 mg/kg body wt./day) in distilled water as a fine aqueous suspension orally for 15 days.

Group IV: Rats (Diabetic) were administered Delonix Regia (200 mg/kg body wt./day) in distilled water as a fine aqueous suspension orally for 15 days.

Group V: Rats (diabetic) were administered glibenclamide (600 ug/kg) in distilled water as a fine aqueous suspension orally for 15 days.

BIOCHEMICAL DETERMINATIONS

After 15th days of treatment, blood was collected from the retro orbital sinus of overnight fasted rats. The serum was separated and triglycerides and cholesterol level were determined by using, triglycerides test kit and cholesterol test kit (Span diagnostic Ltd., Surat) respectively. The serum total protein was determined by Biuret method¹⁰.

STATISTICAL ANALYSIS

The data were expressed as mean \pm SEM. The data of hypoglycemic activity and anti diabetic activity were analyzed by one way analysis of variance (ANOVA) followed by "Tukey's post hoc test." *p* value less than 0.05 was considered as statistically significant.

RESULT OF ANTI DIABETIC STUDY

Table 1: Effect of Delonix regia on hypoglycemic activity in normal rats

Group	Treatment	Hypoglycemic (mg/dl)	
		Onset of study	End of study
I	Normal	96.17 \pm 3.88	98.83 \pm 1.16
II	Delonix regia (100 mg/kg)	97.34 \pm 1.98	101.12 \pm 1.56
III	Delonix regia (200 mg/kg)	100.27 \pm 2.51	106.33 \pm 1.97

Table 2: Effect of Delonix regia treatment on blood glucose(mg/dl) in normal and Diabetic rats

Group	Treatment	Blood Glucose(mg/dl)	
		Onset of study	End of study
I	Normal	100.16 ± 3.36	105.0 ± 5.61
II	Diabetic control	241.81 ± 4.0	265.16 ± 7.38****
III	Delonix regia (100 mg/dl)	250.05 ± 3.2	210.16 ± 9.16****
IV	Delonix regia (200 mg/dl)	247.07 ± 2.9	199.6 ± 2.67****
V	Glibenclamide (600Ug/kg)	250.10 ± 1.9	120.40 ± 2.88****

Value are expressed as mean +- S.E.M (n=6). Values are statistically significant at *P<0.001vs normal group; ***p<0.001vs diabetic control group (one way ANOVA followed by Tukeys post hoc test).

Table 3:Effect of Delonix regia treatment on biochemical parameters in normal and Diabetic rats

Group	Treatment	TC(mg/dl)	TG(mg/dl)	Total protein(g/dl)
I	Normal	93.22 ± 5.24	76.10 ± 5.92	8.60 ± 0.10
II	Diabetic Control	191.02 ± 11.10	115.12 ± 11.05	6.02 ± 0.10
III	Delonix regia (100mg/kg)	110.46 ± 6.92****	91.16 ± 9.05****	7.35 ± 0.49
IV	Delonix regia (200mg/kg)	104.5 ± 8.20****	88.53 ± 8.35****	8.37 ± 1.00
V	Glibenclamide (600Ug/kg)	100.44±4.93****	85.44±6.12****	9.04 ± 1.18****

TC- Total Cholesterol, TG- Total Triglycerides

Value are expressed as mean +- S.E.M (n=6). Values are statistically significant at ***P<0.001vs normal group; ***p<0.001vs diabetic control group (one way ANOVA followed by Tukeys post hoc test).

CONCLUSION

The current research concludes that the extracts of leaves of *Delonix regia*, based on acute toxicity studies are safe at the decided dose level of 100 and 200 mg/kg of body weight. Extract showed the significant hypoglycemic activity which may lower the blood glucose level in hyperglycemia condition and may be helpful in antidiabetic study. Our study provides a way to study the antidiabetic study of the extract for the development of anti diabetic formulation. In our study the biochemical parameters are significantly reduced which may be helpful in diabetic complication from the literature survey it has been reported phytoconstituents alkaloids, glycosides, flavonoids, carbohydrate, tannins are responsible for the anti-diabetic activity. In future the activity of product and in house combination could be checked in other animal models.

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