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Antidiabetic activity of *Bauhinia Tomentosa* Linn. roots extract in alloxan induced diabetic rats

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ABSTRACT

The ethanolic extract of the roots of *Bauhinia tomentosa* Linn. (Family – Fabaceae) were tested for antidiabetic activity by glucose tolerance test in normal rats and alloxan induced diabetic rat. Extract was administered daily for 14 days at doses of 250 and 500 mg/kg. i.p. 5 days after alloxan injection (120mg/kg). Both of doses extract showed significant antidiabetic activity and was compared with glibenclamide (10 mg/kg). Extract with 250 mg and 500mg showed 27.6% and 40.3% decrease in blood glucose level while glibenclamide showed 44.7% decrease in blood glucose level.

Key words – *Bauhinia tomentosa*, alloxan, antidiabetic, glucose tolerance test.

INTRODUCTION

Diabetes Mellitus is a group of syndromes characterized by hyperglycemia, altered metabolism of lipids, carbohydrates and protein and increased risk of complications from vascular disease¹ In the recent past many hypoglycemic agents are introduced, still the diabetic and the related complications continued to be a major medical problems not in developed countries medical problem not in developed countries but also in developing countries. Many Indian Medicinal plants are reported to be useful in diabetes^{2,3}. Traditional antidiabetic plants might provide a useful source of new oral hypoglycemic compounds for development pharmaceutical entities or as simply dietary adjuncts to existing therapies.⁴

Bauhinia tomentosa is an erect shrub with downy branches leaves broader than long coriaceous, pubescent below. Flowers occur usually in auxiliary pairs. It flowers in rainy season and fruits in winter season.

There are only few reports on the effect of this plant in the literature. In the preliminary work we showed that the crude ethanolic extract from *Bauhinia tomentosa* root has hypoglycemic effects on oral daily treatment for 14 days with extracts of *Bauhinia tomentosa* on glucose and alloxan diabetic rats.

MATERIALS AND METHODS

1. Plant Material – Collection of Plant was done from Khush Nursery, Jhansi. Authentication was done by Dr. Tariq Hussain, Head and Scientist, Biodiversity and Angiosperm Technology Department, NBRI, Lucknow. Accession No. is 94002.

2. Preparation of Extract – The powdered root of *Bauhinia tomentosa* was packed in soxhlet apparatus and continuously extracted with petroleum ether (60 - 80⁰C) till complete extraction. The solvent was removed by distillation and then concentrated extract was dried under reduce pressure using rotatory evaporator (at temperature not exceeding 40⁰C) and then moderate heating on water bath. A yellowish brown extract was obtained. From the drug petroleum ether was removed and the defatted drug was extracted with ethanol (95%) till complete extraction, after completion of extraction the solvent was removed by distillation and then concentrated extract obtained was dried under reduce pressure at temperature not exceeding 40⁰C and then moderate heating on water bath. The ethanolic extract obtained was brownish black in Colour. The ethanolic extract was kept in Petri dish and it was stored in dessicator at cool place.

3. Test Animal - Wistar albino rats (of either sex) weighing between 160-250g were used in the experiment. All animals were procured from disease free animal house, Institute of Pharmacy, Bundelkhand University, Jhansi. The Institute of Pharmacy is approved by Institutional Animal Ethical Committee (716/02/a/CPCSEA). Animals maintained under standard environmental conditions were fed with a standard diet and water. The animals were fasted for 16 hours before experimentation. Animals described as fasted were deprived of food for 16 hours but had free access to water⁵.

4. Effect of Ethanolic extract on glucose tolerance in rats – Fasted rats were divided into 3 groups of six rats each. Group I served as control received vehicle. Group II and III received ethanolic extracts at a dose of 250 mg/kg body weight and 500 mg/kg body weight. The rats of all groups were given glucose (2g/kg body weight) 30 min after administration of the drug. Blood samples were collected from tail vein just prior to glucose administration and at 30, 60 and 120 min after the glucose loading. Blood Glucose Level was measured using glucometer.

5. Effect of the *Bauhinia tomentosa* extract on alloxan induced diabetic rats – Diabetes Mellitus was induced by administering intraperitoneal injection of alloxan monohydrate 120 mg/kg body weight to the overnight fasted rats⁶. The rats were maintained on 5% glucose solution for next 24 hours to prevent hypoglycemia⁷. Five days after the administration of alloxan, fasting blood glucose was determined and rats with the blood glucose of 300 -440 mg/dl were included in the study.

After checking the fasting blood glucose in over night fasted diabetic rats, they were divided into 5 groups of 5 rats each .

1st group - normal control group receiving vehicle, i.e.1% Tween80.

2nd group - diabetic control on 1%Tween 80 for 14 days.

3rd group - receiving alcoholic extract at dose of 250 mg/kg orally in the 1% Tween 80 once daily for 14 days.

4th group- receiving alcoholic extract at dose of 500 mg/kg orally in the 1%Tween 80 once daily for 14 days.
5th group-receiving standard drug i.e. Glibenclamide at a dose of 10 mg/kg once daily for 14 days.

6. Statistical Analysis:- The data was statistically evaluated using one way Anova, expressed as mean S.D followed by Dunnet's test using the "Graph Pad Instat Demo version". Results were considered significant at $p < 0.05$.

RESULTS AND DISCUSSION

The ethanolic extract of drug showed marked effect for decreasing the Blood Glucose Level (BGL) and rectifying the problems like irritation etc. associated with the disease. Two concentrations 250 mg/kg and 500 mg/kg were used for investigation against the standard drug Glibenclamide 10mg/kg. The ethanolic extract showed significant decrease in Blood Glucose Level. 500 mg/kg showed 40.3% decrease in Blood Glucose Level. 250 mg/kg showed 27.6% decrease in Blood Glucose Level. Standard drug Glibenclamide showed 44.7% decrease during the study of 14 days (Table:1.1).

Table 1.1 The ant hyperglycemic effect of ethanolic extract on alloxan induced diabetic rats

S. No.	Groups	Blood Glucose level (mg / dl)*				
		Basal Value	Day 2	Day 5	Day 9	Day 14
1	Normal Control	76.2± 2.38	73.8±5.49	75.4±5.31	73.6±2.40	75.2±2.58
2	Diabetic Control	396.2± 3.49	394.4±10.99	395.4±7.30	393.2±12.39	385.2±3.27
3	Ethanolic Extract (250 mg)	400.8±3.49	394.2±8.10(ns)	362.4±12.38**	329.8±6.97**	278.8±17.12**
4	Ethanolic Extract (500 mg)	391.6±3.84	371.8±9.36**	339.6±11.12**	288.8±7.29**	229.8±3.70**
5	Glibenclamide	387.8±2.38	381.6±2.19(ns)	351.4±6.73**	294.6±9.01**	212.8±1.92**

*Mean ± S.D (n=5), ns = not significant; ** $p < 0.01$ shows significant when compare with group 2.

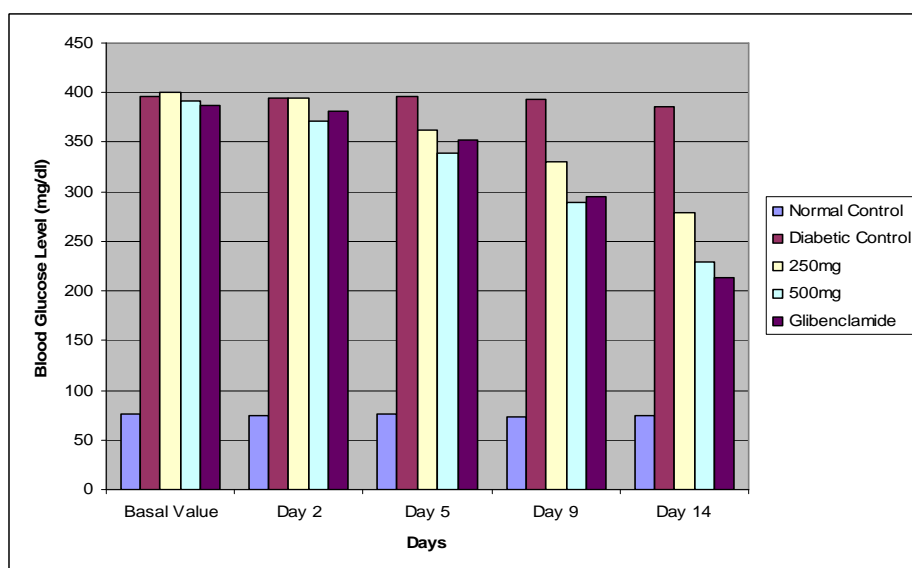


Fig: 1.1 Graphical representation of antihyperglycemic effect of ethanolic extract on alloxan induced diabetic rats

When activity of extract was done by Glucose Tolerance Test in glucose loaded rats, the extract showed significant effect on blood glucose level (Table:1.2).

Table 1.2 The antihyperglycemic effects of ethanolic extract on glucose Loaded rats

S. No.	Group	Blood Glucose Level*			
		0 min.	30 min.	60 min.	120 min.
1	Control	76.2±2.77	164.9±3.34	140.8±4.65	123.8±3.70
2	Ethanolic Extract (250 mg)	71.8±3.56	157.4±7.23(ns)	124.8±4.50**	111.6±2.07**
3	Ethanolic Extract (500 mg)	74.6±3.20	161.8±3.05(ns)	120.6±3.57**	85.8±4.91**

*Mean ± S.D (n=5)

ns = non significant,

**P<0.01 show significant when compared with control.

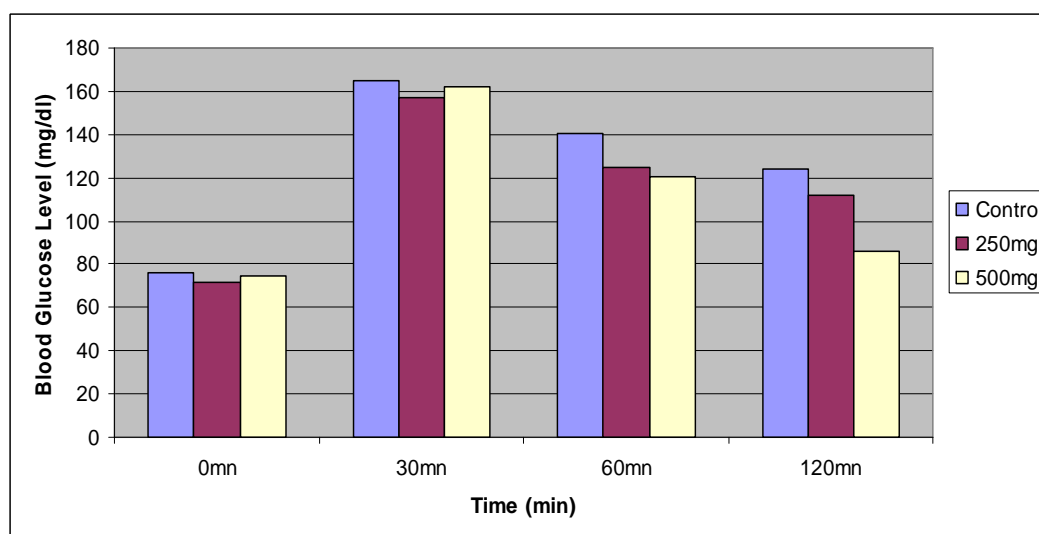


Fig:1.2 Graphical representation of antihyperglycemic effects of ethanolic extract on glucose loaded rats

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