



Antidiabetic activity of *Barleria prionitis* Linn.

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Abstract

Objective: To study antidiabetic effect of various parts of *B. prionitis*. **Materials and methods:** Antidiabetic activity of *B. prionitis* was evaluated using alloxan induced hyperglycemic rats. The potency of alcoholic and aqueous extracts of leaf, stem and root was compared with that of chlorpropamide at a dose of 200 and 100mg/kg respectively. The blood glucose level was measured colorimetrically. **Results:** Alcoholic & aqueous extracts of leaf and root caused significant fall in blood glucose level in diabetic rats. **Conclusion:** *B. prionitis* is almost equipotent to chlorpropamide in its ability to reduce the sugar levels and can be recommended for further studies.

Key words: *Barleria prionitis*, Antidiabetic activity, alloxan.

1. Introduction

Barleria prionitis Linn. [Acanthaceae] is distributed throughout India, Ceylon, South Asia and Tropical Asia [1]. In Sanskrit it is known as Vajradanthi and the juice of its leaves is used in catarrhal affection, spermatorrhea, bleeding teeth, and toothache [2,3]. It is used in Unani medicine for healing wounds [4]. It is also used for reducing inflammation, pain and blood complaints [5]. In the folklore of Sherveroy Hills of Tamil Nadu *B. prionitis* is used in diabetes. But there is no scientific report for its antidiabetic activity so far. Hence to ascertain the claim, we felt the need to study the antidiabetic effect of leaf, stem and root of the drug.

2. Material and methods

2.1 Plant material

The whole plant material of *B. prionitis* was

botanically identified and collected by Mr. D. Narayanappa, Chief Botanist, TAMPCOL, Chennai, from the Sherveroy Hills of Tamil Nadu in the month of May 1993, a specimen of the same is deposited in the department of Pharmaceutics, I.T. BHU, Varanasi.

2.2 Preparation of extracts

The plant material was dried in shade, leaf, stem and root parts were separated and coarsely powdered. The powdered mass of each part was defatted with petroleum ether (60 - 80°C) followed by extraction with alcohol [95% v / v] and water. The dried alcoholic and aqueous extracts were formulated as suspension in distilled water using Tween-80 as suspending agent since Tween-80 has negligible effect on normal blood glucose level

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[BGL]. The strength of the suspension was according to the dose administered and was expressed as weight of dried extract.

2.3 Preparation of reference drug

Chlorpropamide was used as the reference drug for evaluating the antidiabetic activity. Diabenase tablets [100 mg], formulated by Cadila Laboratories, Ahmedabad, were powdered and made into suspension in distilled water using Tween 80 as suspending agent. The strength of suspension was adjusted to 20mg / ml of chlorpropamide.

2.4 Animals

Albino rats of both the sexes weighing 150-200g were chosen for screening antidiabetic activity. 120 mg / kg of alloxan monohydrate [BDH] was used orally to induce hyperglycemia [5-7].

2.5 Antidiabetic evaluation

The acclimatized animals were kept fasting for 24 hrs with water *ad libitum* and injected intraperitoneally a dose of 120 mg/kg of alloxan monohydrate in normal saline. After one hour, the animals were given feed *ad libitum*. A 5% dextrose solution was given for day to overcome the early hypoglycemic phase [9]. The BGL was monitored before alloxanisation and every 24 h after alloxanisation by withdrawing blood from tail by tail tipping method [10].

The BGL was measured colorimetrically using "Glucose enzyme reagent system" manufactured by Span Diagnostics Private Ltd., Surat, India. The system uses glucose oxidase method of estimating glucose in blood [8].

Animals were considered diabetic when the BGL raised beyond 150 mg/100ml of blood. This condition was observed at the end of 72 h after alloxanisation. The animals were segregated into eight groups of six rats each, taking into consideration the diabetic BGL. The alcoholic and aqueous extracts (200 mg/kg), chlorpropamide (100 mg/kg) and vehicle were orally administered, every 24 hours for period of seven days, to rats using rubber catheter.

Dosage for group 2 to 7 was selected by administering the drug orally in graded dosage of 10 mg, 100 mg and 200 mg/kg. Though 100 mg/kg has shown significant activity, a dose of 200 mg/kg was chosen to overcome the effect of induced hyperglycemia.

The BGL was monitored after 1, 3, 5 and 7 h of administration of single dose [for acute study] and at the end of 1, 3, 5 and 7 days [prolonged treatment].

2.6 Statistical analysis

Data obtained was subjected to Student's *t*-test to determine the statistical significance of the change in BGL.

Table 1
Effect of *B. prionitis* on blood glucose levels of alloxan diabetic albino rats after single dose

Drug	Blood glucose level mg/100 ml [Mean \pm SEM]				
	Initial	1 h	3 h	5 h	7 h
Control	273.55 \pm 3.34	279.01 \pm 3.25	281.91 \pm 3.79	285.68 \pm 3.21	291.69 \pm 2.39
Alc. Leaf	299.72 \pm 3.97	142.45 \pm 1.35*	130.94 \pm 1.34*	94.93 \pm 0.95*	96.39 \pm 0.94**
Aq. leaf	284.36 \pm 3.8	195.41 \pm 1.18	191.14 \pm 1.23	184.37 \pm 1.20	177.21 \pm 1.26
Alc. Stem	243.51 \pm 3.0	248.33 \pm 4.2	272.83 \pm 3.93	286.56 \pm 3.83	292.59 \pm 2.21
Aq. stem	240.59 \pm 1.62	247.89 \pm 1.78	265.15 \pm 1.28	272.04 \pm 1.93	285.18 \pm 1.99
Alc. Root	247.68 \pm 4.83	137.06 \pm 4.37	123.8 \pm 6.31*	90.66 \pm 1.4*	92.95 \pm 1.25**
Aq. root	218.25 \pm 2.29	101.34 \pm 2.49*	96.46 \pm 2.25*	95.85 \pm 2.10*	100.82 \pm 2.34*
CHLOR.	274.93 \pm 6.7	138.57 \pm 0.59*	120.28 \pm 1.54*	83.93 \pm 0.94*	82.53 \pm 1.34**

n = 6; * P < 0.05; ** P < 0.01 vs control;

SEM: Standard error mean; n: number of animals; CHLOR: Chlorpropamide.

Table 2

Effect of *B. prionitis* on blood glucose levels of alloxan diabetic albino rats after prolonged treatment

Drug	Blood glucose level after [Mean \pm SEM]				
	Initial	1st day	3rd day	5th day	7th day
Control	273.55 \pm 3.39	298.01 \pm 3.25	301.91 \pm 3.79	325.86 \pm 3.21	332.69 \pm 2.39
Alc. Leaf	299.72 \pm 3.97	86.39 \pm 0.94**	85.20 \pm 2.14**	84.1 \pm 2.10**	82.39 \pm 0.95**
Aq. leaf	233.59 \pm 3.49	112.48 \pm 2.15*	100.0 \pm 6.4*	94.2 \pm 2.52*	92.52 \pm 2.88**
Alc. Root	247.68 \pm 4.83	95.20 \pm 1.58**	94.02 \pm 1.48**	79.97 \pm 1.06**	74.12 \pm 1.13**
Aq. root	240.59 \pm 1.62	100.96 \pm 2.02*	97.05 \pm 2.75*	94.99 \pm 2.53*	94.56 \pm 2.04*
CHLOR.	274.93 \pm 6.7	82.57 \pm 0.59*	80.78 \pm 1.87**	77.82 \pm 1.82**	73.68 \pm 1.83**

n = 6; *P < 0.05; ** P < 0.01 vs control;
SEM: Standard error mean; n: number of animals; CHLOR: Chlorpropamide.

3. Results and discussion

The results are expressed as the change in BGL and presented in the Table 1 and 2.

It is clear from the table 1 and 2 that administration of alcoholic extract of *B. prionitis* leaf caused significant fall [p < 0.01] in BGL 5 hours after a single dose of the extract and on prolonged treatment (i.e. for a week) the antidiabetic activity was maintained as that of the reference drug chlorpropamide. Aqueous extract of *B. prionitis* leaf also possesses antidiabetic activity but it was less than that exhibited by the alcoholic leaf extract.

Administration of alcoholic extract of root of *B. prionitis* produced significant fall [p < 0.01] at the end of 3rd hour and the effect was maximum at the

end of 5th hour. On prolonged treatment the effect was nearly equal to that of the reference drug chlorpropamide. The aqueous extract of root also produced significant fall [p < 0.01] at the end of 5th hour which is equal to that of the reference drug.

Administration of alcoholic and aqueous extract of stem did not reduce the blood glucose level on single dose, on the contrary there is a significant increase, when compared to non treated diabetic animals. Hence this extract was not utilized for chronic studies.

Thus, high degree of antidiabetic activity was observed in the alcoholic and aqueous extract of leaf and root of *B. prionitis*. The plant bears a potential for further research to isolate antidiabetic principle.

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