Vol 2/1 (2002) 80-83

JOURNAL OF NATURAL REMEDIES

Anti-diabetic activity of *Daemia extensa* R. Br.

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Received 19 October 2001: Accepted 25 November 2001

Abstract

Objective : The evaluation of antidiabetic activity of alcoholic and aqueous extracts of whole plant of *Daemia extensa* R Br. Materials and methods: The antidiabetic activity of both the extracts were evaluated using alloxan (120 mg/kg; i.p.) induced hyperglycemic rats. The potency of alcoholic and aqueous extracts were compared with that of reference drug chlopropamide. The blood glucose level was measured by using glucometer. Results: The alcoholic extract produced a highly significant fall in Blood Glucose Level (BGL) at 1 h after a single dose of the extract and in prolong treatment (i.e. for a week) the antidiabetic activity was maintained at par with the reference drug chlopropamide. Aqueous extract possess antidiabetic activity which was maintained upto 3 hours after a single dose and later the activity decreases but upon prolonged treatment, the peak activity was found on second day. Conclusion: Alcoholic extract of *D. extensa* is almost equipotent to chlorpropamide. This qualifies it to be used in ethnomedical diabetic management.

Keywords: *Daemia extensa,* anti-diabetic activity, alloxan.

1. Introduction

Daemia extensa R. Br. (family-Asclepiadaceae) is distributed throught out the hotter parts of India. It is seen in the Himalayas upto an altitude of 3500m and in the hills of Assam and Bihar and is also found in Srilanka and Afganistan [1,2]. In sanskrit it is known as Uttaravaruni. The plant is pungent, cooling, anthelmintic, laxative, antipyretic, cures biliousness, asthma, ulcers, useful in eye complaints, urinary discharges, leucoderma, uterine complaints, inflammation and facilitates parturation. Decoction and juice of the leaves are reputed to be a cure for snakebite. The plant has a general reputation as an expectorant, emetic and also used in infantile diarrhoea [3,4,5]. It is commonly used among the folks of sherveroy hills of Tamilnadu as a substitute for *Gymnema sylvestre* for the treatment of diabetes [6], but

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till date there are no reports on its antidiabetic activity. Therefore, it was thought worthwhile to evaluate its antidiabetic effects using alloxan induced experimental rats.

2.Materials and methods

2.1 Plant Material

The whole plant material of *D. extensa* was collected from the Sherveory hills of Tamilnadu during the month of May and identified by Mr. D. Narayanappa, chief botanist TAMPCOL, Chennai. The specimen of the same is deposited in the department of Pharmaceutics, I .T. B.H.U., Varanasi.

2.2 Preparation of extracts

The plant material was dried in shade and coarsely powdered, and extracted with petroleum ether (60-80°C) is order to defat it, followed by alcohol and then with water. The dried extracts were formulated as suspension in distilled water using Tween-80 as suspending agent. The extracts were chemically tested for the presence of different chemical constituents using standard methods [7].

2.3 Animals

Adult charles foster albino rats (150 ± 10 g) of either sex were obtained from the central animal house of the institute and were acclimatized to laboratory conditions for at least one week and were given uniform diet (Rat chow-gold mohur, Lipton) and water; alloxan monodydrate (BDH) (120 mg/kg) was given intraperitonially in normal saline to induce hyperglycemia. Principles of laboratory animal care guidelines were followed (NIH publication No 80-28 revised 1925).

2.4 Evaluation of Anti-diabetic activity

The acclimatized animals were kept fasting for 24 h with water *ad. libitm* and alloxan monohydrate (120 mg/kg, i.p.) in normal saline was administered. After one hour of alloxan administration the animals were given feed *ad libitm.* A 5% dextrose solution was given in feeding bottle for a day to over come the early hypoglycemic phase [8]. The BGL was monitored after alloxanisation by with drawing a drop of blood from the tail vein by tail tipping method [9].

The blood was dropped on the dextrostix reagent pad. The strip was inserted into microprocessor digital blood glucometer and the reading were noted (WHO expert committee an diabetic mellitus. Technical Report Series No. 646-1980).

After 72 h, rats having BGL beyond 150 mg/dl of blood were selected for the study and divided

Table 1
Effect of *D. extensa* on blood glucose levels of alloxan diabetic rats after single dose.

Drug	**Dose**	**Blood glucose level mg/dl [Mean ± SEM]**				
	mg/kg	**Initial**	**1h**	**3h**	**6h**	**12h**
Control	-	220.6±17.27	215.0±25.62	218.8±24.86	224.2±28.52	227.0±26.72
Alcoholic extract	200	225.4±16.51	34.6±15.13[b]	41.0±14.80[b]	49.0±8.79b	54.2±15.46[b]
Aqueous extract	200	226.4±25.52	94.0±11.37[b]	96.6±13.41[b]	131.8±10.77[a]	155.4±9.89
Chlorpropamide	100	224±24.87	53.0±18.86[b]	52.8±24.63[b]	59.8±8.17[b]	75.2±14.87[b]

n=5; [a]p<0.05, [b]p< 0.01 *vs* control.

Table 2
Effect of *D. extensa* on blood glucose levels of alloxan diabetic rats after prolonged treatment.

Drug	Dose	Blood glucose level mg/dl [Mean ± SEM]				
	mg/kg	Initial	1st day	2nd day	3rd day	7th day
Control	-	220.6±17.27	230.0±28.66	182.4±17.54	187.6±16.31	198.2±29.42
Alcoholic extract	200	225.4±16.51	68.6±10.34[b]	59.2±12.97[b]	70.52±19.98[b]	73.5±19.35b
Aqueous extract	200	226.4±25.52	171.0±13.36	126.2±38.37[b]	157.0±12.92[a]	153.75±12.87[a]
Chlorpropamide	100	224±24.87	91.0±15.31[b]	87.8±13.82[b]	82.4±16.54[b]	78.5±22.64[b]

n=5 ; [a]p< 0.05, [b]p< 0.01 *vs* control.

into 4 groups of five rats in each group. The alcoholic and aqueous extracts of *D. extensa* at the dose of 200 mg/kg. The reference drug chlopropamide (100 mg/kg) and vehicle were administered orally in each group of animals for consecutive 7 days. The blood glucose level was monitored after 1, 3, 6 & 12 h of administration of single dose (for acute study) and at the end of 1,2,3 & 7 days (prolonged treatment).

2.5 Statistical analysis

Data obtained was subjected to student's *t* - test and two way analysis of variance to determine the statistical significance of the change in BGL. P<0.05 was considered significant.

3. Results and discussion

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

The administration of alcoholic extract of *D. extensa* produced a highly significant reduction (P<0.01) in BGL at 1 h after a single dose of the extract and in prolonged treatment (7 days), the antidiabetic activity was maintained at par with reference drug chlopropamide.

A single dose of aqueous extract of *D. extensa* also possessed a good degree of antidiabetic activity which was maintained upto 3 h (p<0.01) later the activity gradually decreases but in the prolonged treatment of the extract, but upon prolonged treatment, the peak activity was found on second day.

Oliver [10] listed glycosides, flavonoids, tannins, organic sulphur compounds, catechol and alkaloids as active ingredient in hypoglycemic plants . Our preliminary phytochemical work reveals the presence of glycosides in both aqueous and alcoholic extracts.

Thus the hypoglycemic effect produced by the extracts of *D. extensa* may be due to the presence of glycosides. The present finding tends to endorse the wide use of this plant as a substitute of *G. sylvestre.*

However the mechanism for lowering the plasma glucose level in animals is not clear and further investigation will be needed to define it. Further studies are in progress to isolate the active principle and to studies its mechanism of action.

Reference

1. Chopra RN, Nayar SL, Chopra IC. (1956) *Glossary of Indian Medicinal Plants*, Council of Scientific & Industrial Research: New Delhi ; 188.

2. Gamble JS. (1956) *Flora of the Presidency of Madras,* Botanical Survey of India: Calcutta; 588.

3. Kirtikar KP, And Basu BD. (1975) *Indian Medicinal Plants,* Periodical Experts: Delhi; 1624-1627.

4. Nadkarni AK. (1976) *The Indian Matecia Medica,* Popular Prakashan: Bombay ; 430-431.

5. Sathyavathi GV, Raina MK, and Sharma M. (1976) *Medicinal Plants of India,* Indian Council of Medical Research: New Delhi; 326-327.

6. Raghunathan K, Mitra R. (1982) *Pharmacognosy of Indigenous Drugs*, Central Council of Research in Ayurveda & Siddha : New Delhi ; 982-96.

7. Goldner MG, Gomari G. (1944) *Endocrinol.* 35: 241.

8. Armin J, Grant RT, Wright PH. (1960) *J. Physiol.* 151:131.

9. Trease GE, Evans WC. (1983) *Pharmacognosy,* 12th edn., Bailliere Tindall: London ; 217-26.

10. Oliver B. (1980*) J. Ethnopharmcol.* 2: 119-27.