

HYPOGLYCEMIC ACTIVITY OF AQUEOUS ROOT EXTRACT OF *GLOCHIDION ZYLANICUM*

J.V.C. SHARMA^A, D. SATYAVAHTI^A, J. VENKATESWARARAO^{*B},
SHARMILA.S^B, K. ABEDULLAKHAN^B AVANAPU S. RAO^C

^aM.L.R. Institute of Pharmacy, Dundigal, Hyderabad – 500 043.

^bSultan-UI-Uloom College of Pharmacy, Mount Pleasant, Road No. 3,
Banjara Hills, Hyderabad – 500 034.

^cJoginpally B.R.Pharmacy College, Yenkapally, Moinabad, Hyderabad - 500075

ABSTRACT

The aqueous extract of *Glochidion Zylanicum* root was tested for its hypoglycemic activity in normal and anti diabetic activity in alloxan induced diabetic rats. The aqueous extract 200 and 400 mg/kg. p.o. had shown significant protection and lowered the blood glucose levels in normal and in alloxan induced diabetic rats. The aqueous extract of roots of *Glochidion Zylanicum* showed a significant hypoglycemic activity comparable with that of Glibenclamide 10 mg/kg.

KEYWORDS: Hypoglycemic activity, *Glochidion Zylanicum*.

1.INTRODUCTION

Diabetes mellitus is a metabolic disorder characterized by derangement in carbohydrate, fat and protein metabolism, affecting nearly 10% of population. In recent, past, many hypoglycemic agents are introduced, still the diabetes and the related complications continue to be a major medical problem not only in developed countries, but also in developing countries. Many Indian medicinal plants are reported to be useful in diabetes (Kirithikar,1995; Nadkarni,1976). However, search for new anti-diabetic drugs continue. The plant *Glochidion Zylanicum* (*Euphorbiaceae*) commonly named as Neerummamidi in Telugu, commonly grown in slopes and altitudes of forests in all over Chittoor District, A.P., India, and abundant in kapalitheertham area (Tirumala). It plays an important role in curing diseases like stomachic, anticancer, refrigerant(Dr.Madhavachetty,Sivaji,2008). Although there are reports on the medicinal uses of this plant, there is no report found on its antidiabetic activity on roots.

Therefore, it was thought worthwhile to evaluate its antidiabetic activity.

2.EXPERIMENTAL

The roots of *Glochidion Zylanicum* were collected in the month of July, 2008 from kapalitheertham forest, A.P., India. The plant was identified by Dr. K. Madhavachetty, Asst. Professor, Botany Department, Sri Venkateswara University, Tirupati, A.P., India.

* For correspondence

Email: jvrao1963@yahoo.co.in

The roots were dried for a period of thirty days. It was powdered with mechanical grinder and then 100gm of the powder was macerated in 300ml of distilled water in a conical flask for 72hr. The liquid filtrate was concentrated in *vacuo* at 40°C. The yield was 3%. The dried extract was formulated as suspension in distilled water using 2% Tween 80 as suspending agent. The extract was chemically tested for the presence of different chemical constituents using standard methods(Trease,Evans,1983).

Adult albino Wistar rats (150 – 180gm) of either sex were selected for present study. The animals were grouped and housed in polyacrylic cages with not more than six animals per cage and maintained under standard laboratory conditions. They were allowed access to standard drug pellet diet and water *ad libitum*. Approval for animal studies were obtained from the ethical committee.

Effect of the *Glochidion Zylanicum* extract on normal blood glucose level in rats (n=6):

To evaluate hypoglycemic activity in normal blood glucose level, the rats were divided into four groups of six each. I group of rats served as control and received (10 ml/kg) of 2% Tween 80 p.o aqueous solution. II and III group of rats received 200 and 400 mg/kg p.o of extret of *Glochidion Zylanicum* respectively. IV group of rats received a standard drug Glibenclamide (10mg/kg) for assessing comparative pharmacological significance. The animals were fasted for 18 hours prior to the experiment. The blood samples were collected by tail tipping method after treatments at 0hr, 1hr, 3hr, 6hr and 12hr.

The blood glucose level (BGL) was determined by glucometer (Yanarday, Colak, 1998) and results were analyzed by applying statistical method.

Effect of the *Glochidion Zylanicum* extract on alloxan – induced diabetic rats:

To evaluate antidiabetic activity of *Glochidion Zylanicum* extract in diabetic rats, they were made diabetic by injecting alloxan monohydrate 150 mg/kg body weight dissolved in normal saline and injected intraperitoneally (WHO, 1980). After 1hr of alloxan administration the animals were fed on standard pellets and water *ad libitum*. The experimental animals were fasted 18hr before alloxan administration. After 72hr of alloxan treatments, the rats showing BGL above 200 mg/dl were selected for the study and divided into 4 groups of six rats each. I group of rats served as control and received (10 ml/kg) of 2% tween 80 aqueous solution. II and III group rats received 200 mg and 400 mg/kg p.o of *Glochidion Zylanicum* extract respectively. IV group of rats received a standard drug Glibenclamide (10 mg/kg) for assessing comparative pharmacological significance. The blood samples were collected by tail tipping method after treatments at 0hr, 1hr, 3hr, 6hr and 12hr. Blood glucose level (BGL) was monitored by glucometer and the results were analyzed by applying statistical method.

Statistical Analysis:

Results are expressed as mean \pm SD and the results were analyzed by Dunnett multiple comparisons test *versus* control, $P < 0.05$ implies significant (Woodson, 1987) and were given in table 1 and table 2.

3. RESULTS

Effect on normal blood glucose level:

The blood glucose lowering efficacy of the extract was noticed in normal rats for 24hr after oral treatment of all the dose levels (200 and 400mg / Kg.). The extract reduced the blood glucose level significantly ($P < 0.05$) after 1.5hr of oral administration when compared to control group. It was also noted that the blood glucose lowering capacity persisted upto 24hr after treatment by showing more significant activity ($P < 0.01$). The effect was comparable to that of the effect produced by the standard drug Glibenclamide 10mg. / Kg. Table 1.

Effect on alloxan induced diabetic rats:

The extract demonstrated significant hypoglycemic effect on alloxan induced diabetic rats after 3hr of drug administration and the activity also prolonged upto 12hr. The extract 200mg / Kg., 400mg / Kg doses produced significant activity ($P < 0.01$) when compared with the control group. The hypoglycemic efficacy was compared to that of standard antidiabetic agent Glibenclamide Table 2.

DISCUSSION

The glucose lowering potential exhibited by the extract was more significant and the action is also similar fashion like the standard drug Glibenclamide. The observation confirms the use of this plant in ethnomedical practice for diabetes management. This study warrants the investigation to isolate and identify the hypoglycemic principles and to elucidate their exact mechanism of action.

Table 1:
The effect of *Glochidion Zylanicum* extract on normal blood glucose level in rats (n=6).

Time Interval (in hrs)	Blood sugar level in mg / dl (mean + SD)			
	Control (I Group) 10mg/Kg.	Dose (II Group) 200mg / Kg.	Dose (III Group) 400mg / Kg.	Standard (IV Group) 10mg / Kg.
0	106.82 \pm 4.2	111 \pm 5.2	112 \pm 5.0	109 \pm 4.0
1	107.97 \pm 3.9	99.16 \pm 4.0	102.33 \pm 4.2	96.00 \pm 4.7*
3	115.60 \pm 3.7	97.33 \pm 5.0*	87.50 \pm 6.2*	85.20 \pm 6.7**
6	113.40 \pm 4.4	85.83 \pm 4.8*	76.33 \pm 5.3**	75.16 \pm 4.3**
12	112.26 \pm 3.8	78.33 \pm 4.2***	74.50 \pm 4.9***	70.20 \pm 4.4***

* $P < 0.05$ Vs control, n = 6 in each group.

** $P < 0.01$ Vs control, n = 6 in each group.

*** $P < .001$ Vs control, n = 6 in each group.

Standard : Glibenclamide

Control : 2% Aqueous Tween 80 solution.

Table 2:
The effect of *Glochidion Zylanicum* extract on blood glucose levels of alloxan induced diabetic rats (n=6).

Time Interval (in hrs)	Blood sugar level in mg / dl (mean + SEM)			
	Control (I Group) 10mg/Kg.	Dose (II Group) 200mg / Kg.	Dose (III Group) 400mg / Kg.	Standard (IV Group) 10mg / Kg.
0	300.33 \pm 3.9	284.50 \pm 5.4	284.16 \pm 6.8	278.16 \pm 8.5
1	289.50 \pm 7.4	239.33 \pm 5.5*	224.16 \pm 7.1**	219.16 \pm 7.9*
3	219.2 \pm 20.5	180.9 \pm 12.3**	130.4 \pm 13.4**	119.5 \pm 15.0**
6	289.33 \pm 4.7	217.33 \pm 4.0**	196.16 \pm 5.4**	173.10 \pm 4.0**
12	296.67 \pm 4.9	196.33 \pm 4.2**	177.00 \pm 6.5**	166.83 \pm 6.7**

* $P < 0.01$ Vs control, n = 6 in each group**

$P < 0.001$ Vs control, n = 6 in each group

Standard : Glibenclamide Control : 2% Aqueous

Tween 80 solution

REFERENCES

Dr. Madhavachetty K, Sivaji K “Flowering Plants of Chittoor District” ed. 2008, 317.

Kirithikar K.R, Basu B.D, An, I.C.S., Indian Medicinal Plants International book distributors, Dehradun, India,1,1995, 371 – 372.

Nadkarni K.M, Nadkarni A.K, Indian Materia Medica, Popular prakashan, Bombay, India,1,1976, 615 – 616.

Trease GE, Evans WC, Pharmacognosy. 13th ed. London, Bailliere Tindall, 1983.

Woodson R.F, Statistical methods for the analysis of biochemical data, Series in probability and mathematical statistics, Wiley, New York,1987, 315 – 316.

World Health Organisation Expert Committee on diabetes mellitus, Tech Rep Series, 1980.

Yanarday R, Colak H, Effect of chard (*Beta vulgaris L. Var cicla*) on blood glucose levels in normal and alloxan-induced diabetic rabbits, Pharm Pharmacol Comm, 4,1998,309-11.