

Hypoglycemic Effects of *Clitoria ternatea* Leaves (Linn) Extract

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Short Communication

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ABSTRACT

We evaluated the hypoglycemic effects of methanol ratio extract of *Clitoria ternatea* leaves. The hypoglycemic effect was evaluated in alloxan induced diabetic rats. The extract of *Clitoria ternatea* also significantly ($P < 0.001$) reduced blood glucose level in alloxan induced diabetic rats twelve hours after administration.

INTRODUCTION

Diabetes mellitus (DM) is a widespread disorder, which has long been recognized in the history of medicine, before the advent of insulin and oral hypoglycemic drugs, the major form of treatment involved the use of plants. More than 400 plants are known to have been recommended and recent investigations have affirmed the potential value of some of these treatments [1]. Diabetes mellitus is a group of endocrine syndromes characterized by hyperglycemia; altered metabolism of lipids, carbohydrates, and proteins, and an increased risk of complications from vascular disease. Most patients can be classified clinically as having either type I diabetes mellitus (type I DM formerly known as insulin dependent diabetes of IDDM) or type II diabetes mellitus (type II DM formerly known as non-insulin dependent diabetes of NIDDM) [2]. A good-looking perennial twining herb with terete stems and branches, leaves compound, imparipinnate, leaflets 5–7, sub-coriaceous, elliptic-oblong, obtuse; flowers blue or white, solitary axillary or in fascicles, corolla papilionaceous; fruits nearly straight, flattened pods, sharply beaked; seeds 6–10, smooth, yellowish brown. *Clitoria ternatea* is used as aphrodisiac tonic and are useful in ophthalmopathy. The leaves are useful in otalgia, hepatopathy and eruptions. The root also has anti-inflammatory, analgesic and antipyretic properties. *Clitoria ternatea* is used in leucoderma, burning sensation and pains. The roots are used as bitter, refrigerant, ophthalmic and laxative [5].

MATERIALS AND METHOD

Plant Material

Leaves were collected from village Kailiya (Distt – Jalaun), Kush Nursery, Gwalior road, Jhansi, Institute of Pharmacy, B.U. Jhansi during the month of September 2011. Authentication of plant material is done by Dr. Gaurav Nigam, Deptt. of Botany, B.U. Jhansi, Ref. No. BU/BOT/376/24-01-2012.

Preparation of Extract

The *Clitoria ternatea* leaves were shade dried, and then these are made into coarsely powdered form using dry grinder. The powdered leaves of the plant (800gm.) was packed in Soxhlet apparatus and continuously extracted with petroleum ether (40–60°C) till

complete extraction, after completion of extraction the solvent was removed by distillation and then concentrated extract obtained was dried under reduced pressure using rotatory evaporator at temperature not exceeding 40°C and then give moderate heating on water bath. A yellowish extract approximate 18 gm. was obtained. From the drug petroleum ether was removed and the defatted drug was extracted with methanol (95%) till complete extraction, after completion of extraction the solvent was removed by distillation and then concentrated extract obtained dried under reduced pressure at temperature not exceeding 40°C and then give moderate heating on water bath. The methanolic extract obtained was dark green in colour, weighed about 40 gm. The methanolic extract was kept in petridish and it was stored in desiccator at cool place.

Animals

The adult male albino rats of weight 180–240 gm were selected for the study. 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). The animals were housed in polypropylene cages, 5 per cage with free access to standard laboratory diet and water *ad libitum*. The rats were maintained under standard laboratory conditions at 25±2°C relative humidity 50±15% and normal photo period (12 h dark/ 12h light) were used for experiment.

Drugs

Alloxan of CDH, New Delhi was used for the induced of diabetes and was obtained from Department of Pharmacy and the standard drug i.e. glibenclamide was send by Sun Pharmaceutical Industries, J & K.

Extraction of Plant

The powder of leaves of *Clitoria ternatea* was subjected to extraction in methanol. The extract was then concentrated at reduced pressure and used for the experimentation.

Preparation of Dose

The Dose of 200 mg/kg and 400 mg/kg of methanol extract was selected for the test. All the doses was given orally after making emulsion in vehicle i.e. 1% acacia gum and the standard drug i.e. glibenclamide was given orally (10 mg/70kg) in the vehicle.

Experimental Work

Effect of Methanolic Extract on Alloxan Induced Diabetic Rats

Induction of Experimental Diabetes

Diabetes mellitus was induced by administering intraperitoneal injection of alloxan monohydrate 120 mg/kg [3] to the overnight fasted rats. Five days after administration of alloxan, fasting blood glucose of 300 to 450 mg/dl were included in the study.

Sample Collection

Blood sample were collected from tail nipping and glucose level was determined by an automatic electronic glucometer (Accucheck comfort).

Procedure

After checking the fasting blood glucose in overnight fasted diabetic rats. They were divided into five groups of five rats each and one group of non-diabetic rats. All the doses were given in the following manner:

- 1st Group– normal control group received vehicle.
- 2nd Group–diabetic control received vehicle.
- 3rd Group–Received alcoholic extract at dose of 200 mg/Kg orally.
- 4th Group– Received alcoholic extract at dose of 400 mg/Kg. orally.
- 5th Group– Received standard drug i.e. Glibenclamide (10 mg /Kg. in Vehicle) orally [3].

The treatment was continued for 3 hours. During the period water was supplied *ad libitum*. All the doses were administered orally by the oral feeding needle. The effect of extract on Blood glucose levels was estimated on overnight fasted rats on 0 hour, 1 hour, 2 hr and 3 hr by the method described before. The general behaviors of the animals were recorded. The blood glucose level in (Mean ± SEM) is shown in the Table.

Effect of Methanolic extract on Oral Glucose Tolerance Test

The hypoglycemic effect of methanolic extract of *Clitoria ternatea* leaves was study on glucose loaded rats.

Protocol

In this glucose tolerance test fasted normal rats were divided into sifour groups of five animals each, Group I served as control and received vehicle. Group IV received standard drug glibenclamide at an oral dose of 10 mg/kg and Group II and III received methanolic extract orally at a dose of 200 mg/kg and 400 mg/kg respectively. The rats of all the groups were given glucose (4 g/kg), 30min after the extract and drug administration Blood samples were collected by tail nipping just prior to glucose loading and blood glucose levels were measured by Accucheck Comfort glucometer. Basal value is those after which glucose was administered.

Statistical Analysis

The data were statistically evaluated using one way Anova. expressed as Mean ± SEM followed by Tukey test using the Graph pad instant Demo (Data set 1.IS) version P. values of 0.05 or less were considered to be significant.

RESULT AND DISCUSSION

The methanolic extract of the drug showed marked effect for decreasing the blood glucose level and rectifying the problem like fatigue and irritation associated with the disease. Two concentration of the extract were used for the investigation i.e. 400 mg/kg and 200 mg/kg against the standard glibenclamide 10 mg/kg dose showed 23.12 % decrease in blood glucose level, 200mg /kg showed 21.92% decrease and standard drug showed 28.52% decrease during the study of two week when compare with the standard drug. 400mg/kg dose of methanolic extract was near about as effective as standard drug (glibenclamide) (Table 1). When the activity of extract was done by the glucose tolerance test in glucose loaded rats, the methanolic extract 400mg/kg showed significant effect on the blood glucose level but extract of 200 mg/kg did not show the significant decrease in blood glucose level. The value of p is less than 0.001 except in 200 mg/kg in glucose tolerance test (Table 2).

Table No 1: The Antihyperglycemic Effect of Methanolic Extract on Alloxan Induced Diabetic Rats.

GP	Dose	Blood Glucose Level (mg/dl) at hr			
		0 hr	1 hr	2 hr	3 hr
I	N.C	75.75 ±3.93	75.56 ±2.20	76.63 ±1.59	76.06 ±1.48
II	D.C	343.37 ±8.04	342.19 ±6.37	340.52 ±5.48	333.69 ±4.57
III	CTLE (200mg/kg)	340.82 ± 4.51	289.95 ±3.01***	272.48 ±3.72***	260.01 ±4.98***
IV	CTLE (400mg/kg)	347.52 ±4.92	293.11 ±2.76***	271.52 ±2.48***	256.19 ±2.50***
V	Glibenclamide (10mg/kg)	346.35 ±4.28	287.90 ±2.51***	253.46 ±2.77***	238.67 ±2.36***

N.C. = Normal Control; D.C. = Diabetic Control. CTLE= *Clitoria ternatea* Leaves Extract ***P < 0.001 show significant when compare with group II

Table No: 2 The Antihyperglycemic effect of Methanolic Extract on Glucose Loaded rats

GP	Dose	Blood Glucose Level (mg/dl) at minutes			
		0	30	60	120
I	Control (4mg/kg)	75.92 ±2.21	177.50 ±4.38	151.89 ±3.54	126.32 ±3.61
II	CTLE (200mg/kg)	71.52 ±1.37	159.50 ±3.73**	135.68 ±2.10***	110.37 ±1.64**
III	CTLE (400mg/kg)	77.30 ±3.07	153.40 ±2.52***	130.73 ±2.38***	101.74 ±1.60***
IV	Glibenclamide (10mg/ kg)	81.85 ±2.52	147.01 ±2.00***	119.81 ±2.86***	86.97 ±3.03***

CTLE= *Clitoria ternatea* Leaves Extract, ***P < 0.001 show significant when compare with group I

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