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"EFFECT OF ETHANOLIC EXTRACT OF *CESTRUM NOCTURNUM* LEAVES ON BLOOD GLUCOSE LEVEL OF STREPTOZOTOCIN-INDUCED DIABETIC ALBINO WISTAR RATS"

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ABSTRACT

Aim: To evaluate blood glucose level after oral administration of Ethanolic extract of leaves of *Cestrum nocturnum* for 4 weeks. ***Method*:** Extract of leaves of the trial drug was prepared with the help of soxhlet extraction technique using ethanol as a solvent. 18 Diabetes induced albino wistar rats were divided in three groups (Negative control, Test group and Standard Group). Negative control was administered 5 ml/kg/p.o. normal saline. Test group was administered 400 mg/kg/p.o. leaves extract of *Cestrum nocturnum*. Standard Group was administered 10mg/kg/p.o. metformin. **Duration of treatment:** 4 weeks. **Evaluation:** Blood glucose levels and body weights of rats were measured at the end of first, second, third and fourth week. ***Results*:** Oral administration of the extract for 4 weeks caused a significant ($P < 0.01$) reduction in blood glucose level in diabetic rats. The body weight of diabetic animals was also improved after daily administration of the extract.

KEYWORDS: *Cestrum nocturnum*, antidiabetic, leaves extract.

INTRODUCTION

Diabetes mellitus is a chronic metabolic disorder caused by deficiency in production of insulin by the ß-cells of pancreas. This results in increased concentration of blood glucose. This uncontrolled hyperglycemia after long duration leads to retinopathy, neuropathy, nephropathy, cardio-vascular problems and damage to blood vessels. The blood glucose level

in the human body is balanced by insulin and glucagon. The normal blood sugar of human body should be between 70 mg/dl to 110 mg/dl at fasting state and below 140 mg/dl at two hours after eating. If blood glucose level is less than 70 mg/dl is termed as hypoglycemia and more than 110 mg/dl is termed as hyperglycemia.[1]

The genus Cestrum contains more than 300 species, and most of them are native to warm subtropical and tropical areas of America. *Cestrum nocturnum* L. (Solanaceae), commonly known as night-blooming Jessamine, is an evergreen shrub with glossy, smooth, simple leaves; vine-like stems; and greenish, creamy white tubular flowers. The flower's volatile compounds were identified as phenylacetylaldehyde and linalool.[2] The leaves of C. nocturnum have pharmacological significance in Chinese folk medicine and have been used for the treatment of burns and swellings.[3] The leaves of the plant have shown significant analgesic and bactericidal activity.[4] Local anesthetic effect, inhibitory effect on central nerve system and cardiac arrhythmic effect of plant is also documented.[5]

Mature leaf holds a calcinogenic glycoside that escorts to vitamin D toxicity and is accountable for elevated serum calcium level.[6] Some of glycosides such as (25=R)-spirost-5-ene-2R,3,-diol pentaglycosides (nocturnoside A)[7] (25R)-spirost-5-en-3,-ol tetraglycoside (nocturnoside B)[8] and phenolic glucosides (cesternosides A and B),[9] two new flavonol glycosides and seven steroidal saponins including four new ones,[10] and eight new steroidal glycosides have been isolated from the leaves of C. nocturnum.[11] In the present study, we investigated the antibacterial and antifungal activities of the whole plant of C. nocturnum. The plant contains many flavonoids and sterols/triterpenoids as itsmain constituents, which are known bioactive principles for anti-diabetic potential.[12] Flavonoids are also known to regenerate the damaged β-cells in diabetic mice.[13]

MATERIAL AND METHOD

Plant material

Plant sample was collected from herbal garden of Bilwal Medchem and Research laboratory Pvt Ltd, Mandha, Jaipur and botanical authenticate by botanist of Bilwal Medchem and Research laboratory Pvt Ltd, Reengus, Sikar.

Preparation of Extract

The leaves were washed in running water and cut into small bits to facilitate drying. The pieces of plant material were dried for 12 hrs in a hot air oven at 60°C. The dried plant

material (leaves) was taken separately and grounded using an electric blender to obtain a coarse powder. Dried coarse powder was then extracted with ethanol solution using Soxhlet's apparatus.

Animal

Wistar rats (200–250 gm) were selected for experimental study. The animals were kept and maintained under laboratory conditions of temperature (21.5 ± 22∘C), humidity (60 ± 1%), and 12-hour light/dark cycle. They were allowed free access to food (standard pellets) and water *ad libitum*. Experimental protocols and procedures used in this study were approved by the Institutional Animal Ethics Committee of Institute of Biomedical and Industrial Research, Jaipur, Rajasthan.

Induction of Diabetes

60mg/kg of Streptozotocin was injected intravenously in all 18 albino wistar rats. Three days after degeneration of beta cells, diabetes was induced in all animals.[14]

Treatment Protocol

Diabetic animals were randomly assigned into the following groups of six animals each and treated as follows.

Group I: Six Diabetes induced albino wistar rats was administered 5 ml/kg/p.o. normal saline.

Group II: Six Diabetes induced albino wistar rats was administered 400 mg/kg/p.o. leaves extract of *Cestrum nocturnum*.

Group III: Six Diabetes induced albino wistar rats was administered 10mg/kg/p.o. metformin.

The drug solutions or vehicle were administered orally by gastric intubation once daily at 11 o'clock for 28 days. The effect of vehicle, extract, and standard drug on blood glucose were determined in animals.

Statistical Analysis

All values of results are presented as mean ± standard error of mean (SEM).The statistical analysis involving two groups was evaluated by means of Student's *t* test.

RESULTS AND DISCUSSION

Table 1: Effect of *Cestrum nocturnum* on blood glucose level.

Groups	Blood glucose (mg/dL)	
	BT± SEM (0 Day)	AT±SEM (28 Day)
Group-I	269.67±8.441	306.33±4.745
Group-II	264±6.121	131.17±7.709**
Group-III	267.67±5.714	107.83±2.482**

The effects of metformin (group III) and Ethanolic extracts (group II) on blood glucose levels in diabetic rats after treatment of 28 days are shown in Table 1, in which extract and metformin showed significant reduction ($P < 0.01$). It was observed that standard drug metformin lowered the blood glucose levels significantly bringing it back to normal which is an indication of the presence of some β-cells, as metformin is known to stimulate insulin secretion from β-cells. The decrease in weight in diabetes was due to continuous excretion of glucose and decrease in peripheral uptake of glucose and glycogen synthesis.[15]

CONCLUSION

In the present study, *Cestrum nocturnum* was selected for antidiabetic studies owing to its traditional uses. Therefore, the study was undertaken to justify its claimed uses. Wistar rats were selected as experimental animals for the antidiabetic activity. The extract was screened for streptozotocin-induced anti-diabetic activity. The Ethanolic extract of plant showed significant ($P < 0.01$) anti-diabetic activity at dose 400 mg/kg. This is evidenced by percentage reduction in blood glucose levels after 28th day after administration the extract.

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