

Evaluation of antidiabetic potential of *Tinosporacordifolia* in Streptozotocin (STZ) induced diabetics Swiss albino mice.

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Received 26 November 2020; Accepted 10 December 2020

ABSTRACT

Background: *Tinosporacordifolia* herb has different Classes of phytochemicals with medicinal significance. The aim was to evaluate the antidiabetic potential of *T. Cordifolia* in STZ induced diabetic mice in Comparison with a Currently used oral antidiabetic agent rosiglitazone.

Materials and Method: There were 30 mice with fasting blood glucose (FBG) in the range 70-110 mg/dl were used for the study five groups each containing six mice, were induced diabetes with STZ (0.5mg/kg). The diabetic control group (0.5ml normal saline), Standard control group (2mg/kg rosiglitazone), test group I (100mg/kg *T. Cordifolia* extract), test group II (200 mg/kg *T. Cordifolia* extract). Fasting glucose levels were recorded on 1st, 7th, 14th and 21st day. Stastical analysis was done by using MATLAB software and data were presented as mean \pm SEM

Results: *Tinosporacordifolia* extract showed that dependent antidiabetic action in both low dose (100 mg/kg) and high dose group (200 mg/kg). Antidiabetic action with high dose of *Tinosporacordifolia* is comparable to that of standard drug rosiglitazone.

Conclusion- The antidiabetic potential of *T cordifolia* in diabetic mice *T cordifolia* can be used as therapeutic agent to manage type 2 diabetes mellitus.

KEYWORDS: *Tinosporacordifolia*, Rosiglitazone, Streptozotocin, antidiabetic potential.

I. INTRODUCTION

Diabetes mellitus is a chronic disorder in metabolism of carbohydrates, proteins, and fats due to absolute or relative deficiency of insulin secretion with/without varying degree of insulin resistance¹.

Diabetes mellitus is now seen as heterogeneous group of diseases characterised by hyperglycemia resulting from various causes². India has emerged as one of the major epicentre of the global diabetes mellitus pandemic. Rapid development in socioeconomic status and demographic changes has led the Indian population with increased susceptibility for explosive prevalence of diabetes mellitus in past four decades³. The chronic diabetes is associated with long term damage and dysfunction of eye, heart, kidney, blood vessels and others⁴. As per ancient literature, more than 800 plants are reported to have antidiabetic activities. Ethnopharmacological survey indicate that more than 1200 plants are used in traditional medicine for their hypoglycemic activity⁵. Many antidiabetic drugs are being used in the treatment of diabetes mellitus but search for more effective drug with less or no side effects⁶. So the present study is to investigate the antidiabetic potential of stem extract of *Tinosporacordifolia* and its comparison with currently used oral antidiabetic drug rosiglitazone.

II. MATERIALS AND METHOD

Albino mice : The albino mice are excellent model for present study. Adult albino mice weighing around 17-20 gram were selected for experiments. The relative humidity of the room was maintained between 50 and 55 percent 12 hours of lighting and 12 hours of darkness was provided in the rooms for optimal growth and reproduction.

Plant materials : Preparation of plant stem extract : The powder of *T cordifolia* (weighted 940 gram) after the grinding is kept in the separate preculator and filled up with about 3 litres commercial alcohol (95% ethanol and 5% water) more than 1 inch than powder and left it 24 hours. After 24 hours, the whole dissolved solution is drained out in a 5000 ml conical flask. About 50 ml dissolved solution is taken in 3000 ml Round bottle flask from the 5000 ml conical flask and evaporated under reduced pressure and low temperature (60⁰C) in Rotavapour. In Rotavapour, the commercial alcohol is vapourised and plant extract remains in the round bottle flask the remaining plant extract is collected from the saptula from round bottle flask and kept in plastic jar.

Grouping of mice.

Group- 1	:	Normal control
Group- 2	:	Diabetic Control
Group- 3	:	T cordifolia (100 mg/dl)
Group-4	:	T Cordifolia (200 mg/dl)
Group- 5	:	Rosiglitazone.

Induction of diabetes:

Streptozotocin was used to induced diabetes mellitus. After an overnight fasting, the mice were injected with freshly prepared 0.5 ml of this solution is injected to each mouse intraperitoneal by insulin syringe. mice were developed hyperglycemia with fasting blood glucose of more than 200 mg/dl were selected for the study. In all the groups the blood glucose levels were recorded on day- 1st, 7th, 14th and 21st day

Statistical analysis

The results were express in mean standard deviation the results were analysed using one way ANOVA with post Hoc analysis The statistical significant value for any measure was set to P<0.05 at a confidence interval of 95%

III. RESULTS

Effect on fasting Blood Glucose (FBG) Levels

Induction of diabetes with STZ increases the blood glucose level in the mice by a factor of four, when compared to the control. The changes in the blood glucose levels before and after receiving the treatment in normal and diabetic mice are listed in Table 1. Treatment with T. cordifolia extract at four different concentrations (100 and 200 mg/kg body weight) significantly decreases the blood glucose levels when compared to the control. The FBG level of the diabetic control was significantly higher than that of normal control (p<0.01). T. cordifolia extract at different doses significantly reduced FBG after 1 week of administration (p<0.01), and the FBG levels were stable within 4 weeks of administration (p<0.01), and the FBG levels were stable within 4 weeks. T. cordifolia extract at 200 mg/kg body wt/day produced more hypoglycemic effects than at 100mg/kg body weight.

TABLE: 1
Effects of different of T. cordifoliachirayita extract on (Mean±S.D).

Effect of T. cordifolia extracts on FBG (Mean±S.D.)				
Groups	Blood glucose levels (mg/dl)			
	Pretreatment (days)	Post-treatment (days)		
	1	7	14	21
Normal control	72±0.09**	70.07±0.19**	72.86±0.31**	71.13±0.13**
Diabetic control	271.94±1.43*	270.91±1.33*	269.68±1.44*	270.93±1.30*
T cordifolia (100 mg/dl)	274.93±1.27**	180.78±2.39**	144.39±1.33**	143.32±1.81**
T Cordifolia (200 mg/dl)	274±1.20**	162.68±1.23**	158±1.63**	112±1.21**
Rosiglitazone.	278±1.42**	92±1.23**	89.85±1.21**	87.18±0.94**

*p<0.05 as compared with normal control.

**p<0.01 as compared with diabetic control.

IV. DISCUSSION

The aqueous extract of stem of *Tinosporacardifolia*(TC), commonly known as Guduchisattwa in Ayurveda, is recommended for the treatment of diabetes mellitus.⁷ Authors, therefore, preferred the aqueous extract of the stem and it has been evaluated and its efficacy is compared with that of standard oral hypoglycaemic drug rosiglitazone. The extract met with all the analytical specifications of the standardized herbal extract as per the international standards.

In this study, low dose *T. cardifolia*(100mg/kg) decreased blood glucose level (BGL) from 274.9mg/dl on day 1 to 143.32mg/dl on day 21st and high dose (200mg/dl) *T.Cardifolia*BGL from 274.12mg/dl to 157.12mg/dl on day 21st. The results show that the stem extract of *T. cardifolia* has definitive hypoglycaemic activity. The present study is in accordance with the previous studies done by who reported the hypoglycaemic action of *T. cardifolia*.⁸

The percentage reduction in BGL during the study period is 47.8% for low dose *T.cardifolia*(100mg/kg) and 68.18% for high dose of *T. Cardifolia* (200mg/kg). This shows the dose dependent activity of *T.cardifolia*

Singh SS et al, investigated the chemical constituents and the medicinal properties of ethanolic extract of *Tinosporacordifolia* at a dose of 400mg/kg body weight, which produced a significant reduction of blood sugar in alloxan induced diabetic mice.⁹

In this study *T. cardifolia* did not produce hypoglycaemic in non-diabetic test group (BGL-115mg/dl on day 1-100.3mg/dl on day 21st), which suggests that it might have anti-hyperglycaemic activity and no hypoglycaemic activity in normal mice. Studies show that *T.cardifolia* induces secretion only in the presence of high plasma glucose level which supports our above observation. This can be a huge advantage in the therapy of diabetes mellitus, since one of the important adverse effect of using conventional anti diabetic drugs in hypoglycaemia.

V. CONCLUSION

Treatment with *T.cordifolia* extract at two different concentrations significantly decreases the blood glucose levels in diabetic mice when compared to the control. This decrease is comparable to the effect shown by the Rosiglitazone. These results indicate that *T.cordifolia* extract acts in significant reduction in blood levels in diabetic mice.

In conclusion, the present study indicates that *T.cordifolia* extract show high potential for the treatment of diabetes and that the improvement of insulin resistance might be the underlying mechanism of the pharmacological actions.

ACKNOWLEDGEMENT

Authors are thankful to Department of Zoology, Patna University, Patna and P.G. Department of Biotechnology, College of Commerce, Arts & Science, Patna for providing necessary equipment's to complete the entire research works.

CONFLICT OF INTEREST

Authors declare no conflict of interest regarding publication or any other activity related to this article.

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Anand Mohan, et. al. "Evaluation of antidiabetic potential of *Tinosporacordifolia* in Steptozotocin (STZ) induced diabetics Swiss albino mice.." *IOSR Journal of Pharmacy (IOSRPHR)*, 10(11), 2020, pp. 20-22.