

**ANTIDIABETIC EFFECT OF *TRICHOSANTHES DIOICA* AND
COCCINIA INDICA IN ALLOXAN INDUCED DIABETIC RATS**

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ABSTRACT: Antidiabetic effects of combined aqueous fruit extract of *Trichosanthes dioica* and *Coccinia indica* were evaluated in alloxan induced diabetic rats. The combined aqueous fruit extract of *Trichosanthes dioica* and *C. indica* at a concentration of 300 mg/kg body weight/rat/day was orally administered to Alloxan induced diabetic rats for a period of 7,15 and 30 days. The elevated levels of blood glucose in the diabetic rats reverted back to near normal after treatment with the combined aqueous fruit extract of *Trichosanthes dioica* and *Coccinia indica*. Similarly significant decrease in the levels of plasma insulin elevated to near normal after treatment with fruit extract. The result of this experimental study indicates that combined fruit extract possess a significant antidiabetic effect.

KEYWORDS: Diabetes mellitus, Alloxan, Fruit extract.

INTRODUCTION

Diabetes mellitus (DM), also known as simply diabetes, is a group of metabolic diseases in which there are high blood sugar levels over a prolonged period. This high blood sugar produces the symptoms of frequent urination, increased thirst, and increased hunger. Untreated, diabetes can cause many complications. Acute complications include diabetic ketoacidosis and nonketotic hyperosmolar coma. Serious long-term complications include heart disease, stroke, kidney failure, foot ulcers and damage to the eyes ([Soon and Tan, 2002](#); [Yoshikawa et al., 1995](#)). The disease becomes a real problem of public health in developing countries, where its prevalence is increasing steadily and adequate treatment is often expensive or unavailable. Alternative strategies to the current modern pharmacotherapy of diabetes mellitus are urgently needed, because of the inability of existing modern therapies to control all the pathological aspects of the disorder, as well as the enormous cost and poor availability of the modern therapies for many rural populations in developing countries ([Scheen, 1997](#); [Lyra et al., 2006](#)).

Plants used in traditional medicine to treat diabetes mellitus represent a valuable alternative for the control of this disease. Pointed gourd (*Trichosanthes dioica*) is known by the name of parwal, palwal, parmal, patol, potala in different parts of India and Bangladesh and is one of the important vegetables of these regions. The fruits and leaves are the edible

parts of the plant which are cooked in various ways either alone or in combination with other vegetables or meats. Juice of leaves of *T. dioica* is used as tonic, febrifuge and in subacute cases of enlargement of liver and spleen. In Charaka Samhitha leaves and fruits used for treating alcoholism and jaundice. Leaves are used in odema and alopecia. It is also used as antipyretic, diuretic, cardiogenic and laxative. *Coccinia indica* (Bimba in Sanskrit) known as Ivy Gourd has a long history in ancient Indian medicinal system for its use in diabetes, bronchitis and skin diseases. It is a climbing perennial herb, growing wild throughout India ([Hossain et al., 1992](#)).

In the present study, the antidiabetic effect of the fruit extract of *Trichosanthes dioica* and *Coccinia indica* in Alloxan induced diabetic rats was evaluated.

MATERIALS AND METHODS

2.1. Experimental Animals

Albino rats of the Wister strain were used. They weighed between 150 and 200g and were fed on Goldmohar brand feed (manufactured by Lipton India Ltd., New Delhi) and water *ad libitum*. The albino rats maintained under the Good Laboratory Practices (GLP) and follow the guidelines of Committee for the Purpose of Control and Supervision on Experiments on Animals ([CPCSEA, 2003](#)).

2.2. Medicinal plants

The fruits of *Trichosanthes dioica* and *Coccinia indica* were used. The plants were obtained from

medicinal plant farm house [Govt Regd.], Lucknow. They were identified and authenticated by plant experts in the Department of Botany, SLS, Khandari, Agra.

2.3. Preparation and administration of plant extracts

For the preparation of aqueous extract, a decoction was prepared by bringing 500 gm/L of material to boil in the water. The suspension was filtered (Whatmann No.1 filter paper) and the filtered solution was brought to dryness under vacuum. The dried fraction was stored at -20°C until required. The dried fraction was re-extracted with distilled water for experimentations. The rats were given free access to the extracts (300 mg/kg b.wt.) for a period of 30 days.

2.4. Induction of diabetes in rats

The rats were injected intraperitoneal with alloxan monohydrate (Span Chemical Co. Mumbai) dissolved in sterile normal saline at a dose of 120 mg kg⁻¹ b.wt. The rats were kept for 15 days to stabilize the diabetic condition. Only rats with a fasting blood glucose level of at least 200 mg/dl (Kim *et al.*, 2006).

2.5. Blood Collection

The blood samples were collected directly from ventricle of heart. The blood samples which were collected in heparinized tubes were then centrifuged at 3000g for 15 minutes. The clear serum obtained was used for the analysis of glucose and insulin.

2.6. Experimental Design

Animals were divided into three groups and for each group six animals were taken. Group I (Normal control) (0.9% NaCl; 5ml/kg.b.w.), Group II served as Alloxan induced diabetic control, Group III received combined fruit extract of *M.citrofolia* and *C.indica* (300mg/kg.b.w.) once a day for 30 days.

2.7. Oral Glucose Tolerance Test (OGTT)

The oral glucose tolerance test (OGTT) was performed for dose of aqueous fruit extract of *Trichosanthes dioica* and *Coccinia indica* (300mg/kg.b.w.) and blood glucose level was

measured by one touch glucometer (accu-check). The glucose level was measured at the interval of 0, 30, 60, and 120 min after the administration of extract.

2.8. Biochemical assays

Fasting blood glucose level, lipid profiles and serum insulin were evaluated in normal and diabetic rats. The blood glucose level was estimated by one touch glucometer (Accu check). The serum insulin was estimated by Radioimmunoassay (RIA) method (Scott *et al.*, 1982).

2.9. Statistical analysis

All the values in the test are presented as mean ± SEM. Statistical differences between the means of the various groups were evaluated by one-way analysis of variance (ANOVA) using the SPSS program followed by Students't-test. P values of 0.05 or less were considered to be significant.

RESULTS AND DISCUSSION

The mean blood glucose concentration of controlled and aqueous fruit extract of *Trichosanthes dioica* and *Coccinia indica* treated animals on 0, 30, 60 and 120 min are in table-1. The significant reduction ($p < 0.01$) of blood glucose was observed at 60 and 120min of the experiment. Table-2 showed serum glucose decrease and insulin was increased significantly $p < 0.001$ after oral administration of combined aqueous fruit extract of *Trichosanthes dioica* and *Coccinia indica* in alloxan induced diabetic rats during 7,15 and 30 days respectively as compared to diabetic controls. In the present study, oral administration of *Trichosanthes dioica* and *Coccinia indica* aqueous fruit extract decreased serum glucose and enhanced insulin level in diabetic rats. This hypoglycemic effect may be due to depression of key gluconeogenic or the increase in the levels of glucose transportes and stimulation of uptake in peripheral tissues (Kim *et al.*, 2006; Kamiya *et al.*, 2008). Another effect of these plants extract may be that it preserves the cells of islets of langerhans of β -cells functions, which results in a significant increase in insulin activity (Horsfal *et al.*, 2008; Muralidharan and Sivaraman, 2009).

Table 1: The Effect of plant extracts on blood glucose levels in alloxan-induced diabetic rats (mg /dl)

Treatment	0 min	30min	60min	120min
Normal	93±3.2	133 ± 6.7	129± 5.8	125 ± 6.0
Diabetic control	298±10.8	301 ± 7.9	300±12.2	302.6 ±14.2
<i>Trichosanthes dioica</i> and <i>Coccinia indica</i> (300mg/kg b.wt.)	275 ±19.8	234 ± 4.6*	210±9.5*	177 ± 3.4*

Values are mean concentration of blood glucose ± S.E. (n=6)

Significantly increased or decreased values compared with 0 min data ($p < 0.05$)*.

Table 2: Effect of aqueous fruit extract of *Trichosanthes dioica* and *Coccinia indica* on blood glucose and insulin activity in Alloxan induced diabetic rats after 7,15 and 30 days.

Parameter	Normal control	Diabetic control	Diabetic control + fruit extract of <i>Trichosanthes dioica</i> and <i>Coccinia indica</i> (300 mg/kg b.wt.)		
			7 day	15 day	30 day
Serum glucose (mg/dl)	105.5±2.11	298±10.8	237±12.9*	196±17.8**	114±4.6**
Serum insulin (µu/ml)	2.12±0.11	0.24±0.05	0.99±0.045*	1.12±0.06*	1.69±0.07**

Values are given as mean S.Em. for 6 rats per groups

Significant at P<0.01*; P<0.001**

CONCLUSION

Our study has shown that the combined fruit extract of *Trichosanthes dioica* and *Coccinia indica* is most effective in glucose and lipid lowering effect in diabetic rats.

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