

## Evaluation of Anti-Diabetic Activity of Aqueous Extract of *Coscinium fensestratum colebr* Stem in Alloxan Induced Diabetic Rats



### Medical Science

**KEYWORDS :** Alloxan, Diabetes, Glucose, Stem

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### ABSTRACT

*Aims and Objectives: To evaluate the anti-diabetic activity of Coscinium fensestratum colebr stem in Alloxan induced diabetic rats.*

*Materials and Methods: Total 18 rats were selected and divided into three groups each of 6 rats. Group-I given 1% gum acacia, group-II Glibenclamide (10 mg/kg), group-III C.F stem (500 mg/kg). Blood samples were collected at different time intervals (0, 4, 6 and 8 hours) and glucose was estimated.*

*Results: Alloxan given rats showed significant increase in glucose levels compared to control groups. Treatment with test drug significantly reduced glucose levels all the time levels compared to Alloxan group.*

#### *Conclusion*

*Coscinium fensestratum colebr stem administration significantly reduced the glucose levels in Alloxan induced diabetic model.*

### Introduction

Diabetes Mellitus (DM) is a major health problem in the developing countries. It is noticed that DM ranked seventh among the leading cause of death. Life time treatment is required to control the glucose levels in DM patients. Use of synthetic drugs cause development of adverse effects<sup>1</sup>. Alloxan is an agent used to induce type-I DM animals to screen new anti-diabetic drugs in animals. Medicinal plants might provide the new compounds for the treatment of DM<sup>2</sup>. Due to less side effects herbal treatment become popular in the treatment of DM. In the Ayurveda *Coscinium fensestratum* plant commonly used for the treatment of anti-diabetics, antioxidant, hypotensive, hepatoprotective and inflammation<sup>3,4,5</sup>. From with this background the present study investigated the anti-diabetic activity of aqueous extract *Coscinium fensestratum colebr* stem in Alloxan induced diabetes in Wistar Albino rats.

### Materials and Methods

#### Animals

Wister Albino rats weighing 150-200 grams were obtained from Central Animal House, Madurai Medical College, Madurai, Tamil Nadu. They were fed on standard rat pellet diet and water was provided in feeding bottle. All the animals were maintained under standard laboratory conditions temp 24°C and humidity 60-70%. The study was approved by Institutional Animal Ethics Committee<sup>6</sup>.

#### Collection of plant materials

*C.F.C* stem was collected from local area of Madurai, Tamil Nadu. The stem was cleaned and made into fine powder and used for the extraction.

#### Preparation of aqueous extract of *Coscinium fensestratum colebr* stem

The required crude stem powder was weighed and soaked in a round bottomed flask. 300ml of distilled water was added and refluxed for about 24 hours. After 24 hours the solution was filtered and the filtrate was evaporated to dryness and the final extract was obtained. The extract was stored and used for the study<sup>7</sup>.

### Study design

- Group-I: Gum acacia (1%)
- Group-II: Glibenclamide (10 mg/kg)
- Group-III: Aqueous extract of *C.F* stem (500 mg/kg)

### Alloxan induced diabetes in rats

Alloxan manufactured by LOBA chemicals Private Ltd., Batch No. G204207 was used in the study (which was purchased from Bharat Surgical supplies, Madurai) to induce diabetes mellitus in the Albino rats. Alloxan was given at the dose of 110 mg/kg intraperitoneally as a single dose after 18 hours of fasting. Rats showed high glucose levels were included in the study<sup>8</sup>.

### Procedure

Total 18 diabetic rats were selected and divided into three groups. The group-I received Gum acacia (1 % 0.5 ml/kg) served as a control. Group-II received the standard drug Glibenclamide (10 mg/kg) served as a standard. The group-III received aqueous extract of *C.F* stem (500 mg/kg) served as a test. After administration of drugs to their respective groups blood samples were collected at 0, 4th, 6th and 8th hour of time period. Blood samples were centrifuged at 4000 RPM for 15 min. Serum was separated and glucose levels were estimated by Oxidase-peroxidase method by using fully automated analyzer<sup>9</sup>.

### Statistical analysis

Glucose levels were expressed in MEAN±SEM. The data was analyzed by Statistical Analysis of Social Sciences (SPSS 16.0 version). One way ANOVA (Posthoc) followed by Dunnet t test used to find the statistical significant between the groups. p values less than 0.05 (p<0.05) considered statistically significant.

### Results

Comparison of control group rats glucose levels with standard and test drug showed no significant difference at 0 hour. Significant (p<0.05) reduction of glucose levels were observed at 4, 6 and 8 hours compared standard and test drug with control group. Glibenclamide showed more efficacy than test drug in the reduction of glucose levels at all time levels (Table-1). Significant reduction of glucose levels were observed in standard

group compared to control and test drug compared within the groups (Graph-1).

**Discussion**

Diabetes mellitus is one of the most important diseases in the world. It is fourth leading causes of death in the most common developed countries<sup>10</sup>. Based on the deficiency of insulin diabetes mellitus was classified into two groups. Type-I insulin dependent diabetes mellitus and Type-II non insulin dependent diabetes mellitus. Alloxan is one of the chemical substances used for the induction of diabetes mellitus in animals. Administration of Alloxan causes a destruction of beta cells of pancreas leads to development of diabetes mellitus. This type of diabetes mellitus is an example for type-I diabetes mellitus<sup>11</sup>. This is the most common methods to use screen the new anti-diabetic drugs in animals. The observations in present study indicate that aqueous extract of *Coscinium fenestratum colebr* stem was found to reduce the glucose level in animals made diabetic with Alloxan. It is known that Alloxan increase the free radicals production and causes tissue damage. In the present study investigation aqueous extract of test drug significantly reduced the glucose levels in the Alloxan induced diabetic rats. It may be suggested that plant extract may contains phytochemicals which can act like insulin and decrease the glucose levels. Overall study results showed the anti-diabetic activity of aqueous extract of *Coscinium fenestratum colebr* stem, the activity may be due to presence of chemical constituents like flavonoids, tannins and glycosides<sup>12</sup>.

**Conclusion**

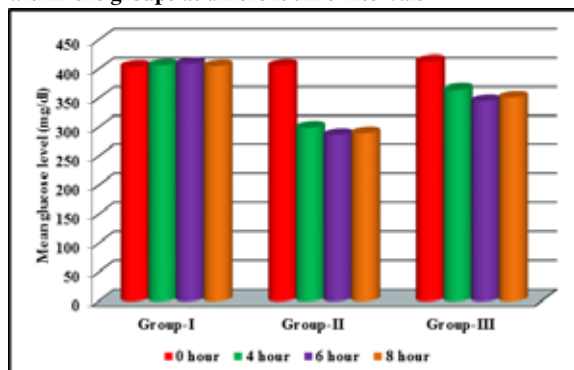
In conclusion, this can be stated that the aqueous extract of *Coscinium fenestratum colebr* stem is having potential of being used for anti-diabetic activity in herbal treatment. There are required further studies to isolate the phytochemicals having anti-diabetic activity.

**Table-1: Comparison of mean serum glucose (mg/dl) levels between the groups at different time intervals**

Groups	Serum glucose level (MEAN±SEM)			
	0 hour	4 <sup>th</sup> hour	6 <sup>th</sup> hour	8 <sup>th</sup> hour
Group-I	404.34 ±7.21	406.67 ±6.81	409.33 ±7.37	405.33 ±6.67
Group-II	406.13 ±8.54	299.23 ±12.49*	286.33 ±1.59*	289.33 ±9.87*
Group-III	413.65 ±7.24	364.19 ±9.17*.*	344.89 ±13.23*.*	351.24 ±14.87*.*

(\*p<0.05 significant compared group-I with other groups, #p<0.05 significant compared group-II with other groups)

**Graph-1: Comparison of mean serum glucose (mg/dl) levels within the groups at different time intervals**



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