

ANTI-DIABETIC ACTIVITY OF ANAPHYLLUM WIGHTII SCHOTT IN ALLOXAN INDUCED DIABETIC RATS

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ABSTRACT

Objective: The primary objective of this study was to determine the anti-diabetic activity of *Anaphyllum wightii* in alloxan induced diabetic rats. Diabetes mellitus is the most common endocrine disorder that impairs glucose homeostasis, resulting in severe diabetic complications. Herbal preparations of tubers of *Anaphyllum wightii* had been considered as effective, economical and safe treatments for curing various diseases in Indian traditional system of medicine including diabetes. Therefore, the present study to investigate the anti-diabetic activity of ethanolic extract of *Anaphyllum wightii* in alloxan induced diabetes in albino wistar rats. Alloxan was administered as a single dose (120mg/kg, b.wt) to induce diabetes. Administration of ethanolic extracts from tubers of *Anaphyllum wightii* (100, 150 & 200mg/kg body weight/day) for 10 days, to alloxan-induced diabetic rats. The fasting blood sugar levels and serum biochemical analysis in alloxan-induced diabetic rats were investigated. The results suggest that the administration of *Anaphyllum wightii* have an anti-diabetic effect in alloxan induced diabetic rats and their effect was equivalent to that of reference drug Glibenclamide.

Keywords:

INTRODUCTION

Anaphyllum is a genus of flowering plants in the Araceae family. It consists of two species, in this genus—*Anaphyllum beddomei* Engl. and *Anaphyllum wightii* Schott were reported from the high ranges of south Western Ghats. The two species in this genus are similar in appearance to those in the genus *Anaphyllopsis*. Genus *Anaphyllum wightii* is listed as an endemic and threatened genus of South India (Nayar, 1987)¹. The species of the genus *Anaphyllum* are found in marshes. They are characterized by pinnate leaves and twisted spathe for the spadix. The tribal communities (Kani Tribes, Malasars, Kadars, Pulaiyars, Madhuvars, etc.) use these plants as food and as an antidote to snake bite. Leaves of *Anaphyllum beddomei* form a part of tribal diet (Ramachandran, 2007). Arun et al.(2007)² reported the use of the corms of *Anaphyllum wightii* (keerikizhangu), as an antidote to snakebite along with some other medicinal plants.

MATERIALS AND METHODS

Plant material

Anaphyllum wightii tubers were collected from wynad hills, wynad (dist), Kerala, India. The taxonomical identification of the plant was done by Dr. N.Sasidharan, Scientist-F, Programme coordinator, FE&BC division, Kerala Forest Research institute, Peechi, Thrissur. The voucher specimen was preserved in Academy of pharmaceutical sciences, Pariyaram Medical College, Kannur, Kerala.

Preparation of plant extract

The collected plant tubers was dried at room temperature, pulverized by a mechanical grinder, sieved through 40mesh. About 120g of powdered materials were extracted with ethanol (absolute alcohol 95%) using soxhlet apparatus. The extraction was carried out until the extractive becomes colorless. The extracts is then concentrated and dried under reduced pressure. The solvent free

semi solid mass thus obtained is dissolved in tween 80 and used for the experiment. The percentage yield of prepared extract was around 10%w/w.

METHODOLOGY

The animals were divided into six groups. Each group consisted of 6 animals. Alloxan induced diabetic rats were used, Group I – Control, non-diabetic. Group II – Control, diabetic. Group III – Diabetic, treated with standard drug (Glibenclamide 10mg/kg body weight/day). Group IV, V & VI – Diabetic, treated with ethanolic extract of *Anaphyllum wightii* tubers (100, 150 & 200mg/kg body weight/day respectively) orally. This treatment was continued for seven days. Blood samples from the rats were collected from the retro orbital plexus puncture method. Fasting blood glucose level was estimated at 0, 1, 3, 5, & 7 hours for acute studies and on 0, 3rd, 5th, 7th & 10th day for sub acute studies. The Blood glucose levels were determined by Glucose oxidase method (Varley, 1988)³.

RESULTS

Effect of *Anaphyllum wightii* on blood glucose level:

There were observable changes in BGL of treated and untreated rats. Treatment of diabetic rats with ethanolic extract of *Anaphyllum wightii* and Glibenclamide significantly decreased the BGL compared to untreated diabetic rats. Dose dependent reduction in BGL was observed in Alloxan induced diabetic rats treated with ethanolic extract of *Anaphyllum wightii*. On single oral administration of the extract for acute study a significant decrease in fasting blood sugar level was observed at dose 150 & 200 mg/kg bodyweight. The maximum reduction in blood glucose was observed after 7hr at dose 200 mg/kg body weight. In sub acute treatment, on 7th day, the extract at dose of 150 & 200 mg/kg of body weight showed significant reduction in blood glucose level as compared to that of diabetic control group.

Table 1: Hypoglycemic effect of *Anaphyllum wightii* after single dose

Groups	Drugs	Conc.	Initial hrs	01 hrs	03 hrs	05 hrs	07hrs
I	control non Diabetic	2% Tween 80w/v soln	102.59±1.1	102.51±1.4	101.81±1.5	101.23±1.6	100.13±1.3
II	Diabetic control	2% Tween 80w/v soln	230.54±1.4	228.19±1.2	222.93±1.3	220.18±1.2	219.18±1.2
III	Diabetic + standard	10mg/kg	228.19±1.1	221.59±1.2	215.79±1.9	212.32±1.81	204.32±1.81
IV	Diabetic	100mg	228.32±1.5	221.51±1.8	214.34±1.4	208.14±1.2	202.14±1.2
V	Diabetic	150mg	227.41±1.5	217.59±1.5	209.47±1.1	201.31±1.8	198.31±1.8
VI	Diabetic	200mg	232.32±1.5	227.37±1.6	220.53±1.8	212.22±1.9	200.22±1.1

Table 1: Hypoglycemic effect of *Anaphyllum wightii* in long term Treatment

Groups	Drugs	Conc.	Initial hrs	03 day	05 day	07 day	10 day
I	control non Diabetic	2% Tween 80w/v soln	102.59±1.1	102.51±1.4	101.81±1.5	101.23±1.6	100.13±1.3
II	Diabetic control	2% Tween 80w/v soln	230.54±1.4	228.19±1.2	221.93±1.3	211.18±1.2	201.18±1.2
III	Diabetic + standard	10mg/kg	228.19±1.1	210.59±1.2	201.79±1.9	194.32±1.81	186.32±1.81
IV	Diabetic	100mg	228.32±1.5	211.51±1.8	199.34±1.4	191.14±1.2	185.14±1.2
V	Diabetic	150mg	227.41±1.5	211.59±1.5	201.47±1.1	192.31±1.8	181.31±1.8
VI	Diabetic	200mg	232.32±1.5	217.37±1.6	201.53±1.8	189.22±1.9	179.22±1.1

DISCUSSION

Models of experimental diabetes that utilizes diabetogenic agent Alloxan induced blood glucose levels higher than 250 mg/dL⁴ which has been considered as severe diabetes. Diabetes mellitus is one of the most common chronic disease and is associated with hyperlipidemic and co-morbidities such as obesity, hypertension. Evaluation of anti diabetic activity using Alloxan induced hyperglycemia model has been described by Dashet *al*⁵. The petroleum ether extract of *Ficus krishnae* was screened to explore the scientific basis of its utility for correction of biochemical changes in Alloxan induced diabetic rats. Despite the folk medicine use, so far, there have been no studies on its antidiabetic effect. However, presence of triterpenoids⁷, which possess hypoglycemic and anti hyperglycemic properties, has been reported in literature^{8,9}. These compounds has been implicated in the anti diabetics activities of many plants¹⁰.

CONCLUSION

The present study suggests that ethanolic extract of *Anaphyllum wightii* leaves posses a potent antidiabetic property as it significantly reduced the fasting blood sugar level in alloxan induced diabetic rats as compared to diabetic control group.

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