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Hypoglycemic activity of ethanolic extract of *Aphyllorchis montana* on Alloxan induce diabetes in rats

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ABSTRACT

Aim of the present study is to evaluate the Hypoglycemic effect of ethanolic extract of *Aphyllorchis montana* in rats. *Aphyllorchis montana* is one of the plants used by traditional healers as a remedy for diabetes but scientifically there is no evidence that plant *Aphyllorchis montana* used in diabetes. Diabetes mellitus (DM) is a metabolic syndrome characterized by an increase in the blood glucose level. Treatment of diabetes is complicated due to multi-factorial nature of the disease. Hypoglycemic activity of the ethanolic extract of *Aphyllorchis montana* were investigated in Alloxan induced diabetic rats. *Aphyllorchis montana* was obtained by simple maceration method and was subjected to standardization using pharmacognostical and phytochemical screening methods. Dose selection was made on the basis of acute oral toxicity study (50-5000 mg/kg b. w.) as per OECD guidelines. After oral administration of the extract at two different doses (100 and 200mg/kg body weight) to alloxan induced diabetic rats, the blood glucose level was assayed. The reduction in the glucose level in diabetic rats proved that low dose of *Aphyllorchis montana* showed a significant hypoglycemic effect.

Key words: Alloxan, anti-diabetic activity, *Aphyllorchis montana* , Dextron

1. INTRODUCTION

Although different types of oral hypoglycemic agents are available along with insulin for the management of diabetes mellitus. It results from defects in insulin secretion, insulin sensitivity, or both. Chronic microvascular, macrovascular, and neuropathic complications may ensue. "The Genetic Landscape of Diabetes" introduces some of the genes that have been suggested to play a role in the development of diabetes. The incidence of type II diabetes is closely linked to choice of diet leading to overweight or obesity [1]. About 75% of diabetes is type II or non – insulin dependent diabetes (NIDD) and is associated to other disease conditions like obesity coronary heart, eye, renal, vascular and neurological problems. The use of most synthetic anti-diabetic drugs like sulfonylurea, biguanides and intravenous insulin injections have their own disadvantages. The most important side effect of sulfonyl ureas is hypoglycemia. The severe hypoglycemia can lead to death. Insulin injection takes place intraveneously. This is because insulin is frequently destroyed in the gastrointestinal tract. Insulin degradation and presence of insulinase were also reported by many authors. Although different types of oral hypoglycemic agents are available along with insulin for the management of diabetes mellitus, there is a growing interest in herbal remedies due to the side effects associated with these therapeutic agents [2]. Thus plants have played a major role in the discovery of new therapeutic agents. *Aphyllorchis montana* is one of the plants used by traditional healers as a remedy for diabetes mellitus. The present study was undertaken to investigate the anti-hyperglycemic effect of the ethanolic extract of *Aphyllorchis montana* plant on diabetes induced by alloxan in rats.

2. MATERIALS AND METHODS

2.1. Experimental animals

All animals will be housed at ambient temperature (22±1°C), relative humidity (55±5%) and 12/12 h light/dark cycle. Animals had access to standard pellet diet and water given *ad libitum*. The experimental will be approved by our institutional ethical committee following the guide lines of CPCSEA.

2.2. Extraction

Table -1: Effect of *Aphyllorchis montana ethanolic* extract (AMEE) on blood glucose level in oral glucose tolerance test in normal rats

Sample	Blood glucose		
	0min(mg/dl)	30min(mg/dl)	90min(mg/dl)
Normal	79.83± 0.8	168.70±2.40	145.84±2.96
Negative control	77.97±1.4	171.92±4.21	106.23±4.4
AMEE(100mg/kg)	78.93±0.7	174.37±3.72	110.32±6.6
AMEE(200mg/kg)	79.33±0.7	176.44±4.2	122.22±4.4

All values are shown as Mean ± S.E.M

Table -2: Effect of *Aphyllorchis montana* extracts on blood glucose (mg/kg) level of alloxan-induced diabetic albino rats after subacute treatment

Treatment	0hr	1hr	3hr	5hrs	3rd day	5th day	7th day
Normal	81.0± 1.69	81.8±1.7	81.8±1.4	79.8±1.3	81.3±0.9	79.8±0.8	80.7±0.7
Negative control	278.3± 7.9	207.6±6.2**	175±7**	157.8±5**	135±6.9**	116.3±5.2**	105.6±5**
AMEE (100mg/kg)	267±7.9	243.6±5.3**	177.8±6**	159.8±9*	106±9**	102±4.9**	94±4***
AMEE(200mg/kg)	309.5±15	250±17.4**	188.1±16*	256±18.**	110±23**	110±11**	98±28**

All values are shown as Mean ± S.E.M

*-value is less Significant, **-value is significant, ***-value is highly significant.

2.5 kg of the fresh, air-dried, powered crude drug of *Aphyllorchis montana* was extracted with ethanol by adopting simple maceration procedure at room temperature for 7 days in a conical flask with occasional shaking and stirring [4]. The extracts was filtered using whatman filter paper (no.1) and concentrated in vaccum at 40°C using a rotary evaporator and the residues obtained will be stored in a freezer at 80°C until further tests.

2.3. Acute oral toxicity studies

The acute oral toxicity studies of extracts were carried out as per the OECD guidelines. Administration of the stepwise doses of all four extracts of *Aphyllorchis montana* from 50 mg/kg b. wt. up to a dose of 5000 mg/kg weight caused no considerable signs of toxicity in the tested animals [5]. One-tenth of the upper limit dose was selected as the level for examination of antidiabetic activity.

2.4. Induction of diabetes

Diabetes was induced in male Wistar rats by alloxan Diabetes was induced by injecting it at a dose of 150 mg/kg, intraperitonially.

2.5. Methodology

DAY 0: Group I (control) animals served as vehicle treated controls.

DAY 1: Group II (Negative control) animals were injected Alloxan Intraperitoneally with a dose of 150mg/kg.

DAY 1-7: Group III (standard), IV (Ethanolic extract of *Aphyllorchis montana* at a dose of I00 mg/kg) [6] (Ethanolic extract of *Aphyllorchis montana* at a dose of 200 mg/kg) animals. At the end of study blood was collected retro-orbitally.

3. RESULTS AND DISCUSSION

Diabetes mellitus, a common heterogeneous metabolic syndrome, is prevalent throughout the world and has been projected to become one of the world's main disablers and killers within the next 25 years. Blood glucose level, urine sugar and body weight have been commonly measured to monitor the glycemic control mechanism.

In the present study, diabetic rats had lower body weight, high blood and urine sugar levels as compared to normal rats. However, orally administered AMEE significantly increased the body weight and decreased the blood glucose level. This could be due to potentiation of the insulin effect of plasma by increasing the pancreatic secretion of insulin from existing β-cells of islets of Langerhans or its release from

bound insulin. The significant and consistent antidiabetic effect of AMEE in alloxan diabetic rats may also be due to enhanced glucose utilization by peripheral tissues. Flavonoids, sterols, alkaloids and polyphenols as bioactive antidiabetic principles. The phytochemical screening of *A.montana* revealed the presence of various flavonoids, furoflavones, triterpenoids, carbohydrates, alkaloids are present. Hence, the antidiabetic activity of the above mentioned AMEE is probably due to the presence of several bioactive antidiabetic principles and their synergistic properties. The fall of 50% and 75% urine sugar of severely diabetic group after 7 days of treatment with the most effective dose further confirms our findings.

4. CONCLUSION

Hypoglycemic effect in Alloxan-induced diabetic rats and reduced the mortality rate significantly. The present investigation has also opened avenues for further research, to the different dose studies and development of potent formulation for diabetes mellitus from *A. montana* leaves. From this study we concluded that low dose of *A. montana* has hypoglycemic activity

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