Antihyperglycemic Activity of *Passiflora mollissima* Bailey

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According to the local traditional healers in Ooty, leaves of *Passiflora mollissima* Bailey are being used as an antidiabetic drug. In this direction, the ethanol extract of *Passiflora mollissima* was tested for its anti diabetic activity in alloxan-induced diabetic rats. The extract was studied at two dose level, 100 mg/kg and 200 mg/kg respectively. The activity was compared with reference standard, phenformin and control. The plant extract at a dose of 100 mg/kg and 200 mg/kg significantly (P<0.001) lowered the blood sugar level of hyperglycemic rats.

Key words: *Passiflora mollissima*, antihyperglycemic activity, alloxan mono hydrate

Diabetes mellitus is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action or both. Overt diabetes affects 2-3% of the total world population. In conventional therapy, Type I diabetes is treated with exogenous insulin and Type 2 with synthetic oral hypoglycemic agents[1]. Though different types of oral hypoglycemic agents are available along with insulin for the treatment of diabetes, there is an increased demand by patients to use the natural products with antidiabetic activity[2]. One such plant that is being used by the local traditional practitioners of Ooty to treat diabetes is *Passiflora mollissima* commonly known as Banana Passion fruit. *P. mollisima* is used as anti feedant, anti fungal, and antibacterial[3]. The reported main constituents of *P. mollissima* are alkaloids, saponins, flavonoids, triterpenoids, and proteins[3]. In order to confirm the claim of local healers, our efforts were made to study its antidiabetic action.

The aerial parts of fresh *Passiflora mollissima* (Passifloraceae)[4] were collected in the month of August and the collected parts were identified and authenticated by taxonomist in The survey of Medicinal Plant and Collection Unit, Udagamandalam. The collected plant materials were dried and powdered. The powdered material was defatted using petroleum ether (60-80^0) for 72 h and successively extracted with ethanol for 72 h in Soxhlet apparatus. The extract was evaporated under reduced pressure to obtain solid mass (yield 26.4% w/w). The phytoconstituents in the extracts were identified to be alkaloids, tannins and flavonoids by treating the extracts with various chemical reagents.

Male Wistar strain rats (weighing between 150–250 g) procured from the animal house of JSS College of Pharmacy, Ooty were used for investigation. The study design was approved by Institutional Animal Ethics Committee (IAEC) (Reg. No.-118/1999/CPCSEA). The animals were housed in standard environmental conditions of temperature (21±2^o), humidity (55±10%) and a 12 h light-dark cycle. Rats were supplied with standard pellet diet and water *ad libitum*. Diabetes was induced to rats by injecting 150 mg/kg of alloxan monohydrate intraperitoneally in 0.9% w/v NaCl[5]. After 72 h of injection blood glucose level was measured. Rats having blood glucose level above 225 mg/dl were selected and grouped in to four groups consisting of 6 animals each. A 0.3% w/v solution of carboxymethylcellulose was used as vehicle for extract and drug. The first and second group received the extract of *P. mollisima* at a dose level of 100 mg/kg and 200 mg/kg respectively, (LD_{50} was found to be 825 mg/kg[6]), the third group received reference standard, (phenformin (300 mg/kg)) and the fourth was treated only with vehicle.

After 5 d of the treatment blood samples were collected from rat tail vein under mild anesthesia and serum was prepared by centrifugation. The blood sugar level was measured in autoanalyser by using Ecoline glucose kit.

Data were expressed in Mean±SEM and the obtained data were subjected to one way ANOVA followed by Dunnet's 't' test[7]. The results are given in Table 1. P<0.001 implies the significance.

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TABLE 1: EFFECT OF ETHANOLIC EXTRACT OF *PASSIFLORA MOLLISSIMA* IN ALLOXAN INDUCED DIABETIC RATS

Group	Treatment	Dose mg/kg	Blood glucose concentration (mg/dl)			Percentage reduction
			0th day	3rd day (alloxan)	8th day (drug)	
I	*P. mollisima*	100	67.16±6.45	298.84±28.7	179.4±18.69*	39.9
II	*P. mollisima*	200	56.12±3.56	236.68±16.14	136.6±2.76*	42.3
III	Phenformin	300	63.5±2.43	272.66±22.18	135.5±15.53*	50.36
IV	Vehicle control	....	59.68±3.61	305.66±30.33	361.83±30.73	-18.4

Six animals were used in each groups and values are expressed in Mean±SEM. Significance levels *P<0.001 (Dunnet's 't' test), compared to vehicle treated groups and the vehicle used was 0.3% w/v of CMC

The ethanol extracts significantly (P<0.001) reduced blood sugar level of hyperglycemic animals when compared to untreated group (Table 1). Chemically alloxan is 2,4,5,6-tetra-oxohexahydropyrimidine. It is cytotoxic to beta-cells of islets of Langerhans and is capable of inducing chemical diabetes in a wide variety of animal species through damage of the insulin secreting cells[8,9]. The experiment revealed that the plant extract significantly (P<0.001) decreased the glucose level in hyperglycemic animals. The glucose lowering activity observed in the diabetic animal may be due to the inhibition in renal glucose reabsorption[10] or stimulation of insulin release resembling the oral hypoglycemic sulfonylureas or insulinotropic activity in experimental diabetes[11] or by some other mechanisms. This study provides preliminary pharmacological evidence for the tribal claim that this plant is antidiabetic.

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Accepted 25 July 2007
Revised 12 February 2007
Received 18 April 2006
Indian J. Pharm. Sci., 2007, 69 (4): 570-571