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Evaluation of antidiabetic activity on whole plant of Vanda Tessellate (Roxb) Hook

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ABSTRACT

In the present study, an attempt was made to investigate phytochemical evaluation and *in vivo* Antidiabetic studies on the whole plant of vanda tessellate (Roxb) Hook.

Keywords: Vanda tessellate, Antidiabetic activity

INTRODUCTION

Based on the material of origin, Ayurvedic medicines are divided into three classes, namely herbal, mineral and animal. Among this, herbal formulation has gained great importance and rising global attention recently. Ayurveda has about 700 type of plants listed in its medicinal systems. The use of such herbals is mentioned in the ancient Ayurvedic literature such as Chakara Samhita and Sushruta Samhita. The discovery of herbals is further complemented with knowledge on the method of isolation, purification, characterization of active ingredients and type of preparation. The term "herbal drug" determines the part/parts of a plant (leaves, flowers, seeds roots, barks, stems and etc.) used for preparing medicines.

The roots of vanda tessellate are used as antipyretic, dyspepsia, bronchitis, piles, inflammation, externally for rheumatism, nervous diseases.Juice of leaves given in otitis and paste as febrifuge.It contains β-sistosteral, γ-sistosterol, resins, tannins, alkyl perulate, glycosides, sistosterol D glucosides and terpenoids.

Diabetes Mellitus is a chronic disorder characterized by impaired metabolism of glucose and other energy yielding fuels, as well as the late development of vascular (involving small and large blood vessels) and neuropathic complications. Regardless of the cause, the disease is associated with common hormonal defect, namely insulin deficiency, which may be total, partial, or relative when viewed in the context of coexisting insulin resistance [1]. Incidence of each type of diabetes varies widely throughout the world. There are more than 177 million persons with diabetes in the world today and by 2025, this number is expected to approach 300 million. Therefore, it has become necessary to look for an economical as well as therapeutically effective treatment for diabetes mellitus in developing and undeveloped countries. Diabetus mellitus can be divided into two groups based on their requirements for insulin:-

- Type 1: Insulin- dependent diabetes mellites (IDDM)
- Type 2: Non-insulin dependent diabetes mellitus(NIDDM)

Type 1: Insulin- dependent diabetes mellites (IDDM)

Cause

A burst of insulin secretion normally occurs after ingestion of a meal in response to transient increase in the levels of circullating glucose and amino acids. In the post operative period, low, basal levels of circulating insulin are maintained through beta cell secretion. However type one diabetes has virtually no functional beta cells [2].

Treatment: Type 1 diabetic must rely on exogenous(injected) insulin in order tp control hyperglycemia, maintain acceptable levels of glycosylated hemoglobin (HbA_1C) and avoid ketoacedosis. The goal in administering insulin to type 1 diabetic is to maintain blood glucose concentrations as close to normal as possible and to avoid wide swings in blood glucose level that may contribute to long term complications.

Type 2: Non-insulin dependent diabetes mellitus (NIDDM)

Most diabetic are in this category, metabolic alterations observed are milder than those discribed for IDDM [e.g NIDDM patients typically are not ketotic], though long term clinical consequences can be just as devastating e.g. vascular complications and subsequent infections can lead to amputation of lower limbs [3].

Cause

In NIDDM pancrease retains some beta cell function, resulting in variable insulin levels that are insufficient to maintain glucose homeostatis. Patients with type 2 diabetes are often obese [4].

Type-2

Diabetes is freequently accompained by target organ insulin resistence that limits responsiveness to both endogenous and exogenous insulin. In some cases insulin resistence is due to a decreased number of mutations of insulin receptors [5].

Treatment

The goal in treating type 2 diabetes is to maintain blood glucose concentrations with normal limits and to prevent the development of long term complications of thhe diseases. Weight reduction, exercise and dietory modification decrease insulin resistence and correct the hyperglycemia of type 2 diabetes in some pateints. Oral hypoglycemic agents and insulin therapy may requiered to acheive satisfactory serum glucose levels [6-12].

Botanical information and ethanomedical information about plant used

Scientific name : Vanda tessellate(Roxb)Hook.
Kingdom :Plantae
(unranked): Angiospermis
(unranked):Monocots
Order :Asparagales
Family :Orchidaceae
Subfamily :Ebidendroideae
Tribe :Vandeae

Genus :Vanda
Species: V.tessellata

MATERIALS AND METHODS

Collection of plant material

The plant *vanda tessellate* collected from western ghat, gobi, erode. after collection the plant was washed thoroughly with running tap water, cut into small pieces and shade dried. The dried material was then pulverized separately into coarse powder by a mechanical grinder. The resulting powder was preserved in the department for further study.

METHOD

Animal used

Adult albino rats (wister strain) of either sex with weighing 150-180gm were used. The animals were maintained on the suitable nutritional and environmental condition throughout the experiment. The animals were housed in polypropylene cages with paddy house bedding under standard laboratory condition for an acclimatization periods of 7 days prior to performing the experiment. The animals had access to laboratory chow and water *ad libitum*.

Effect of alloxan induced hyperglycemia

Hyperglcemia was induced by a single intra peritonial injection of freshly prepared aqueous solution of alloxan monohydrate (SD fine chemicals Pvt.Ltd., Biosar) 150mg/kg, to overnight fasted rats. Control rats recieves similar volume of vehicle, normal saline(2ml/kg body weight) alone. Animals that did not develope hyperglycemia after 48 hrs of alloxan injection were rejected and new animals were used. Immediately after confirmation of diabetes, rats were classified into six groups of six rats each. Group I received normal saline and served as control. Group II treated with alloxan monohydrate 150mg/kg served as diabetic control. Group III&IV treated ***WHOLE plant methanol extract*** (100mg/kg &200mg/kg) respectively. Group V treated with glibenclamide(5mg/kg)served as reference standard. Treatment continued for 21 consecutive days. Before the treatment (0day), and at the end of 7^{th} and 21^{th} day plasma levels were estimed using the glucose oxidase method. The results were analysed byy student 't' test.

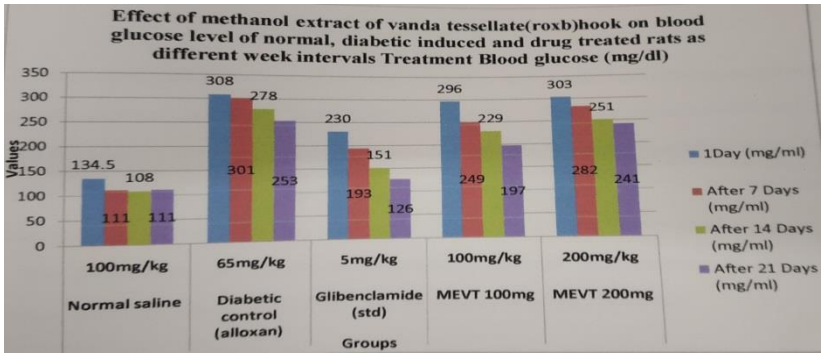
Table no.1: Antihyperglycemic activity of vanda tesselleta on control and alloxan induced diabetic rats

S.no	Groups	Dose mg/kg	Treatment (days) (Mean +/- SE, n=6)			
			1	7	14	21
1	Normal saline	100mg/kg	134.5±3.9**	111±3.78**	108±4.29**	111±4.38**
2	Diabetic control(alloxan)	65mg/kg	308 ± 3.4*	301±2.70*	278±6.75*	253±5.6**
3	Glibinclamide(std)	5mg/kg	230± 9.83**	193±2.71**	151±5.57**	126±4.56**
4	MEVT 100mg	100mg/kg	296 ± 2.8***	249±5.87**	229±8.27**	197±6.81**
5	MEVT 200mg	200mg/kg	303± 2.11*	282±6.92*	251±9.65**	241±6.09**

RESULTS AND DISCUSSION

The effect of vanda tessellate(roxb)hook plant extract on blood sugar level of alloxan induced diabetic rats was given on table 1. Oral administration of vanda tessellate (roxb) hook whole plant extract (100 & 200mg/kg) was evaluated for its anti-diabetic activity against alloxan induced diabetes in rats. Blood sugar levels were determined on 1^{st}, 7^{th},14^{th} and 21^{th} day after the test drug administration. The doses 100 mg/kg of vanda tessellate (roxb)hook whole plant extract showed significant ($P<0.01$) decrease in the blood sugar level in alloxan induced diabetic rats. The effects were comparable with the the effect produced by the glibinclamide treated group.

Graph shows the effect of methanol extract of vanda tessellate(roxb)hook on blood glucose level of normal, diabetic induced and drug treated rats as different week intervals treatment blood glucose(mg/dl).



CONCLUSION

The methanolic extract of vanda tessellata at dose pf 100mg/kg possessed significant antidiabetic activity when compared to 200mg/kg. And its concluded that in the present study on the whole plant methanolic extract of vandatessellata showed that good antidiabetic activity when compared with standard drug, Glibinclamide. However the future study may also include cataloguing, standardizing for quality control and all developing new drugs/pharmaceuticals keeping the desease and cost factor in view.

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