IJPSR (2010), Vol. 1, Issue 9 **(Research Article)**

INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH

Received on 14 May, 2010; received in revised form 13 July, 2010; accepted 14 August, 2010

PROTECTIVE EFFECT OF ETHANOLIC EXTRACT OF *SOLANUM NIGRUM* ON THE BLOOD SUGAR OF ALBINO RATS

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Keywords:

Solanum nigrum,

Albino rats,

Blood sugar,

Hyperglycemia,

Antidiabetic property

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ABSTRACT

In recent times, focus on plant research has increased all over the world and a large body of evidence has collected to show immense potential of medicinal plants used in various traditional systems. *Solanum nigrum* (commonly called Makoi) is also a medicinal plant. A dietary intake of *Solanum nigrum* supplies our body with nutrients that offer protection against numerous diseases. All parts of this plant are used in the traditional medicine as a remedy for treating various diseases like, cough, cold, asthma, skin diseases and liver problem. Now a day, Diabetes mellitus has become a real problem of public health in developing countries. This is a metabolic disorder characterized by disarrangements in carbohydrate, protein and fat metabolism caused by the complete or relative insufficiency of insulin secretion and /or action. This is due to defective or deficient insulin secretary response. This results into impaired glucose use, which is a characteristic feature of diabetes mellitus i.e. resultant hyperglycemia. Elevated blood glucose level causes dehydration of the tissue cells as glucose does not diffuse easily through the pores of cell membrane and increased osmotic pressure. Present investigation is therefore designed to determine the effect of crude ethanolic extract of *S. nigrum* on blood sugar of albino rat after daily oral administration of dose at the level of 250mg/kg b. wt. for five and seven days respectively. It was noticed that the chronic administration for longer duration leads to significant decrease in blood sugar compared to control. Thus it can be concluded that *Solanum nigrum* also has the anti- diabetic property.

INTRODUCTION: In recent times, focus on plant research has increased all over the world and a large body of evidence has collected to show immense potential of medicinal plants used in various traditional systems. *Solanum nigrum* is also a medicinal plant. It has been used widely as medicinal and food plants despite their reputation for being poisonous. The unripe fruit of *S. nigrum* contain the highest concentration of toxin particularly *Solanine* [1]. The level of toxin in the berries is greatly reduced by ripening [2, 3]. The ripe berries are eaten raw as fruits and are used in pies and preservative in many regions of the world. All parts of this plant are used in the traditional medicine as a remedy for treating various diseases like, cough, cold, asthma, skin diseases and liver problem.

Now a day, Diabetes mellitus has become a real problem of public health in developing countries [4]. It is actually a chronic disorders related to abnormality of carbohydrate, fat and protein metabolism. This is due to defective or deficient insulin secretary response. This results into impaired glucose use, which is a characteristic feature of diabetes mellitus i.e. resultant hyperglycemia.

Elevated blood glucose level causes dehydration of the tissue cells as glucose does not diffuse easily through the pores of cell membrane and increased osmotic pressure. Present investigation is therefore designed to determine the effect of crude ethanolic extract of *S. nigrum* on blood sugar of albino rat after daily oral administration of dose at the level of 250mg/kg b. wt. for five and seven days respectively. It was noticed that the chronic administration for longer duration leads to significant decrease in blood sugar compared to control.

MATERIALS AND METHODS:

Collection and Extraction of Plant Material :
Whole plant of *Solanum nigrum* except root was collected locally from the Bundelkhand region and dried in shade till total moisture is removed from the plant. These air dried plants were powdered in an electric grinder. The extraction process was done with the help of Soxhlet apparatus. Solvent was ethanol. Extracts were kept in desiccators for the removal of remaining moisture.

Animals: Mature albino rats of *Sprague- Dawley* strain weighing about 150-200gm were obtained from the defense research laboratories, Gwalior and were used for study. They were fed with standard rat pellet diet (Amrut, Delhi) and water *ad- libitum* and maintained under standard laboratories conditions temperature 24-280c,relative humidity 60- 70%. The study was permitted by the Institutional animal ethics committee (IAEC) of Bundelkhand University, Jhansi and with permission from committee for the purpose of control and supervision of experiments on animals (716/o2/9/CPCSEA).

Experimental Protocol: A dose at a concentration of 250mg/kg b. wt. was prepared. Animals were divided into two groups each having 5 rats. Group I rats received normal standard diets and vehicle only. Group II is experimental, which receive different dose of *solanum nigrum* extract.

Blood Sampling: The rats were fasted over night and sacrificed under light anesthesia (ether inhalation) at the end of 5 and 7 days after treatment. Blood samples were collected from the retro- orbital plexus of treated rats. The samples were taken in to tubes with anticoagulant. From this sample blood sugar was estimated by a standard method of Asatoor and King [5].

RESULT AND DISCUSSION: The blood sugar levels of the control rats remained almost static during 7 days (**Table 1**). When oral dose (250mg/kg b. wt.) of *Solanum nigrum* was administered daily for 5 days and 7 days, there was a successive decrease in the blood sugar level.

TABLE 1: EFFECT OF DAILY ADMINISTRATION OF *S.NIGRUM* EXTRACT ON THE BLOOD SUGAR (MG/DL OF BLOOD) OF ADULT ALBINO RATS

N=5	Blood Glucose Level (mg/dl of blood)	
	5th day	7th day
Control (vehicle only)	102±4.01	99±3.90
Treated with *Solanum nigrum* (250mg/kg b. wt.)	85±2.89	73±3.04

Values are expressed as mean ± S.E. P≤0.05

Medicinal plant extracts have been valuable anti-diabetic agents and may involve one or more active components responsible for blood glucose reduction [6, 7]. The preliminary phytochemical screening of these fractions of *S. nigrum* aqueous extract revealed the presence of alkaloids and *solanines* which may be responsible for the observed antidiabetic effects of these fractions by possibly stimulating insulin release from pancreatic beta cells. In consonant with this study, some researchers reported that alcoholic extract of leaves of *Cinnamomum tamala* (Bayberry) produced hypoglycemic activity in alloxan induced diabetic rats when administered orally for two weeks at a dose of 250 mg/kg [8].

Mohammad et.al.[9] has earlier reported the hypoglycemic activity of aqueous extract of *G. lucidum* in Wistar rats. Over 400 medicinal plants are available globally for the medication of *diabetes mellitus*, with a few having been subjected to scientific authentication to ascertain their effectiveness as anti-diabetic agents [10]. Substances with hypoglycemic properties would be effective in the management of diabetes mellitus [11]. This protective effect of the extract may be mainly attributed to steroidal saponins, namely nigrumin I and II, which may possess antioxidant and detoxifying effects. Therefore, a dietary intake of *Solanum nigrum* fruits supplies our body with nutrients that offer protection against numerous diseases. Further studies are warranted to elucidate the mechanisms of action and to explore its medicinal value.

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