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Antidiabetic Effect of Burdock Tuber (*Arctiumlappa* L.) Extract on Aloxan Diabetic

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Diabet is one of the most disorders in endocrine part of pancreas. use some plants whit therapeutic effect such as lapa major is a route for remedy in diabet . this study was done to virify effect of root extract of lapa major. In this investigation 36 male vistrar rat were divided into 6 group randomly. Except for group 1, in all group diabet was induced .group 2 received insulin and in group 4,5 and 6 extract was administration in dose of 100, 200 and 300 mg/kg. blood samples were collected on day 7, 14 , and 21 .result were analyzed by anova test . results indicated that the level of blood glucose were increased after induced of diabet . the level of blood glucose in group which received insulin and in all diabetic groups in day 21 decresedsignhficantly . in the other groups (4, 5) the level of glucose decreased , but not significantly, insupoosed that, because of low number of cases or low number of days that extract was administration.

Key words: Antidiabetic, *Arctiumlappa* L.,ethanolic extract

Rats Diabetes mellitus, often simply referred as diabetes, is a group of metabolic diseases in which a person has high blood sugar, either because the body does not produce enough insulin, or because cells do not respond to the insulin that is produced. Diabetes mellitus is one of the common metabolic disorders, and 2.8% of the population suffer from this disease throughout the world and it may cross 5.4% by the year 2025. diabetes mellitus is group of many different disease because, hyperglycemia causes damage to eyes, kidneys, nerves, heart and blood vessels. Diabetes is one of the causes of renal end-stage disease. It is caused by inherited and/or acquired deficiency in production of insulin by the pancreas or by the effectiveness, uncontrolled high blood sugar leads to the development of kidney damage especially high blood pressure is also present. Hyperglycemia generates more reactive oxygen species and attenuates anti-oxidative mechanism through glycation of the scavenging enzymes. Therefore, oxidative stress has been considered to be a common pathogenic factor of the diabetic. Traditionally herbal folk, medicine is most popular, which have antioxidant property, and 1000 side effects. Due to antioxidant property and these drugs give good results and reduce the blood glucose level, therefore, some herbal folk medicinal plant have been reported

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which are useful in diabetes treatment. Now days more than 400 plants are being used in different forms for hypoglycemic effects all the claims practitioners or users therefore a proper scientific evaluation & Screening of plant by Pharmacological tests followed by chemical investigation is necessary (Shukla *et al*., 2011; Dixit *et al*., 2006; Patil *et al*., 2011). Various studies have shown that of free radicals and decrease in antioxidant potential due to persistent hyperglycemia. This leads to oxidative damage of cell components such as proteins, lipids and nucleic acids (Rolo and Palmeira, 2006). diabetes mellitus is associated with increased formation Besides, drugs classically used for the treatment of diabetes include, insulin, sulphonylureas, biguanides and thiazolidinediones. Recently, many investigations indicated that supplementation with nature antioxidants may alleviate the oxidative damage in diabetes (Naziroglu and Butterworth, 2005; Kamalakkannan and Prince, 2006). In particular, it is recognized that consumption of natural antioxidants of fruits, vegetables and grains are important for the prevention of chronic illnesses in diabetes patients (Dixit and Kar, 2010; Singh *et al*., 2005). A considerable interest has grown in finding both hypoglycemic and antioxidative properties of natural antioxidants for the treatment of diabetes (Rajkumar *et al*., 1991). Hence, this paper was designed to investigate antidiabetic activity of burdock extract in alloxan diabetic rats.

Preparation of burdock ethanolic extracts (BRE)

Fresh roots of burdock were cleaned, dried in shade and finelypowdered. The powder was defatted with petroleum ether and thenextracted with 70% ethanol (1:10, w/v) for 72 h at roomtemperature. Filtered with Whatman paper No.1 and the residuewas re-extracted twice till exhaustion, the combined filtrates wasconcentrated under vacuum at 50°C and the resulting filtrate were freeze-dried (Boyikang Refrigerated Vapor Trap, SD-1A-50). Theextract yield was 16.5% (w/w); the obtained extract was stored at -20°C until use.

Induction of Diabetes Mellitus in rats

Diabetes is induced by injecting Alloxanhydrate ($C_4H_2N_2O_4.H_2O$ (LOBA CHEMIE PVT LTD, Mumbai)80mg / kg body weight, subcutaneously in albino rats after 12 h of continuous fasting.[80]Fasting blood sugar wasevaluated by using Glucometer (SD Fine chemicals) after 72h. Rats whose blood glucose levels remained <300 mg/dl fomore than one week following the initial injection of alloxan received a second dose of alloxan to maintain a bloodglucose level >300 mg/dl for the duration of the study (Oi *et al*., 1997).

Experimental design and treatment schedule

24 diabetic rats and six normal rats were randomly divided into five groups (n = 6). The extract was administered for 21 days. They included: group I: normal control rats administered saline (0.9%, w/v); group II: diabetic control rats administered saline (0.9%, w/v); group III: diabetic rats administered glibenclamide (100 mg/kg b.w.) daily for 14 days; group IV: diabetic rats administered BRE (200 mg/kg b.w.); and group V: diabetic rats administered BRE (300 mg/kg b.w.). The effects of administration of BRE in diabetic rats were observed by measuring fasting blood glucose and changes in body weight. Fasting blood glucose was estimated on day 7,14 and 21 of BRE administration. Serum insulin level was estimated by using a commercial diagnostic radio immunoassay kit (Beijing North Institute of Biological Technology, China).

Statistical analysis

Data were statistically evaluated using one-way analysis of variance followed by Duncan's test as a post-analysis of variance test. The values were considered significant when $p<0.05$.

RESULTS

In table 1 all of the data were expressed in SI units and analyzed by repeated measurements ANOVA, LSD and T-test using SPSS/PC software (Norusis, 1993). All values were expressed as mean and standard error of mean (SEM), and $P<0.05$ was seen as statistically significant., Also as is indicated in Table 1 mean of Blood glucose are studied between different groups in rats. According to this study on day 7, 14 and 21 the average amount of blood glucose in group 3 which received insulin compared to the control group(2) was significantly decreased (pd"0.05) but on day

21 not only The average amount of blood glucose in group 3, but also The average amount of blood glucose in group 4,5 and 6 compared to the control group(2) was significantly decreased. ($p \leq 0.05$)

This data showed that after 21 day , the level of blood glucose in group which received extract in dose of 100, 200 and 300 mg/kg was significantly decreased and this extract can act like insulin.

Table 1.

	Group	Three	Seven	Fourteen	Twenty
(1) health	Mean	129.5000	128.3333	138.6667	144.6667
	Std. Error of Mean	6.94142	2.15510	4.29470	5.46911
(2) serum	Mean	400.8333	413.0000	433.6667	497.6667
	Std. Error of Mean	63.56960	80.99095	85.74445	79.60346
(3) insulin	Mean	341.6000	172.0000*	147.0000*	128.0000*
	Std. Error of Mean	70.17735	16.60422	3.04959	5.80517
(4)100.00	Mean	272.0000	285.0000	288.8333	272.0000*
	Std. Error of Mean	62.57209	68.64984	79.92264	85.82968
(5) 200.00	Mean	475.6667	481.1667	458.6667	293.5000*
	Std. Error of Mean	68.49023	66.02899	67.13552	91.79279
(6) 300.00	Mean	266.8333	277.1667	265.6667	185.6667*
	Std. Error of Mean	71.86906	72.66426	65.84308	62.53408

DISCUSSION

The study results showed that BRE had a marked hypoglycemic activity by lowering the blood glucose levels in STZ-induced diabetic rats, and by the improvement of the glucose tolerance but not fasting blood glucose in normoglycemic rats. STZ is an antibiotic that can cause pancreatic ²-cell destruction. STZ-induced diabetic rat is one of the animal models of insulin dependent diabetes mellitus or type I diabetes mellitus. In this model, STZ significantly induced hyperglycemia accompanied by hypoinsulinemia, which arises from irreversible destruction of the ²-islet cells of the pancreas through its generation of cytotoxic oxygen free radicals (Szkudelski, 2001). In this study, oral administration of BRE 14 days produced a significant increase in insulin levels along with a decrease in blood glucose levels in STZ-induced diabetic rats, exhibiting its protective potential for regulating diabetes mellitus. The elevation in serum insulin levels may be due to substances present in BRE which promote insulin secretion by the stimulation of a regeneration process and protect the remaining beta cells from further deterioration. Under normal conditions, insulin promotes intracellular glycogen deposition by stimulating glycogen synthase (Eliza *et al*., 2009) in the diabetic state due tolack of insulin which results in the inactivation of glycogensynthase system as well as reduced insulin-inducedglucose utilization by the tissues (Munoz *et al*., 1996). Inthis study, it was shown that hepatic and skeletal muscleglycogen content reduced drastically in STZ-diabetic ratsTreatment of BRE to diabetic rats significantly improvedglycogen content of liver and muscles. Induction of diabetes with STZ also leads to loss of body weightwhich may be due to increased catabolism of glycogen inmuscle, liver and loss of tissue proteins (Rajkumar *et al*., 1991). After 14 days of BRE treatment, body weight oSTZ-diabetic rats was improved. An increase in glycogencontent and body weight of diabetic rats might be due to an improvement in insulin secretion and glycemic control.

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