



ISSN No: 0975-7384
CODEN(USA): JCPRC5

J. Chem. Pharm. Res., 2010, 2(5):458-460

Hyperglycemic activity of *Eugenia jambolane* in Streptozotocin induced diabetic rats

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ABSTRACT

Diabetes mellitus is a metabolic disorder in the body characterized by hyperglycemia altered metabolism of lipids, carbohydrates and proteins with an increased risk of complications of vascular disease.

Key words: Diabetes mellitus, Hyperglycemia , metabolism.

INTRODUCTION

Diabetes mellitus , a chronic metabolic disorder , has now become an epidemic , with a world wide incidence of 5% in the general population. The fundamental defect in diabetes mellitus is an absolute or relative lack of biologically active insulin , which results in the impairment of uptake and storage of glucose , reduced glucose utilization for energy purpose. Insulin deficiency causes excessive catabolism of protein and the amino acids that released are utilised for gluconeogenesis and it also stimulates lipolysis in the adepose tissue and give rise to hyperlipidemia and fatty liver.

The present study reports some herbal drug isolated from the two important plants of Vidisha district of M.P. The drug have been isolated in laboratory using Petroleum ether, Alcohol and Water as solvents. The drugs are being chemically analysed which will be tested in Albino rats induced diabetes by streptozotocin. The drug were found to decrease the glycolytic activity in the Islets cells.

EXPERIMENTAL SECTION

Eugenia jambolane commonly Known as “**Jamun**” belonging to the family Myrtaceae. This plants extract has been shown as growth inhibitor to certain diabetes. Insulin plant is used in India to control diabetes and it is known that diabetic people eat one leaf daily to keep their blood glucose low. After proper identification in the Botany department, powdered of the plant was procured in laboratory stock.

Preparation of Extracts

The seeds of the plant were collected in rainy season and were dried under shade. Coarsely powdered and were packed separately in airtight containers.

Extraction

The dried seed material was powdered to 60 mesh size. The powdered mass of each part was defatted with petroleum ether (60 - 80°C) followed by extraction with 90% Alcohol and Water. The yield was recorded as 12.35 and 10% . The dried alcoholic extract was formulated as suspension using distilled water and the strength of the suspension adjusted according to the dose administered (200 mg / kg body weight).

Alcoholic extract and water extract of seeds were given orally twice a day for 2 weeks , in a dose of 200 mg / kg body weight with the help of gastric catheter.

Chemical analysis of Crude drug

The biologically active compound was separated from the crude extract by column chromatography. It was following by TLC using MeOH : H₂O (13 : 7). This gave three fractions. Each fraction was further chromatographed till a single spot was obtained as shown in Table – 1.

Induction of Diabetes

The animals were starved overnight then diabetes was induced by a single intravenous injection of a freshly prepared streptozotocin solution (50 mg / kg body Wt.). Streptozotocin was dissolved in 0.1 M freshly prepared Citrate buffer solution (pH 4.5). The animals were allowed to drink 5% glucose solution overnight . After 5 days streptozotocin administration rats showed diabetes. Control rats were injected with citrate buffer alone. The seed powdered extract in aqueous solution was administered orally through gastric catheter at a concentration of 200 mg / kg body weight / rat / twice a day for 15 days.

Experimental design

The animals were divided into four groups for the analysis of biochemical parameter. Each group has 06 animals.

Group I : Normal Control Rats.

Group II : Diabetic Control Rats.

Group III : Diabetic rats treated with Eugenia jambolane extract 200 mg / kg body Wt. orally.

Group IV : Diabetic treated with Standard drug.

Table – 1: TLC of the Crude Extract of *Eugenia jambolane*

Solvent system	Obtained fraction	Spot No.	Behaviour		Rf value of each spot
			Visible	UV Light	
MeOH : H ₂ O (13 : 7)	C1	Spot 1	Light Yellow	Brown	0.42
		Spot 2	Yellow Brown	Yellow	
		Spot 3	Dark Brown	LightBrown	

RESULTS AND DISCUSSION

In the present work we describe the hyperglycemic activity of the ethanolic and aqueous extracts of *Eugenia jambolane* in STZ induced diabetic rat as shown in the (Table – 2). The result of present study indicates that the alcoholic extract friction was found to be quite active, decreasing the blood glucose level -27.2%. Jang et al (2000) found that increased oxidative stress involved in the pathogenesis and progression of diabetic tissue damage. Shrivastava et al (2003) have reported that 70% ethanolic extract of *Butea monosperma* showed increasing insulin in the β – cells of pancreas. Latha and Pari (2004) have reported the effect of aqueous extract of *Scoparia dulcis* on blood glucose level in the rats. Similarly, Hussain (2002) has reported to reversal of diabetic retinopathy in Streptozotocin induced diabetic rats using traditional Indian antidiabetic plant *Azadirachta indica*. Our laboratory is recognized by CPCSEA approval No. 804/03/CA/CPCSEA.

Table – 2: Effect of Alcoholic and Water extract of seed powdered of *Eugenia jambolane* on the blood glucose level in Streptozotocin induced diabetic rat

Group	Doses (mg/kg)	Glucose level (mg/dl) after Streptozotocin		% after drug Treatment
		Before drug treatment	After drug treatment	
Normal control	-	269.15 ± 17.57	305.66 ± 31.32	+13.56
Diabetic control	15	284.67 ± 30.16	140.60 ± 33.14	-50.60
Alcoholic (methanol)	200	283.00 ± 21.28	206.00 ± 23.54*	-27.2
Water	200	257.00 ± 15.31	223.12 ± 12.36	-13.18

* $p < 0.05$ in comparison to corresponding value before treatment

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