Research Article

Anti-Hyperglycemic activity of *Ficus racemosa* Linn leaves

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ABSTRACT
To evaluate the anti-hyperglycemic activity of ethanol (95%) and petroleum ether extract of *Ficus racemosa* leaves. Both extracts were tested on glucose loaded and streptozotocin induced diabetic rats. Blood glucose levels were evaluated at 0h, 1, 3, 5 hours and 0 , 1st, 3rd , 7th day intervals, respectively. In both test samples extracts at a dose of 300mg/kg /oral, has shown good antihyperglycemic activity in normal and streptozotocin induced diabetic rats.

Key words: Streptozotocin, *Ficus racemosa* Linn. **,** Antihyperglycemia, Glibenclamide

INTRODUCTION

Diabetes mellitus is a chronic disease characterized by high blood glucose levels due to absolute or relative deficiency of circulating insulin levels. Though different types of oral hypoglycemic agents are available along with insulin for the treatment of diabetes mellitus, there is increasing demand by patients to use the natural products with antidiabetic activity. Insulin cannot be used orally and continuous use of synthetic drugs causes side effects and toxicity[1-3]. Herbal drugs are prescribed widely even when their biologically active compounds are unknown, because of their effectiveness less side effects and relatively low cost[4]. In the present study attempts were made to study detail pharmacological, particularly anti-hyperglycemic activity of the leaves of *Ficus racemosa* belonging to family *Moraceae*. The milky juice (latex) from the plant *Ficus racemosa* is reportedly used for treating piles and diarrhoea[5]. The fruits are considered astringent, stomachic and carminative. The root sap is used for treating *diabetes*, both the root and fruit are credited with hypoglycemic activity. The root juice is reportedly useful for treating dysentery. The stem bark is used to treat menorrhagia, leucorrhoea, gonorrhea, urinary diseases, hemorrhage and skin diseases. Both the fruits and bark are used extensively in Ayurvedic and Unani medicine[6]. In siddha the bark, fruits and latex are used to treat constipation, anaemia and dysentery[7-9].

Ficus racemosa documented to posses anti-inflammatory[10-12], anti-pyretic[13], antidiuretic[14], antibacterial[15], hepatoprotective[16], leukemia[17], wound healing[18] and antifilarial[19]. The bark of *Ficus racemosa* is reported to possess the Antidiabetic activity[20].

No reports were found on antidiabetic activity of the ethanolic and Petroleum ether extracts of leave of *Ficus racemosa* Linn. But the leaf of this plant contains sterols, triterpenoids in Petroleum ether extract and alkaloids, tannins and flavonoids in ethanolic extract. So, the objective of present work is to evaluate the anti-hyperglycemic activity of Petroleum ether (60^0-80^0C) and (95%v/v) ethanolic extract of *Ficus racemosa* (leaves) on normal and diabetic albino rats of either sex.

MATERIAL AND METHODS

Plant material

Ficus racemosa leaves were collected from Satpuda ranges Dist. Jalgaon (Maharashtra).The plant material was identified and authenticated by Dr.P.S.N.Rao Joint Director from the Botanical Survey of India, Pune. Voucher No. is (VVP1) dated 09/11/2005. and letter No.BSI/WC/Tech/2005/728

Extraction

Powdered leaves were extracted with Petroleum ether (60^0-80^0C) at 50^0C, and 95%v/v Ethanol (Made in china changshu

yangyuan chemical) at 70^{0}C temperature with loaded using soxhlet apparatus. Each extract was concentrated by distilling the excess solvent to obtain the crude extractives .

Chemicals used

Glibenclamide was a generous gift sample from Themis laboratories wagle estate Thane, Mumbai. Streptozotocin was obtained from Himedia Laboratory Limited, Mumbai, India. The glucose oxidase/peroxidase reagents kit was purchased from Dr. Reddy's Laboratories Hyderabad. All other reagents used were of analytical grade.

Evaluation of anti-hyperglycemic activity of extracts

Animals

Normal healthy Albino rats (200-250 g) of Wistar strain of either sex were used for present investigations. Animals were housed under standard environmental conditions at temperature (25±2°C), humidity (55±10%) and light and dark (12:12 h.) Rats were supplied with standard pellet diet (Goldmuhar Brand, Lipton India Ltd., Mumbai.) and water *ad libitum*. The experimental protocol and animal house has been approved by the institutional animal ethics committee and by the animal regulatory body of the Indian Government (Registration No.652/02/a/ CPCSEA, dated 25/01/1999)

Treatment groups

The animals were divided into four groups and each group consists of 6 animals.

Group-1: Control Group (Non-diabetic).**Group-2:** Standard Group- Diabetic rats were treated with Glibenclamide[20] orally (10 mg/kg/day). **Group-3:** Diabetic rats were treated with suspension (triturate extract with acacia and saline solution) of petroleum ether extract orally (300 mg/kg/day).**Group-4:** Diabetic rats were treated with suspension of ethanolic extract orally (300 mg/kg/day) [11, 20]. Then extracts were administered to a group of 6 diabetic rats orally, on the 6th day of *diabetes* induction. Before the treatment with extract, the *diabetes* induced rats were starved for 16 -18 h. For acute study, blood glucose levels were determined at 0, 1st, 3rd, and 5th h and for the sub acute study blood glucose levels were determined at 0,1st, 3rd and 7th day.

Induction of *diabetes*

The experimental of *diabetes* was induced by intraperitoneal injection of 50mg/kg, streptozotocin[21] in sterile saline solution. Each group were subjected to overnight fasting then blood samples of each groups were collected from retro-orbital plexus by means of sterilized glass capillary tubes under light ether anesthesia. Then the blood was cold centrifuged at 2800rpm for 2 min. The glucose oxidase/peroxidase method was used for the determination of blood glucose level in the rats by colorimetric estimation method (490-550 nm). After 5days of streptozotocin injection, the hyperglycemic (glucose level>300mg/dl) rats were separated and used for the study.

Table I: **Showing decrease in blood glucose level in first day hours of all Extracts**

Treatment	Dose mg/kg	blood glucose level (mg/dl)			
		0 h.	1 h.	3 h.	5 h.
Control(saline)Group I	—-	275.15±1.87	276.12±0.78	269.21±2.22	266.02±3.10
Standard(Glibenclamide)Group II	10	282.00±2.80	242.27±1.63	201.42*±4.21	159.11*±0.99
Pet. Ether Extract Group III	300	301.34±3.41	299.72±4.72	292.67±2.91	287.12±3.55
Ethanolic Extract Group IV	300	282.18±5.59	257.68±6.75	210.53±3.02	190.58*±2.12

n = 6, values are presented as mean ± standard deviation, P < 0.05 with respect to corresponding control, One- way ANOVA (Dunnett's test)Group II, III, IV are compare with Group I.*

Figure 1: Showing decrease in blood glucose level in first day hours of all Extracts

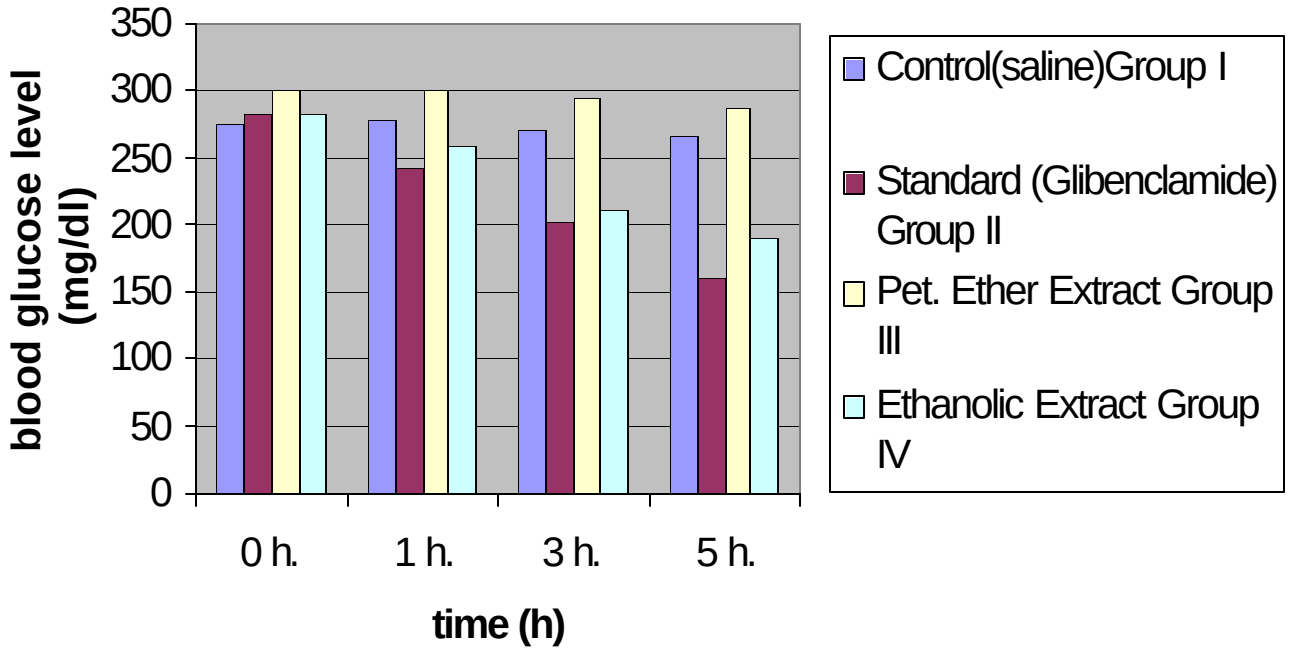
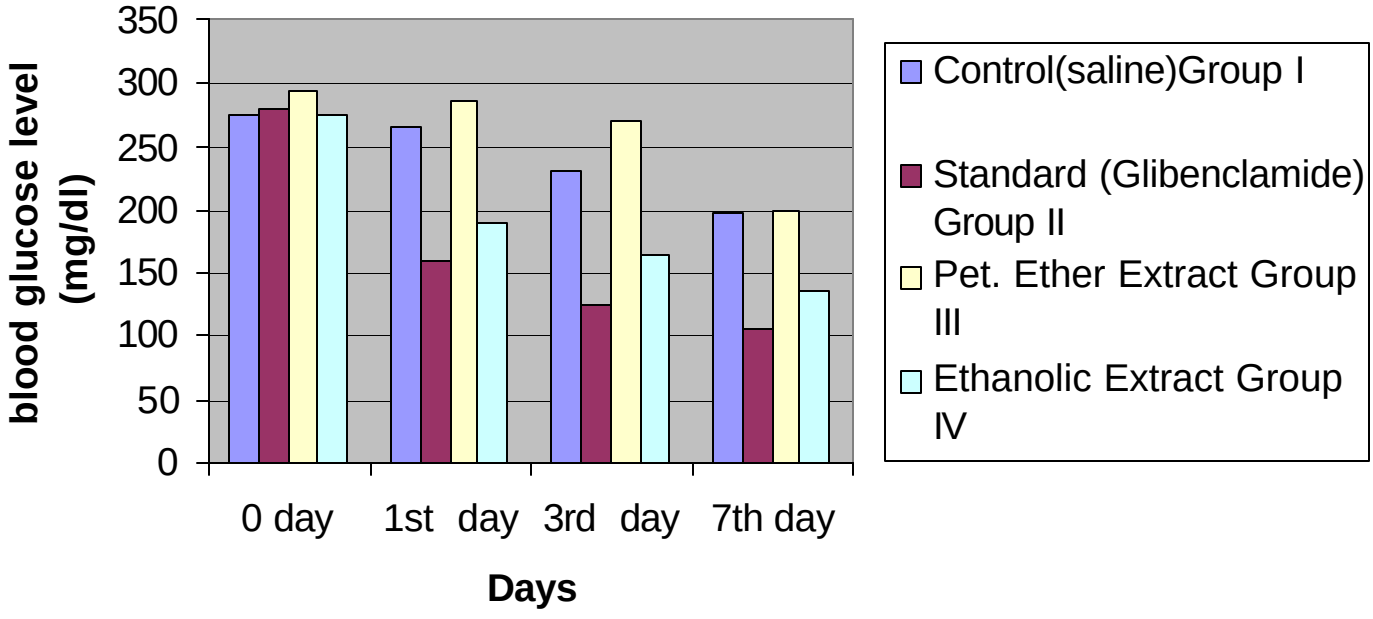


Figure 2: Showing decrease in blood glucose level in days of all Extracts



Statistical analysis

Data were expressed as means ± standard error of means. Statistical comparisons were made by analysis of variance (ANOVA) and post hoc comparisons were done by using Dunnett's test P values P<0.05were considered as significant.

Extracts obtained were subjected for evaluation of hyperglycemia in streptozotocin-induced diabetic rats. Glibenclamide (300mg/kg) was taken as standard. Ethanolic extract showed significant decrease in blood glucose level to 32.46% as comextract did not show significant decrease in blood glucose level. The ethanolic extract further reduced blood glucose level with respect to corresponding control, but the petroleum ether extract did not show any significant decrease in blood glucose level upto 7 days. The ethanolic extract reduced blood glucose level to 50.35% as compared to standard which was 62.44% on 7th day.

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