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Investigation of Anti-diabetic activity of flower extract of *Tecoma stans* (L.) Juss. Ex Kunth.

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Abstract
About 75% of the Indian population depends on this local health care system over the conventional medical system. With a large population dependent on herbal remedies, there is a need to scientifically support the efficacy of long-used herbal products. *Tecoma stans* (L.) Juss. Ex Kunth. is native to India. The flowers of the plant are used medicinally to treat various diseases and disorders. In the present paper Antidiabetic activity of hydro-alcoholic extract of flowers of selected plant was investigated using animal models.

Keywords: Diabetes, Anti-diabetic, Flower extract

Introduction

Diabetes is a chronic disorder of carbohydrate, fat, and protein metabolism characterized by fasting and elevated blood sugar. WHO estimates that the main burden will be in developing countries. Studies conducted in India in the last decade show that not only is the prevalence of diabetes high, but it is also increasing rapidly among the urban population. It is estimated that there are approximately 33 million adults with diabetes in India. This number will reach 57.2 million by 2025.[1]. In recent years, there has been rapid progress in the field of herbal medicine and these medicines have become popular in developing and developed countries due to their natural origin and low side effects. Most of the traditional medicines used are derived from medicinal plants, minerals and organic substances. For more than 1,000 years, some medicinal plants, known as rasayana, have been included in the herbal preparations of the traditional Indian health care system. Most Indian medicine practitioners prepare and distribute their own recipes. The World Health Organization has listed 21,000 medicinal plants in the world. Among the 2500 species found in India, 150 species are widely used commercially. India is the largest producer of medicinal plants and is known as the botanical garden of the world.[2-3]

Tecoma stans (L.) Juss. Ex Kunth. belongs to family Bignoniaceae, Wild throughout India, commonly known as Piliya (H), Yellow trumpetbusy, Yello bell (E). Traditionally all parts of the plant is used as medicine for the cure of the treatment of various diseases. *Trigonella foenum-graecum* Linn. belongs to family Fabaceae, Cultivated in North-Central IndiaCommonly known asMethi (H), Fenugreek (E). Fenugreek leaves and seed are known to have major medicinal properties and have been reported to significantly reduce both blood glucose and cholesterol levels in human and animal subjects in clinical

trials around the world.[4]The present work was aimed on investigation of anti-diabetic activity of flower extract.

Material and Methods

Collection of herbs and their authentication

The flowers of plant were collected in the month of Feb. 2023 and were identified byBotanist and were deposited in our Laboratory.

Pharmacological screening

Procurement of experimental animals

Rats were used for acute toxicity studies according to OECD guidelines 423. Animals were fed a standard pellet diet (Hindustan Ati Ltd. Bangalore) and water ad libitum. All animals were housed in polypropylene cages. Animals were maintained on an alternating cycle of 12 hours of darkness and light. The animals were adapted to laboratory conditions for 1 week before starting the experiment. The experimental protocol was approved after review by the Institute of Animal Ethics.[5]

Experimental animals

The Wister strains of male albino rats weighing between 100 and 150g were taken for the present study. The animals were housed in larger spacious cages and they were fed with commercial pelleted rat chow marketed by Hindustan Lever Ltd., Bangalore, India, under the trade name Gold Mohur Rat Feed and had free access to water ad labium. The animals were well acclimatized to standard environmental conditions of temperature and 12h light dark cycles throughout the experimental period. The animals used in the present study were approved by the Institutional Animal Ethical Committee.

Anti-diabetic activity[6]

The weight of alloxan is prepared by dissolving 1 g of alloxan and 20 ml of water for injection. In this calculated dose, the concentration of Alloxan is said to be 50mg/ml. Different groups of all six mice were used in the current analysis. Basal blood glucose levels of all animals were recorded and 6 animals were excluded as normal controls. The remaining animals received a single injection of Alloxan monohydrate in water, 150 mg/kg body weight, administered by the peritoneal route. After 4 days of alloxan administration, blood glucose was calculated, and animals with blood glucose levels between 280 mg/dl and 380 mg/dl were selected and divided into several groups.

Group 1:- Untreated control (Normal saline water)
Group 2:- Diabetic control (Alloxan 150 mg/kg)
Group 3:- Diabetic+ Glibenclaminde (10mg/kg)
Group 4:- Diabetic + HAETSF (250 mg)
Group 5:- Diabetic + HAETSF(500 mg)

Statistical analysis

Data were analyzed by comparing values for different treatment groups with the values for individual controls. The significant differences among values were analyzed using analysis of variance (one-way ANOVA) in latest computer software programme. All the obtained results are expressed as X (Mean) ±SEM, n=6. (One way ANOVA followed by Bonferroni multiple comparison test).

Results and Discussion

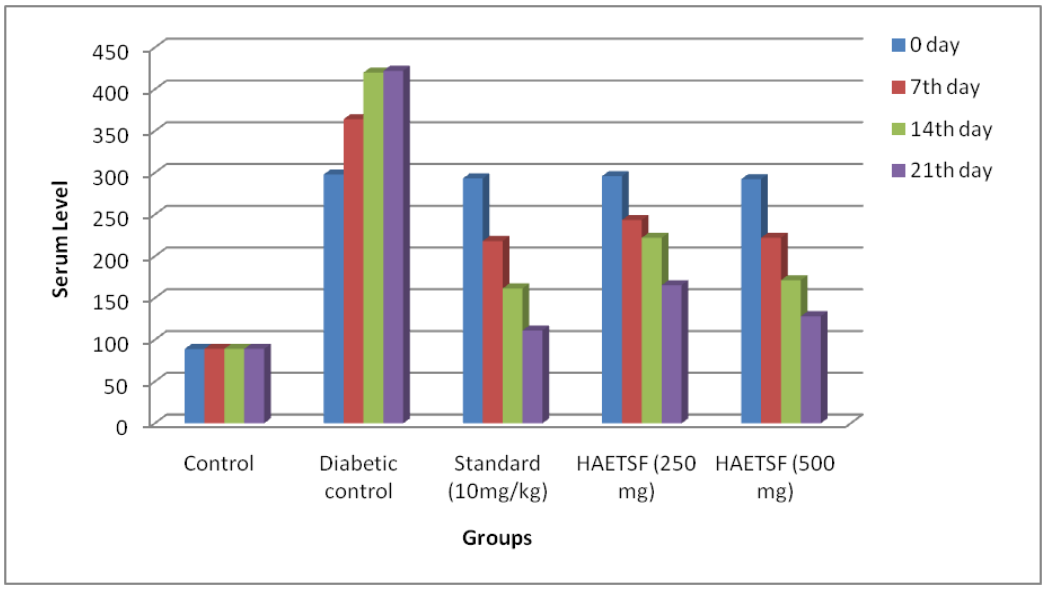
HAETSF is tested according to OECD guidelines no. 423 to determine LD3. The results showed no mortality at a dose of 5000 mg/kg bw, so it was included in category 5. Therefore, 250 mg and 500 mg doses were selected for the current analysis. The serum glucose level was calculated and the results showed that the sugar in the hydro-alcoholic extract was significantly reduced in doses of 250 and 500

mg/kg bw. The antidiabetic activity of the extract on fasting blood sugar levels in diabetic subjects is shown in Table 1. Blood glucose levels are compared with Glibenclamide 10 mg/kg.

Table 1: Serum glucose in normal and diabetic rats

Group	Serum glucose (mg/dL)			
	0 day	**7th day**	**14th day**	**21th day**
Control	89.02±0.08	89.12±0.11	89.12±0.28	89.12±0.12
Diabetic control	298.02±0.11	364.23±0.12$^{\#\#}$	420.08±0.31$^{\#\#\#}$	422.22±0.01$^{\#\#\#}$
Standard (10mg/kg)	293.23±0.01	218.34±1.29**	161.50±1.80***	111.23±1.09***
HAETSF (250 mg)	296.02±0.23	243.43±0.10*	222.10±1.01***	165.42±1.08**
HAETSF (500 mg)	292.43±0.08	222.20±1.08**	171.43±1.81***	128.22±1.02***

All values are expressed as mean ± S.E.M (n=6), ***P<0.001 as compared diabetic control (normal saline), **P<0.01 as compared diabetic control (normal saline), $^{\#\#\#}$P<0.001 as compared to Control. One-way ANOVA followed by Bonferroni multiple comparison test.



Graph 1: Serum glucose level

Conclusion

The hydro-alcoholic extract at the dose of 500 mg/kg bwshowed better efficacy in lowering the blood glucose levels in alloxan induced diabetic rats, when compared with standard drug.

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