

SHORT COMMUNICATION

EFFECT OF *TRIGONELLA FOENUM GRAECUM* (FENUGREEK)
ON BLOOD GLUCOSE IN NORMAL AND DIABETIC RATS

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Abstract: *Trigonella foenum graecum* (Fenugreek) was administered at 2 and 8 g/kg dose orally to normal and alloxan induced diabetic rats. It produced a significant fall ($P < 0.05$) in blood glucose both in the normal as well as diabetic rats and the hypoglycemic effect was dose related.

Key words: rat *Trigonella foenum graecum* (Fenugreek)
blood glucose alloxan induced diabetes

INTRODUCTION

Trigonella foenum graecum (Fenugreek) contains an alkaloid trigonelline and an essential oil. Its role as an antidiabetic has been described by Nadkarni (1). To produce hypoglycemic effect, Fenugreek seeds have been used as whole seed powder and cooked or roasted seed powder(1, 2, 3).

The present work was undertaken to study the effect of Fenugreek seeds on blood glucose levels in normal and alloxan induced diabetic rats.

METHODS

Thirty Wistar rats of either sex maintained on standard diet were administered unroasted Fenugreek seed powder mixed with the diet daily in a low dose of 2 g /kg and high dose of 8 g /kg body weight. In a preliminary study it was observed that roasted seeds had no effect on blood glucose levels in rats.

The animals were divided in two groups of fifteen rats each. Group A was further divided into 3 subgroups A₁ to A₃ consisting of 5 animals each.

Group B was made diabetic by a single intraperitoneal injection of alloxan monohydrate 5% w/v in normal saline in a dose of 120 mg/kg, b.w.

Rats with blood glucose level higher than three times the normal after 3 days were included in the study. The diabetic rats thus selected were also divided into 3 subgroups (B₁ - B₃) of 5 each. Rats in subgroups A₁ and B₁ served as control. Fenugreek seed powder was administered in a dose of 2 g/kg to groups A₂ and B₂ and 8 g/kg to groups A₃ and B₃.

After an overnight fast samples of blood were withdrawn through cardiac puncture under ketamine anaesthesia (50 mg/kg, im). The blood samples taken before, after 1 and 2 weeks of Fenugreek administration were estimated for glucose by Dubowski's method (4). Statistical analysis was done using Student's 't' test.

RESULTS AND DISCUSSION

Blood glucose level decreased significantly both in normal and diabetic rats following unroasted Fenugreek seed powder administration (Table I). The hypoglycemic effect was more pronounced with higher dose. The percentage fall was 23.09% with high dose and 15.59% with the low dose in normal rats and 21.33% and 13.2% in diabetic rats respectively.

The hypoglycemic effect of Fenugreek has been shown in normal rats (5), and nondiabetic man (3).

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TABLE 1: Blood glucose level (mg%±SEM) in normal and diabetic rats following administration of Fenugreek seed powder (n=5 in each group).

Group	Dose g/kg	Before	After treatment	
			1 week	2 weeks
Normal				
A ₁	Control	62.4 ± 3.152	62.0 ± 2.172	62.0 ± 2.064
A ₂	2	65.4 ± 2.616	60.4 ± 2.491	55.2 ± 0.715*
A ₃	8	70.4 ± 4.661	65.6 ± 3.853*	54.2 ± 0.867*
Diabetic				
B ₁	Control	217.0 ± 8.265	216.4 ± 8.268	219.6 ± 7.119
B ₂	2	250.0 ± 5.657	236.0 ± 2.601	217.0 ± 2.119*
B ₃	8	240.0 ± 11.013	204.0 ± 7.209**	184.0 ± 2.222**

P value * < 0.05; ** < 0.01

Riyad et al (2) has not advocated its use in diabetes mellitus. However, their observations indicate a preventive role in the rats pretreated with Fenugreek before the induction of diabetes where they have shown reduction in the severity of onset of experimental diabetes and improvement in the diabetic status when followed by feeding of the same diet.

Fenugreek resembles guar gum in its high dietary fibre content and high viscosity(6). Its hypoglycemic

effect is probably partly because of these factors. However, some other mechanisms might also be operative since viscosity does not appear to be responsible for the slow absorption and digestion of legume carbohydrates (7) and antidiabetic effect may be due to intestinal glucosidase inhibition (2).

Fenugreek seeds along with diet can have a modulatory role in the treatment of diabetes mellitus and can form a part of therapy in its management.

REFERENCES

- Nadkarni KM. *Trigonella foenum graecum*. In: Indian Materia Medica. Bombay Popular Prakashan 1954; pp 1240-1243.
- Riyad MA, Abdul-Ghani AS, Sulman MS. Effect of Fenugreek and Lupine seeds on the development of experimental diabetes in rats. *Planta Med* 1988; 4(54): 286-290.
- Sharma RD. Role of Fenugreek Seeds in diabetes mellitus. *ICMR Bulletin, Division of Publication and Information ICMR, New Delhi* 1987; 17(9): 79-83.
- Dubowski KM. Blood Sugar Estimation of Orthotoluidine method. *Clin Chem* 1962; 8: 215-222.
- Mishkinisky JS, Goldschemied A, Joseph B, Ahronson Z, Sulman FG. Hypoglycaemic Effect of *Trigonella Foenum Graecum* and *Lupinus Termis* (Leguminosae) seeds and their Major Alkaloids in Alloxan-Diabetic and Normal Rats. *Arch Intern Pharmacodyn Ther* 1974; 210: 27-37.
- Valette G, Sauvaire Y, Beccou JC, Ribes G. Hypocholesterolaemic effect of Fenugreek seeds in dogs. *Atherosclerosis* 1984; 50: 105-111.
- Susan W, Traianedes K, O'Dea K. Factors affecting the rate of hydrolysis of starch in legumes. *Am J Clin Nut* 1975; 82: 853-854.