



Research Article

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Evaluation of antipyretic and anti-inflammatory activity of seed extract of *Trigonella foenum graecum*

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ABSTRACT

Medicinal plants are the part and parcel of human society to combat against different diseases from the dawn of human civilization. According to World Health Organization, approximately 80% population of the developing countries are facing difficulties to afford synthetic drugs and are relying on traditional medicines mainly of plant origin in order to maintain their primary health care needs. *Trigonella foenum -graecum* Linn. Leguminosae, a seed spice used to enhance flavor, color and texture of food, and for medicinal purposes in many traditional systems. A number of epidemiological studies and laboratory research have revealed the biological actions of fenugreek. The anti-inflammatory and antipyretic effect of the acetonic extract of *Trigonella foenum graecum* was investigated. The anti-inflammatory effect was studied using Plethysmometer, while the antipyretic effect was estimated using Brewer's yeast-induced hyperpyrexia in rats. The results revealed that oral administration of AETFG at 50mg/Kg exhibited anti-pyretic effect comparable to the standard aspirin (100mg/kg). The plant extract not showed anti-inflammatory property.

Keywords: *Trigonella foenum graecum*, acetonic extract, anti-inflammatory, anti-pyretic activity.

INTRODUCTION

Inflammation is considered as a primary physiologic defense mechanism that helps body to protect itself against infection, burn, toxic chemicals, allergens or other noxious stimuli. An uncontrolled and persistent inflammation may act as an etiologic factor for many of the chronic illnesses [1]. Although, currently used anti-inflammatory drugs are associated with some severe side effects, herbal products are often perceived as safe, because they are natural therefore, the development of potent anti-inflammatory and wound healer drugs with fewer side effects is necessary [2]. The plant known as fenugreek (*Trigonella foenum -graecum* L.) is an annual forage legume known to have a number of important medicinal properties. Fenugreek is well known for its pungent aromatic, high nutritive and multi-therapeutical properties and serves culinary, medicinal and industrial purposes. The Pharmacologic and medicinal actions of fenugreek are attributed to the variety of its constituents including steroids (diosgenin), alkaloids (trigonelline), flavonoids (luteolin), coumarins, aminoacids (hydroxyisoleucine), mucilage (galactomannan), volatile constituents, fixed oils and other substances. The aim of present study was to evaluate the antipyretic and anti-inflammatory property of acetonic extract of *T. foenum graecum* seeds in experimental animal models (3,4).



EXPERIMENTAL SECTION

Plant Material :

Seeds of *Trigonella foenum-graecum* were collected from the Dr.Y.S.Parmar University of Horticulture and Forestry, Naunisolan (H.P) having authentication number (NOUHF/VEG/HIS-2666).

Experimental Animals:

Wistar albino rats of both sexes weighing between 100-250g were obtained and kept at the Laboratory Animal centre of the college. The animals maintained under standard environmental conditions had free access to standard diet and water ad libitum. Rats were housed in groups of six per cage. All the animals were maintained under standard conditions; that is room temperature $26\pm 1^{\circ}\text{C}$, relative humidity 45-55% and 12:12 hrs light-dark cycle. The cages were maintained clean, and all experiments were conducted between 9 am and 4 pm.

Preparation of Plant extract:

Roots were separated from plant, subjected for drying of 15-20 days and crushed into fine powdered form. The extraction of the powder was done by using soxhlet apparatus using acetone as solvent for 24hrs. The final extract was evaporated to dryness with the help of water bath. A dark brown sticky extract was obtained and stored in airtight bottles in refrigerator until they were ready for use. The yield was 40gm.

Phytochemical Analysis:

Prepared extracts qualitatively tests for the presence of tannins, alkaloids, flavonoids, saponins, glycosides, tannins, steroids [5, 6].

Acute Toxicity Testing:

Female Wistar Albino rats were used for acute oral toxicity study. The study was carried out as per the guidelines set by OECD 423 and animals were observed for mortality and behavioral changes [7].

Ethical approval:

The Experimental protocols were approved by the Institutional Animal Ethics Committee (IAEC) and all the experiments were conducted according to the guidelines of Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA).

Antipyretic activity:

The Assessment of antipyretic activity was carried out using Brewer's yeast induced pyrexia in Wistar rats (8). Rats were fasted overnight with water ad libitum before the experiment. The normal body temperature of each animal was measured by digital tele-thermometer and recorded. Pyrexia was induced by subcutaneously injecting 20% w/v Brewer's yeast (10 mL/kg), suspended in normal saline, into the animal's dorsum region. The peak pyrexia was observed to be at 18 h after yeast administration by conducting trial experiments. The animals that showed an increase in rectal temperature of at least 1°C were used for the study. The drugs were administered orally at the time of peak pyrexia. The control group (group I) was administered normal saline (10ml/kg), the standard group (group

II) received aspirin (100 mg/kg) and the research group (group III) was given the research drug at dose of 50 mg/kg respectively. The rectal temperature was recorded at a time interval of 1, 2, 3, 4 and 5 h after drug administration.

Anti-Inflammatory activity

Carrageenan induced paw edema

The Anti-inflammatory activity was performed on rat of either sex. The animals were randomly divided in three groups each of six animals [9]. Group I was treated with normal saline (10ml/kg), group II with diclofenac sodium (10mg/kg), rest of the group were treated with AETFG (50mg/kg). After an hour of oral medication, carrageenan (1%, 0.1ml) was injected subcutaneously in the sub plantar tissue of the right hind paw of each mouse. The inflammation was measured using plethysmometer immediately after injection of carrageenan and then 15,30,60 and 120mins. The average foot swelling in drug treated animal as well as standard was compared with that of control and the percent inhibition (anti-inflammatory activity) of oedema was determined using the formula.

Percent inhibition = $A-B/A \times 100$, where A represent oedema volume of control and B as paw edema of tested group.

Statistical Analysis:

All data were represented as mean \pm standard error mean values. Data were analyzed by one-way ANOVA. Whenever ANOVA was significant, further comparison was made against the vehicle treated groups were performed using the Dunnett's - tests.

RESULTS

Acute toxicity:

Acute toxicity study for acetonc extract of *Trigonella foenum graecum* was performed according to OECD guidelines 423 using female wistar Albino rats. At 2000 mg/kg, the extract was neither produced mortality nor the signs of morbidity. Hence, the dose 50 mg/kg was selected for further studies.

Table No.1: Effect of acetonc extract of *Trigonella foenum graecum* In Yeast Induced Pyrexia

Sl.No	Treatments	Rectal Temperature ($^{\circ}$ C)				
		Normal	30 min	1 hr	2 hr	3hr
1	Normal Saline	36.6 \pm 0.11	38.9 \pm 0.32	38.8 \pm 0.21	38.7 \pm 0.11	38.6 \pm 0.20
2	Standard (100mg/Kg)	37 \pm 0.08	39.4 \pm 0.035*	38.2 \pm 0.01	37.8 \pm 0.03*	37.3 \pm 0.02
3	AETFG (50mg/Kg)	37 \pm 0.02	39.7 \pm 0.42	39.4 \pm 0.21*	38.4 \pm 0.25**	37.7 \pm 0.45

Values are expressed as Mean \pm SEM, for 6 animals, **P<0.01, significantly when compared with control group.

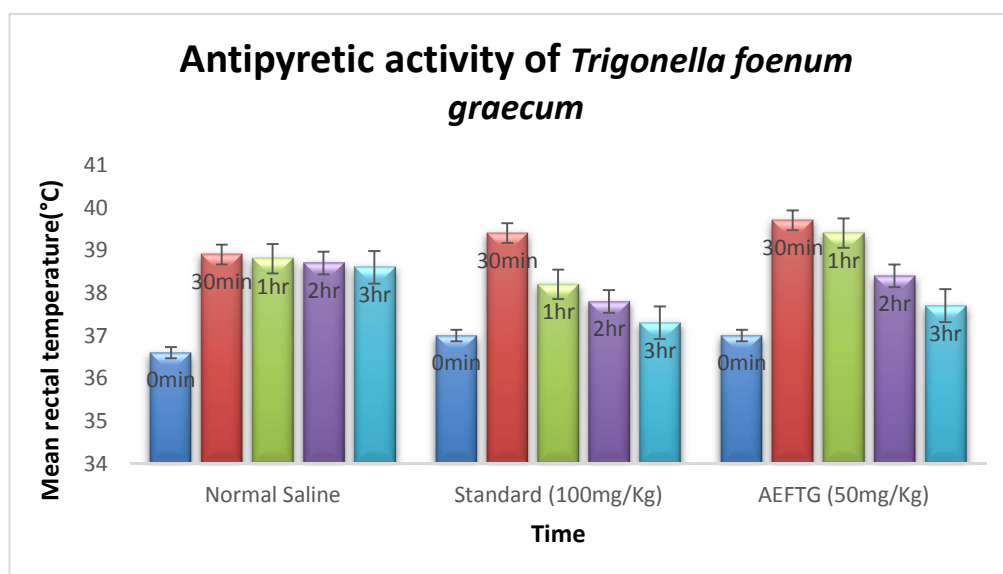


Fig. 1:Effect of AETFG (50 mg/kg) and standard (Aspirin 100mg/kg) Yeast induced pyrexia in rats ,compared with vehicle treated control (Normal Saline)

Phytochemical analysis:

The preliminary phytochemical screening of acetonic extracts of fenugreek seeds showed the presence of alkaloids, phenols, flavonoids, tannins, glycosides, steroids, carbohydrates, proteins.

Assessment of Anti-pyretic Activity:

The acetone extract of the seeds of *T.foenum graecum* showed significant antipyretic effect at the dose of 50 mg/kg when tested on yeast-induced pyrexia in rats. The antipyretic activity of extract was found to be significant and dose dependent when compared with the control group. The antipyretic effect which persisted up to 3hrs was observed at the dose of 50mg/kg of research drug as compared to the standard drug.

Assessment of Anti –inflammatory activity

The acetonic extract of *Trigonella foenum graecum* not showed any anti-inflammatory activity.

DISCUSSION

In the present research, Toxicity assessment and evaluation of antipyretic and anti-inflammatory activity of the seed extract of *Trigonella foenum graecum* were carried out. The acetonic extract of the seed was evaluated on the basis of phytoconstituents present in it.

Fever may occur as a result of infection or one of the sequences of tissue damage, inflammation, graft rejection, or other diseases. It is the body's natural function to create an environment where infectious agents or damaged tissues cannot survive. Yeast induced fever is called pathogenic fever. Its etiology includes production of prostaglandins, which set the thermoregulatory center at a higher temperature. Most of the antipyretic drugs like aspirin or paracetamol inhibit COX-2 expression to reduce the elevated body temperature by inhibiting PgE2 biosynthesis (10-14). Antipyretic effect of acetonic extract of the seeds of TFG found significant effect at the dose of 50 mg/kg in yeast-provoked elevation of body temperature when compared with control group. The acetonic extract of fenugreek may not have significant anti-inflammatory effect.

CONCLUSION

In the present study the acetonic extract of seeds of *Trigonella foenum graecum* (dose50mg/Kg) possess significant antipyretic activity may be due to the presence of trigonelline and flavonoids which are the main chemical constituents of the plant.

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