



## *In- vitro* anthelmintic activity of *Trigonella foenum-graecum* leaves and seeds (Fabaceae)

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### ABSTRACT

Present study reports anthelmintic activity of petroleum ether, chloroform, ethyl acetate and methanolic extracts obtained from the leaves and seeds of *Trigonella foenum-graecum* Linn. (Fabaceae) on Indian adult earthworms *Pheretima posthuma*. Phytochemical investigation shows the presence of sterol, terpenes, flavonoids, tannins and alkaloids. Amongst all extracts, ethyl acetate extract of leaves showed potent anthelmintic activity as compared with other extracts and the reference drug albendazole. Results show that anthelmintic activity is dose dependant. © 2008 Trade Science Inc. - INDIA

### INTRODUCTION

*Trigonella foenum-graecum* L. (Fabaceae) is nearly smooth erect annual. Leaflets are oblanceolate-oblong, toothed. Flowers are axillary, sessile. Calyx teeth linear. Pods are long. Seeds are traditionally used as antipyretic, anthelmintic, cure leprosy, useful in heart disease. Leaves are useful in external and internal swelling and burns<sup>[1,2]</sup>. Seeds are having wound healing activity<sup>[3]</sup>.

Seeds induce uterine contractions<sup>[4]</sup>, inhibit cancer of the liver<sup>[5]</sup>, lower blood cholesterol levels and also have an antidiabetic effect<sup>[6]</sup>. The seed and leaves are anticholesterolemic, anti-inflammatory, antitumor, carcinative, demulcent, emollient, expectorant, febrifuge, galactogogue, hypoglycaemic and laxative<sup>[7-9]</sup>. Compounds extracted from the plant have shown cardio-tonic, hypoglycaemic, diuretic, antiphlogistic and hypotensive activity<sup>[8]</sup>. One of its constituent alkaloids, called 'trigonelline', has shown potential for use in cancer therapy. Seeds contained alkaloids as trigonelline. Furostanol glycosides as trigofenosides A-1, trigofenosides D-1, saponin as trigofenoside E-1,

diosgenin, gitogenin, sarsapogenin were isolated from seeds<sup>[1,2,10]</sup>. The seed contains the saponin diosgenin, an important substance in the synthesis of oral contraceptives and sex hormones<sup>[10]</sup>, whilst saponins in the plant have been extracted for use in various other pharmaceutical products<sup>[4]</sup>.

Present study reports anthelmintic activity various extracts of *T.foenum-graecum* leaves and seeds.

### EXPERIMENTAL

Leaves and seeds of *Trigonella foenum-graecum* was collected from Ahmednagar district of Maharashtra in October 2006 and gets authenticated by Botanical Survey of India, Pune (Voucher specimen No. TF1). Leaves and seeds were shade dried, powdered and subjected to successive solvent extraction in Soxhlet extractor using petroleum ether (60-80°C), chloroform, ethyl acetate and methanol as solvents. The extracts were vacuum dried.

#### Anthelmintic activity<sup>[11]</sup>

The anthelmintic activity was evaluated on adult

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**TABLE 1: Anthelmintic activity of various extracts of leaves and seeds of *T.foenum-graecum***

Treatment	Concentration used (mg/ml)	Time taken for death (min)	
		Leaves extract	Seed extract
PE	20	10.45±0.265	6.20±0.238
	40	10.33±0.423	6.01±0.439
	60	9.34±0.872	5.76±0.629
CH	20	4.38±0.346	5.16±0.238
	40	4.01±0.543	5.11±0.739
	60	4.02±0.549	4.98±0.567
EA	20	3.62±0.198	6.53±0.962
	40	3.06±0.451	6.32±0.654
	60	3.01±0.295	5.82±0.945
ME	20	7.48±0.242	8.30±0.206
	40	7.23±0.734	8.23±0.672
	60	6.98±0.239	8.02±0.629
Albendazole	20	6.32±0.527	6.32±0.527
	40	6.02±0.723	6.02±0.723
	60	5.97±0.512	5.97±0.512
Control	5% DMF in normal saline	-	-

Control worms were alive up to 24 Hrs. of observation. Results are expressed as Mean±SEM from six observations; PE-petroleum ether extract, CH-chloroform extract, EA- ethyl acetate extract, ME-methanol extract of *T.foenum-graecum*

Indian earthworms, *Pheritima posthuma*<sup>[11]</sup> due to its anatomical and physiological resemblance with the intestinal roundworm parasites of human beings<sup>[12-14]</sup>. Twenty eight groups, each containing of six earthworms of approximately equal size were released into 10ml of desired formulation as follows: vehicles (5% DMF in normal saline), albendazole (20mg/ml) or petroleum ether or chloroform or ethyl acetate or methanolic extracts of leaves and seeds of *T.foenum-graecum* (20mg/ml, 40mg/ml, 60mg/ml each) in normal saline containing 5% DMF. Final pH of the medium was 7.3. Observations were made for the time taken to paralysis and death of individual worm. Paralysis was said to occur when the worms did not revive even in normal saline. Death was concluded when all the worms lost their motility followed with fading away of their body color<sup>[15]</sup>.

### RESULTS AND DISCUSSION

Study was carried out to check whether activity is dose dependant or not, but result showed that all extracts of *T.foenum-graecum* showed significant anthelmintic activity at 20mg/ml concentration. Result showed that ethyl acetate extracts of *T.foenum-graecum* leaves

required less time for paralysis and death of the worms as compared with other extracts and standard drug albendazole. It justifies the use as an anthelmintic suggested in folklore medicines.

Phytochemical investigation shows the presence of sterol and terpenes in petroleum ether extract, chlorophyll pigment and small amount of flavonoids (Shinoda test shows faint pink colour) in chloroform extract, flavonoids and tannins in ethylacetate extract and alkaloids in methanol extract. Tannins are responsible for anthelmintic activity<sup>[16]</sup>, so ethyl acetate extract shows potent anthelmintic activity at 20mg/ml. The plant can further explored for isolation of active constituents responsible for the anthelmintic activity.

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