

ANTHELMINTIC ACTIVITY OF *TECTONA GRANDIS* LINN FRUITS

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ABSTRACT

The objective of the present work was to evaluate the anthelmintic property of ethanolic extract of *Tectona grandis* fruits using Indian earthworm *Pheretima posthuma* as test worm. Various concentrations of ethanolic extract were tested in bioassay which involved determination of time of paralysis (P) and time of death (D) of the worm. Piperazine citrate (10mg/ml) was used as reference standard. The result of present study indicates that the crude ethanolic extract significantly demonstrated paralysis, and also caused death of worms especially at higher concentration (50 mg/ml) compared to standard reference Piperazine citrate. To conclude, the use of the fruits of *Tectona grandis* as anthelmintic has been confirmed and further studies are suggested to isolate the active principles responsible for the activity.

KEYWORDS: *Tectona grandis*, Anthelmintic activity, Piperzine citrate, earth worm.

INTRODUCTION

Tectona grandis Linn is a tree of commercial importance belonging to the family Verbinaceae. It is found distributed in the south and south east Asia¹. Traditionally the aerial parts are used as coolant, haemostatic, depurative and as an anti-inflammatory. They are useful in treating leprosy, skin diseases, pruritis, stomatitis, indolent ulcers, haemorrhages and vitiated conditions of pitta². Paste made from wood is local refrigerant and sedative. Also is used as astringent, hepatic stimulant and diuretic. Wood brayed in water is used as a local application for the relief of headache, toothache and to subdue the inflammation and irritation of the skin. Oil from the nut is used to promote the growth of hair.³ From the literature survey, it was revealed that *Tectona grandis* contain many phytoconstitents like Betulinic acid, β sitosterol, Tusifolin Tectograndinol Tectol^{1,4,5}. In the present investigation we have evaluated the anthelmintic activity of the ethanolic extract of *Tectona grandis*.Linn fruits using Indian earthworm *P. posthuma*.

MATERIALS AND METHODS

Plant material

The fruits of *Tectona grandis*.Linn were collected locally from Mangalore, Karnataka, India during the month of August. The fruit was identified and authenticated by Prof. Gopal Krishna Bhatt, Department of Botany, Poornaprajna College, Udupi, Karnataka, India. A voucher specimen (No. NGSM 237) was deposited in NGSM Institute of Pharmaceutical Sciences, Paneer, Deralakatte, Mangalore, India.

Preparation of the ethanol extract

The fruits were collected and shade dried. The dried fruits were powdered and soaked in ethanol (95%) and kept aside for four days. After four days the ethanol layer was decanted off. The process was repeated for four times. The solvent from total extract was distilled off and concentrate was evaporated on a water bath to syrupy consistency and then evaporated to dryness and was stored in desiccator for further use. The test sample were prepared at the concentration ie. (10, 25, 50 mg/ml) in distilled water containing 15% Tween 80. Suspension of distilled water and 15% of Tween 80 was used as control.

Worm collection and authentication

Indian earthworm *Phretima posthuma* (Annelida) were obtained from the water logged area of soil and was identified at the Department of applied zoology, Mangalore University, Mangalore, Karnataka.

Anthelmintic Assay

The anthelmintic assay was carried as per the method of *Ajaiyeoba et al* with necessary modifications⁶. The assay was performed on adult Indian earthworm, *Phretima posthuma* due to its anatomical and physiological resemblance with the intestinal roundworm parasite of human being^{7,8}. Because of easy availability, earthworms have been widely used for the initial evaluation of anthelmintic compounds invitro^{9,10}. 50ml of formulation containing different concentrations of crude extract (10, 25, 50 mg/ml) and test standard (10mg/ml) were prepared by triturating the sample with 15% tween 80 and distilled water and the resultant mixture were stirred using a mechanical stirrer for 30 minutes. Six earthworms of similar sizes were placed in Petridishes containing the test and standard solutions. Suspension of distilled water and 15% tween 80 was used as control.. The time of paralysis was noted when no movement of any sort could be observed except when the worms were shaken vigorously. Time for death were recorded after ascertaining that worms neither moved when shaken vigorously nor when dipped in warm water (50°C).

Statistical analysis

The data were expressed as Mean \pm SEM and analyzed by using one way analysis of variance (ANOVA), followed by post hoc Sheffe's test using SPSS computer software version 10. The values were considered significant when $p < 0.05$.

RESULTS AND DISCUSSION

The present study dealt with screening of ethanolic extract of fruits of *Tectona grandis Linn* for anthelmintic activity. Preliminary phytochemical screening of crude ethanolic extract revealed the presence of flavanoids. The ethanolic extract of *Tectona grandis.Linn* fruits exhibit anthelmintic activity in dose dependent manner. The ethanolic extract at dose of 50 mg/ml caused paralysis in 21 min and death in 32 min against *P. posthuma* as compared to the reference standard piperazine citrate (10mg/ml) showed the same at 19 min and 53 min respectively.

Piperazine citrate by increasing chloride ion conductance of worm muscle membrane produces hyper polarization and reduced excitability that leads to muscle relaxation and flaccid paralysis¹¹. The ethanolic extract of the plant not only demonstrated paralysis, but also caused death in shorter time as compared to reference drug piperazine citrate. In conclusion the use of *Tectona grandis.Linn* fruits as an anthelmintic have been confirmed and further studies are suggested to isolate the active principle responsible for the activity.

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Table 1: Anthelmintic activity of ethanolic extract of fruits of *Tectona grandis* Linn

Test substance	Concentration mg/ml	Time taken for paralysis (P) and death (D) of worms in min (<i>P. posthuma</i>)	
		P	D
Vehicle			
Ethanolic extract	10	30.38 ± 1.06*	48.28 ± 0.71*
Ethanolic extract	25	23.11 ± 0.88*	40.25 ± 0.89*
Ethanolic extract	50	21.69 ± 1.80.*	32.41 ± 1.11*
Piperazine citrate	10	19.33 ± 0.39	52.59 ± 0.63

All the values are expressed as mean ± SEM (n = 6), values are statistically significant at p<0.05
* = p<0.05 when compared with standard group

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