

## Research Article

### Anthelmintic Activity of Ethanolic Extract of *Tectonia Grandis*

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#### ABSTRACT

*Tectonia Grandis* Linn. Belonging to family Verbenaceae commonly known as Teak or sagwan. It is commonly found in India and other south Asian countries. Teak is also considered as a major constituent in many folklore medicines. Medicinally it has various pharmacological activities. The present study was done with the aim to evaluate anthelmintic activity of ethanolic extract of bark of *Tectonia grandis* Linn. by using adult earthworm *pheritima posthuma*. Various concentration of extracts were tested and results were expressed in terms of time for paralysis and time for death of worms. Ivermectin was used as a reference standard and tween 80 in saline as a control group.

**Key-words:** *Tectonia grandis*, Ivermectin, *pheritima posthuma*, Tween 80.

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## Introduction -

Helminths are multicellular eukaryotic animals that generally possess digestive, circulatory, nervous, excretory, and reproductive systems. Some are free living in soil and water. Helminths are studied in microbiology because they cause infectious diseases and most are diagnosed by microscopic examination of eggs or larvae. Eggs may have striations (lines), a spine, or an operculum (hatch by which the larva leaves).<sup>1, 2</sup>

Helminths infect more than one-third of the world population. Helminths infections differ from bacterial or protozoan infections because the worms do not usually increase in number in the host.<sup>1, 2, 3</sup> Symptoms are usually due to mechanical damage, eating host tissues. Although the majority of infections due to helminthes are generally restricted to tropical region and causes enormous hazard to health and contribute to the prevalence of undernourishment, anemia, eosinophilia and pneumonia. Parasitic disease causes ruthless morbidity affecting principally population in endemic areas. The gastrointestinal helminths becomes resistant to currently available anthelmintic drugs therefore there is a foremost problems in treatment of helminthes disease. Hence there is an increasing demand towards natural anthelmintic.<sup>4, 5, 6</sup>

*Tectonia grandis* Linn. Is a large deciduous tree which under favorable conditions may reach a height of 30-40 meter. The bark is thick, grey or light grayish-brown. The leaves are large 25-50 cm long and 15-35 cm wide. The flowers are small (6-8 mm in diameter), whitish and bisexual. The plant contain no. of chemical constituents i.e. quinones, steroidal compounds, glycosides, phenol acids, flavonoids etc.<sup>7</sup>

## Traditional Uses -

Bark: is used as astringent, constipation, anti-infective agent, and depurative. It is used in bronchitis hyperacidity, dysentery, and verminosis, burning sensation, diabetes, leprosy and skin diseases.

Leaves: are cooling, haemostatic, anti-inflammatory and vulnerary. They are useful in leprosy, skin diseases, purities, stomatitis, hemorrhages, and indolent ulcer.

Wood: Acrid, cooling, laxative, sedative to gravid uterus, useful in treatment of piles leucoderma and dysentery. Oil extracted from the wood is best for headache, biliousness, burning pains particularly over a region of liver.

Roots: are useful in anuria and retention of urine.

Flowers: are acrid, bitter, and dry and cures bronchitis, biliousness, urinary discharge. According to unani systems of medicine, oil extracted from the flowers is useful in scabies, and promotes the hair growth.<sup>7</sup>

The present study was performed to study the anthelmintic activity of ethanolic extract of *Tectonia grandis* Linn. On Indian earth worms (*pheretima posthuma*).

## Material and Method -

### Collection of Plant

The *Tectonia grandis* Linn. Plant materials were collected from Tasgaon, District. Sangli. (Maharashtra).

### Authentication and Identification of Plant Material

The bark of *Tectonia grandis* Linn. Was identified and authenticated by Mr. M. D. Wadmare Dept. of Botany, Smt. Kasturbai Walchand College Sangli.

### Drying of Plant Materials

In the present study the collected plant bark were sorted carefully and washed thoroughly to remove dirt and debris. The materials were dried in the open air. In order to secure adequate air circulation, the drying trays were located at a sufficient height above the ground to achieve uniform drying of plant materials. After complete drying, the barks were powdered by mixer grinder to obtain coarse powder.<sup>10</sup>

### Preparation of Ethanolic Extract of Bark

In the present study, the plant bark was carefully selected and shade dried. The dried bark was reduced to powder in the mechanical grinder and passed through a sieve no.40 to obtain powder of desired size.

About 150 gm of powdered material was subjected to exhaustive extraction with 1 liter of ethanol in a soxhlet extractor in order to remove the fatty material from plant bark. The extraction was continued until the solvent in the thimble became clear. The solvent was filtered by using muslin cloth and whatmann paper no.1. The filtrate was concentrated to dryness to obtain crude extract. The dried ethanolic extract of *Tectonia grandis Linn.* was stored in desicator under controlled conditions till it used for experimental purpose.<sup>11, 12</sup>

### Experimental Animals

Indian adult earthworms (*pheretima posthuma*) were used to study anthelmintic activity. The earthworms were collected from moist soil and washed to remove all fecal materials. The earthworms of 3-5cm. in length and 0.1-0.2cm in width were used for all experimental protocol.<sup>[8]</sup> The earthworm resembles both anatomically and physiologically to the intestinal roundworms parasites of human beings, hence can be used to study anthelmintic activity.<sup>9</sup>

### Drugs and Chemicals

Ivermectin (Pulse Pharma, Hyderabad), Saline water (Nutrilife, Ahmadabad). Vehicle 2% v/v Tween 80 in distilled water were used.

### Preparation of Test Sample

The test samples were prepared before starting the experiment. The test samples were prepared by dissolving extract to get concentration range 25, 50 and 100mg/ml of ethanolic extracts (ETG). For present study the Ivermectin taken as a standard drug. The concentration of standard drug was prepared in 2%v/v Tween80 to give 20mg/ml concentration.

### Evaluation of Anthelmintic Activity

The extracts were tested for anthelmintic activity.<sup>13</sup> *Pheretima posthuma* of nearly equal size (6cm ± 1) were used for the in vitro anthelmintic activity of extracts. The worms were divided into the respective groups containing six earth worms in each group. Extracts were dissolved in minimum quantity of 2%v/v Tween80 and the volume was adjusted to 20ml with normal saline for making the concentration of 25, 50 and 100mg/ml. All the earthworms were washed in normal saline solution before they were released into 10 ml of respective formulation as follows, vehicle (2% v/v Tween80 in normal saline), Ivermectin and ETG (25, 50 and 100mg/ml). The anthelmintic activity was determined in six observations. Six worms of about the same size per petridish were used. They were observed for their spontaneous motility and evoked responses. Observations were made for the time taken to paralysis and death of individual worms. Paralysis were said to occur when the worms do not revive even in normal saline. Death was concluded when the worms lost their motility followed with fading away of their body colour.<sup>8</sup>

### Statistical Analysis

Results were expressed as mean±s.e.m. Statistical significance was determined by one-way analysis of variance (ANOVA) followed by Dunnett's test, with the level of significance at  $P < 0.001$

### Result and Discussion

In the present work, ethanolic extract of *Tectonia grandis Linn.* bark was used to evaluate anthelmintic activity against Indian earthworms *Pheretima posthuma*. Each extract containing 25, 50, 100mg/ml

produces dose dependent paralysis ranging from loss of motility to loss of response to external stimuli which eventually leads to death. As shown in Table no.1

Table no.1 Anthelmintic activity of ethanolic extracts of *Tectonia grandis* Linn. Bark on Indian earthworms *Pheretima posthuma*.

Name of group	Name of extract and concentration	Time taken for paralysis in min. (Mean±s.e.m)	Time taken for death in min. (Mean±s.e.m)
Group I	Tween 80 in saline	----	----
Group II	Ivermectin (20mg/ml)	21.33±0.49	28.83±0.60
Group III	ETG (25mg/ml)	43.00±0.57	62.83±0.70
Group IV	ETG (50mg/ml)	35.05±0.61	44.33±0.49
Group V	ETG (100mg/ml)	27.00±0.57	36.00±0.70

Results are expressed as Mean±s.e.m.

P value was calculated by comparing with control by one-way ANOVA. Control worms were alive up to 24 hrs of observation.  $P < 0.001$ , significantly when compared with reference compound, Ivermectin.

The result of the current investigation indicates that the ethanolic extract of *Tectonia grandis* Linn. is the most potent and requires less time to paralysis and death of worms. Extracts showed a concentration depended anthelmintic property. The function of anthelmintic drug, like Ivermectin, is known to cause paralysis of worms so that they are expelled in the faeces of man and animals. The extract not only demonstrates this property, but they also caused death of worms.

From the observation of ethanolic extract of bark of *Tectonia grandis* Linn. Was showed anthelmintic activity. After a brief stimulant effect, earthworm lost their motility of exposure to crude extract of bark of *Tectonia grandis* Linn. Ethanolic extract exhibited anthelmintic activity in dose dependent manner giving short time of paralysis in minutes and time of death in minutes in respective concentration. Therefore potency of drug was found to be inversely proportional to the time taken for paralysis and death of worms. The higher the concentration of ethanolic extract produced paralytic effect much earlier and necrotic spots were observed externally on the worms, with higher concentration. The effect of each ethanolic extract was compared with Ivermectin as a standard drug (20mg/ml).

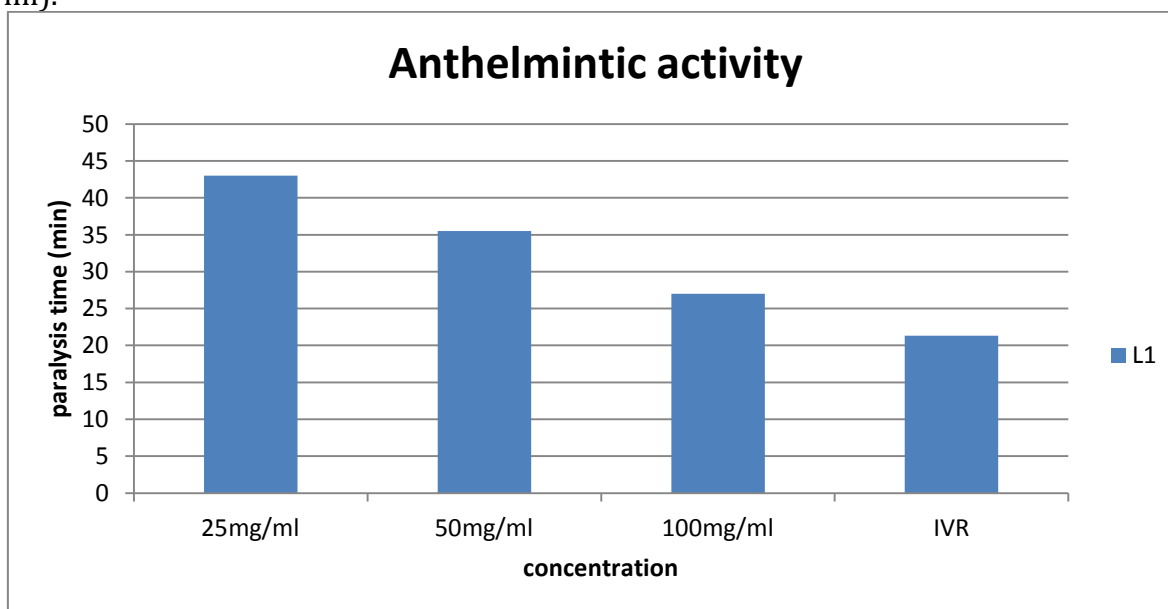


Figure no. 1 Graph showing Paralysis time of test compound against *Pheretima posthuma*

### Conclusion

By using the *pheretima posthuma* as the animal models, we have shown that the ethanolic extract of bark of *Tectonia grandis* Linn. has potential to act against helminthiasis. Moreover, the extent of anthelmintic effect of bark powder is comparable to that of standard drug, Ivermectin being used against helminthiasis, in general. These observations suggest that the bark powder of *Tectonia grandis*

*Linn.* Must contain lead compounds that may provide profound implications on designing de novo anthelmintic drugs.

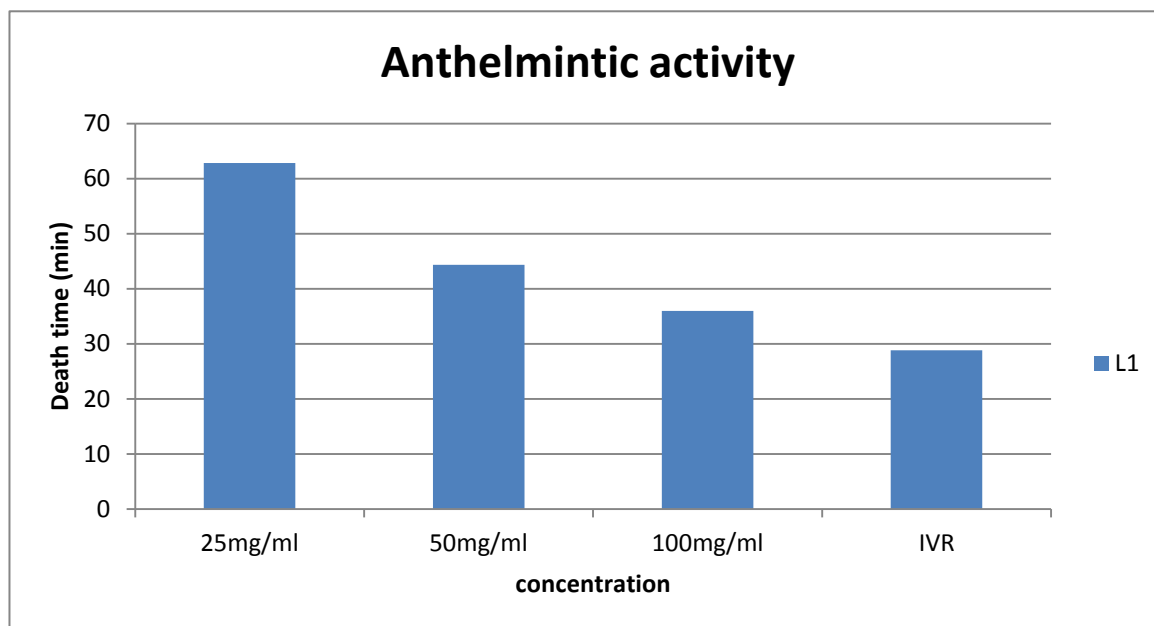


Figure no. 2 Graph showing Death time of test compound against *Pheretima posthuma*

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### References

1. [http://en.wikipedia.org/wiki/parasitic\\_worm](http://en.wikipedia.org/wiki/parasitic_worm) Parasitic helminths-1
2. Hotez P, Brindley P, Jeffrey, Bethony M, King H, and Pearce E, Jacobson J. Helminth's infections: the great neglected tropical diseases.
3. <http://parasite.org.au/para-site/content/helminth-introduction>.
4. Bundy DA. Trans Royal Soc. Trop Med Hyg. 1994; 8, 259-261.
5. Tagbota S, Townson S. Adv Parasitol. 2001:50,199-205.
6. Sondhi SM, Shahu R, Magan Archana. Indian Drugs. 1994: 31, 7, 317-320.
7. Rajuri Aradhana, K.N.V.Rao, David Banji and R.K.Chaithanya. A review on *Tectona grandis.linn*: chemistry and medicinal uses. Herbal tech industry.2010
8. Sayyad RR, Kare R.D, Jagtap S.M., Anthelmintic Activity of Ethanolic Extract of *Cassia Occidentalis Linn*. International journal of pharmacy research and science. 2014 :02(1),42-46
9. Vidyarthi RD. A Text book of Zoology, 14thEdition, S. Chand and Co. New Delhi. 1967:45.
10. Joy PP et al. Medicinal Plants. Kerala agricultural university Aromatic and Medicinal Plants Research Station 1998: 3-4
11. Kumanan R, Sridhar C, Jayaveera KN, Sudha S, Rubesh Kumar S, Duganath N. Comparative Study of Anthelmintic Activity of Different Leaf Extracts of *Tecoma stans (L.)* on Adult Indian Earthworms. International Journal of Pharmaceutical and Clinical Research. 2010: 2(2), 63-65.
12. Switi B Gaikwad, Krishna Mohan G, Sneha J Anerthe. Antimitotic Activity and Brine Shrimp Lethality Test of *Tectona grandis Linn*. Bark. RJPBCS.2011:2(4), 1014.
13. Bhusan M, Pawar, Nayana D. Int. J. Pharma Tech Res. 2010: 2,2,1483-1487.