

**ANTHELMINTIC ACTIVITY OF METHANOLIC EXTRACT OF  
*PELTOPHORUM PTEROCARPUM* LEAVES**

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**ABSTRACT**

*Peltophorum pterocarpum* belonging to family Fabaceae and traditionally it is claimed to be used in the treatment of stomatitis, insomnia, constipation, ringworm, dysentery, muscular pains, sores and skin disorders. In the present study methanolic extract of its leaves were investigated for its anthelmintic activity by the use of earthworms with different doses i.e., 25, 50, 100 mg /ml, and showed a significant activity by comparing with the standard drug Albendazole. The dose dependent effects were observed with 25, 50, 100 mg/ml dose. The *Peltophorum pterocarpum* exhibit the similar chemical nature with that of the other species of *Peltophorum* by phytochemical screening of methanolic extract of leaves.

**KEYWORDS:** *Peltophorum pterocarpum*, methanolic extract, anthelmintic activity, albendazole.

**1. INTRODUCTION**

Intestinal helminthiasis is one of the world major neglected tropical diseases. Worldwide 3.5 billion people are infected with intestinal worms; children between 5–15 years are highly infected due to poor sanitation. In India, infections with these parasites are regarded as one amongst the most common public health problems, particularly in rural areas and urban slums. According to the World Health Organization (WHO) in India itself, about 50% to 65% of the total populations were affected.<sup>[1]</sup>

Gastro intestinal helminthes are resistant to currently available drugs and the synthetic anthelmintic drugs are not very safe because of side effects and toxicity. Many of them are not recommended for young children and pregnant ladies. In the recent years, the importance of herbal drugs in medicine has tremendously increased due to their lower side effects. Because of this, demand for the herbal formulation is increasing day by day.<sup>[2]</sup>

*Peltophorum pterocarpum* belongs to the family Fabaceae. The plant is used in different parts of the world for the treatment of several ailments like stomatitis, insomnia, skin troubles, constipation, ringworm, dysentery, muscular pains, sores and skin disorders. In Telugu it is called as Konda chinta, Pachha sunkesula.<sup>[3]</sup>

## 2. MATERIALS AND METHODS

### Collection of leaves and authentication

The fresh leaves of *Peltophorum pterocarpum* (Fabaceae) were collected from village Peddasettypalli, Proddatur, Kadapa district, Andhra Pradesh, India, in the month of January 2014. The plant was authenticated by Dr. Madhav chetty, Taxonomist, S.V. University, Tirupathi, India. The leaves were shade dried at room temperature and the shade dried leaves of *Peltophorum pterocarpum* were powdered to 22 mesh size.

### Extraction of leaves of *Peltophorum pterocarpum*

The powdered leaves were packed in the soxhlet apparatus. Then it was extracted with petroleum ether at about 50<sup>0</sup>C by hot percolation method for 12 hours. The marc left after the petroleum ether extract was taken and subsequently extracted with 95% methanol for about 20 hours at 70<sup>0</sup>C in soxhlet apparatus. Then it was filtered and the filtrate was concentrated to a dry mass by heating on a water bath. The extract was kept in a glass container and then stored in a desiccator for further study.<sup>[4]</sup> The obtained extract was used for phytochemical analysis as per the methods of Harborne.<sup>[5]</sup>

### Phytochemical evaluation

**Table 3.1: Phytochemical evaluation tests**

S.No.	Plant constituent	Test	Petroleum ether extract	Methanolic extract
1	Carbohydrates	Molish's reagent	+ve	+ve
2	Proteins	Xanthoprotein test Millon's test	-ve -ve	+ve +ve
3	Amino acids	Ninhydrin test	+ve	+ve

4	Sterols	Libermann – Burchard reaction	+ve	-ve
5	Alkaloids	Dragendroff's reagent Mayer's reagent	+ve +ve	+ve +ve
6	Tannins	Ferric chloride solution test	-ve	+ve
7	Glycosides	Keller – Killiani test Baljet's test	-ve -ve	+ve +ve
8	Flavonoids	Shinoda test	-ve	+ve

Where, +ve = Positive, -ve = Negative

### Collection of worms

The earthworms belonging to species *Pheretima posthuma* (Annelida), about 3-5 cm in length and 0.1- 0.2 cm in width and weighing about 0.8-3.04 g, were collected from the moist soil of Annaram, Proddatur, Kadapa, Andhra Pradesh, India.

### Anthelmintic Assay

Anthelmintic activity was carried as per the method reported by **Rajesh .R et al.** The extract and the standard drug solution were freshly prepared before starting the experiments. *Pheretima posthuma* was placed in petridishes containing three different concentrations (25, 50, 100 mg/ml) of methanolic extract of *Peltophorum pterocarpum*. Albendazole (20 mg/ml) was used as a standard reference. Each petridish was placed with 6 worms and observed for paralysis (or) death. Observations were made for the time taken to paralyze (P) and death (D) of individual worms. Paralysis was said to occur when the worms do not move even in normal saline. Death was concluded when the worms lost their motility followed with fading away of their body colour.<sup>[6]</sup>

### Experimental Design

The earth worms were divided into 5 groups each group contains 6 earth worms.

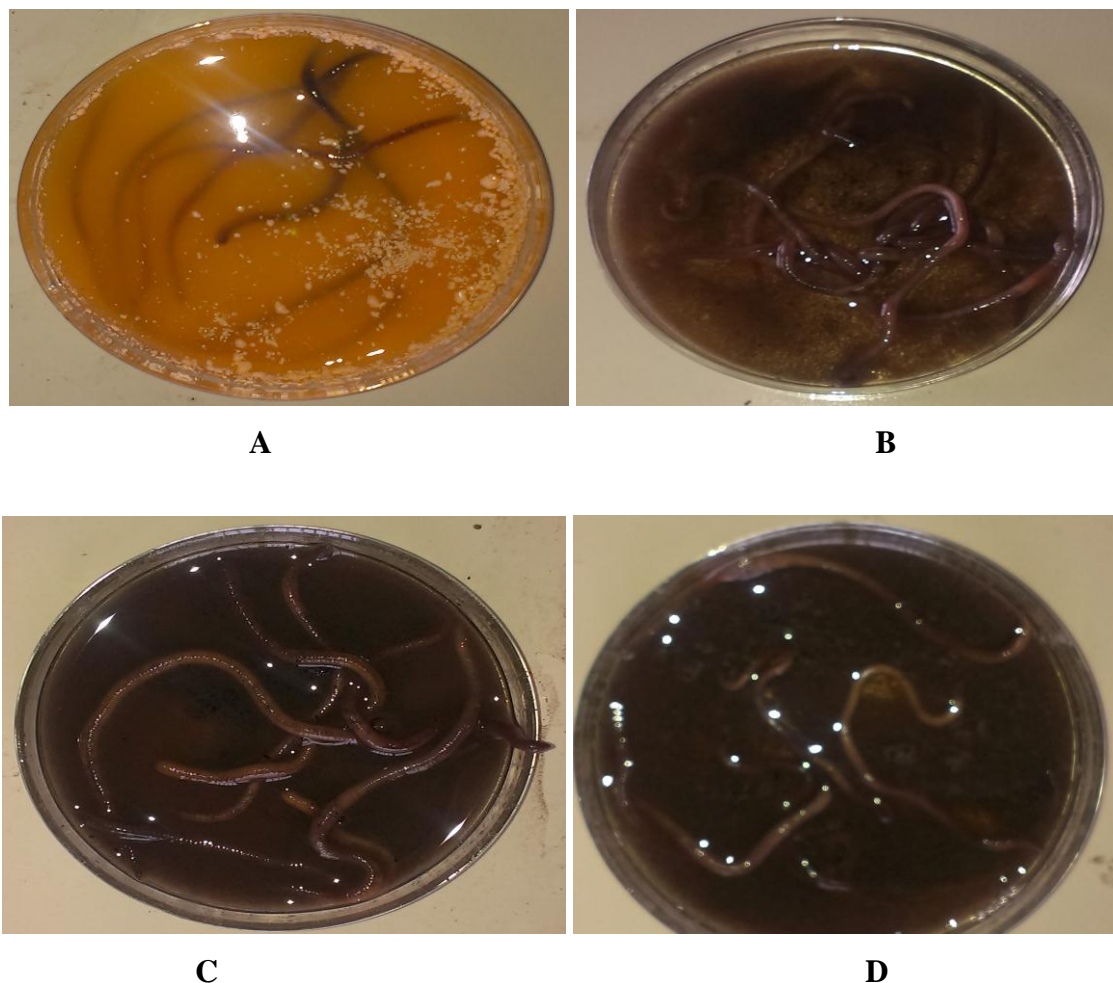
Group I: Earthworms were treated with 1% Carboxy methyl cellulose.

Group II: Earthworms were treated with Albendazole 20 mg/ml.

Group III: Earthworms were treated with methanolic extract 25mg/ml.

Group IV: Earthworms were treated with methanolic extract 50 mg/ml.

Group V: Earthworms were treated with methanolic extract 100 mg/ml.



**Fig 1: Anthelmintic effect of methanolic extract of *Peltophorum pterocarpum***

**A: Earthworms were treated with Albendazole 20 mg/ml.**

**B: Earthworms were treated with methanolic extract 25mg/ml.**

**C: Earthworms were treated with methanolic extract 50 mg/ml.**

**D: Earthworms were treated with methanolic extract 100 mg/ml.**

### 3. RESULTS & DISCUSSION

In the Preliminary phytochemical analysis of methanolic extract of *Peltophorum pterocarpum* leaves, it was revealed that methanolic extract was found to show the presence of alkaloids, carbohydrates, glycosides, flavonoids, amino acids, proteins and tannins. *In vitro* technique had advantage to evaluate anthelmintic activities of medicinal plants, when compared to *in vivo* techniques due to simplicity, low cost, precision, reproducibility and effectiveness of this technique.<sup>[7]</sup>

As shown in table 3.2, different concentrations of methanolic extract of *Peltophorum pterocarpum* exhibited anthelmintic activity. It has shown shortest time of paralysis (P= 39

min) and death (D= 61 min) in 100 mg/ml concentration, while the time of paralysis and death will increase in 50 mg/ml concentration (P= 49 min and D= 92 min) and in 25 mg/ml concentration (P= 58 min and D= 109 min) respectively as compare to albendazole (20 mg/ml) used as standard reference (P= 35 min and D= 57 min) and 1% carboxymethyl cellulose as control. Methanolic extract of leaves of *Peltophorum pterocarpum* exhibited anthelmintic activity in dose dependent manner giving short time of paralysis and death with the dose of 100 mg/ml.

**Table 3.2: Anthelmintic effect of methanolic extract of *Peltophorum pterocarpum* leaves**

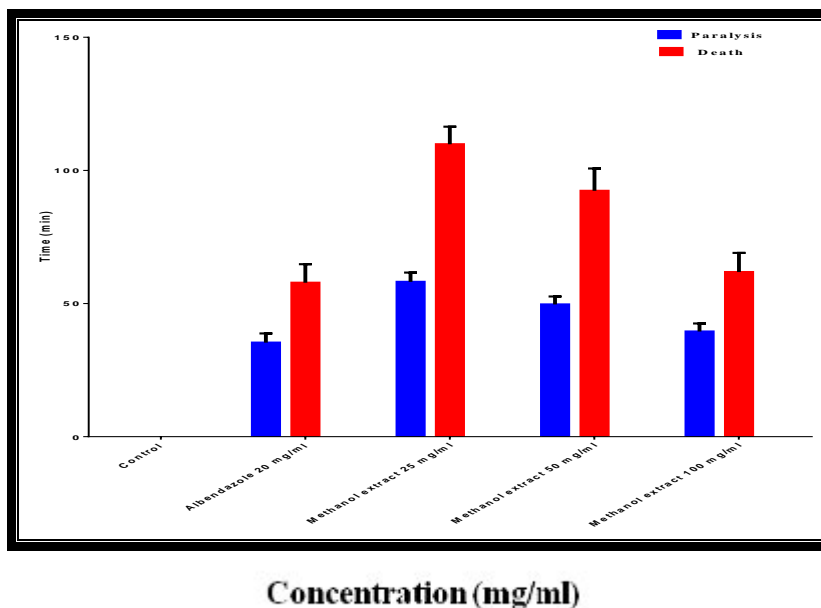
S.NO.	Groups	Concentration (mg/ml)	Paralysis time (P) (Min)	Death time (D) (Min)
1	Group I	1% CMC	—	—
2	Group II	Albendazole 20 mg/ml	35±3.4	57±6.9
3	Group III	Methanol extract 25 mg/ml	58±3.4	109±6.5
4	Group IV	Methanol extract 50 mg/ml	49±2.9	92±8.4
5	Group V	Methanol extract 100 mg/ml	39±3.1	61±7.1

All values represent Mean ±SEM; n= 6 in each group.

In the present study Albendazole is used as standard drug as it causes degenerative alterations in the intestinal cells of the worm. Degenerative changes in organs like endoplasmic reticulum, the mitochondria results in decreased production of adenosine triphosphate (ATP), which is the energy required for the survival of the helminthes. Due to diminished energy production, the parasite is immobilized and eventually dies.<sup>[8]</sup>

Earlier studies have demonstrated that tannins and alkaloids were known to possess anthelmintic activity. Tannins bind to free proteins in the gastrointestinal tract of the host animal or glycoprotein on the cuticle of the parasite and phenolic compounds by uncoupling oxidative phosphorylation hinder the energy production in helminth parasites. Alkaloids may act on central nervous system and caused paralysis of the earthworm. The effect can be due to presence of the steroidal alkaloids and oligoglycosides which may suppress the transfer of sucrose from the stomach to the small intestine together with their antioxidant effect which is capable of reducing the nitrate generation which can interfere in local homeostasis that is essential for the development of helminthes.<sup>[9]</sup>

Phytochemical analysis of leaves of *Peltophorum pterocarpum* revealed the presence of tannins, alkaloids and flavanoids as constituents. The anthelmintic activity of leaves of *Peltophorum pterocarpum* may be the presence of tannins, alkaloids and flavanoids.



**Fig 2: Anthelmintic effect of methanolic extract of *Peltophorum pterocarpum***

#### 4. CONCLUSION

The traditional claim of leaves of *Peltophorum pterocarpum* as an anthelmintic has been confirmed as the extracts shown activity against *Pheritima postuma*. Further studies are necessary to isolate and reveal the active compound contained in the crude extracts of *Peltophorum pterocarpum* responsible for activity.

#### 5. ACKNOWLEDGEMENT

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