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# An Approach to Explore Anthelmintic Activity of *Erythroxylum monogynum* Leaves in *Pheretima posthuma* as test Worm

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**Abstract**

Different extracts of *Erythroxylum monogynum* were explored for anthelmintic activity on *Pheretima posthuma* (earthworm). Two concentrations (50 and 100 mg/ml) of different extracts of *E. monogynum* were experienced and outcomes were under as paralysis and death times of *P. posthuma*. Albendazole (20 mg/ml) and Piperazine citrate (10 mg /ml) were adopted as standards and carboxy methyl cellulose (0.5%) as a control. The dose-dependent activity was experiential with methanolic extract than hydroalcoholic extract. The authors conclude the anthelmintic activity of *E. monogynum* leaves extract.

**Keywords:** Anthelmintic, *Erythroxylum monogynum*, *Pheretima posthuma*, Albendazole.

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## Introduction

Helminthes infections which are repeatedly entitled helminthiasis amongst the most predominant contagion (Bethony *et al.*, 2006). The helminthes parasites mostly survive in the human body in the gut (Hotez *et al.*, 2008).Growth of opposition in helminthes against anthelmintic drugs (Taylor and Hunt, 1989) that propelled to investigate and go for an alternative. *Erythroxylum monogynum* (Family: Erythroxylaceae), proved to tackle skin diseases, UTI, liver ailments, lung dysfunction and many (Christen et al., 1995; Agar and Evans, 1976;

Bieri et al., 2006; Kumar et al., 2019; Beltrame et al., 2006). But no attempts were made on this herb for anthelmintic activity. Many kinds of research says herbal products are safe and effective (Ananda *et al.*, 2019; Ahad *et al.*, 2010). In this research, we are selected Indian adult earthworms due to anatomical similarity with the intestinal roundworm parasite of human beings (Day and Maule, 1999). The external morphology of *Erythroxylum monogynum* was represented in fig:1.

## Material and Methods

### Collection and authentication of plant material

The leaves of *Erythroxylum monogynum* were collected from July to September locally from Kalasapadu village, YSR Kadapa (Dist.), AP, India and were authenticated by Dr. Madhu Sudhana Reddy A, Professor, Dept. of Botany, YV University, YSR Kadapa, India. A voucher specimen gained and conserved in the herbarium (HC.MBD/HAP/BK/2018/5/16).

**Fig.1: External morphology of *Erythroxylum monogynum***

### Investigational worms

All the tests were done on *Pheretima posthuma* (Earthworms) due to its anatomical likeness with the intestinal roundworm parasites of human beings. They were placid from moist soil and eroded with water to eliminate all feces.

### Preparation of Extracts

The plant leaves were unglued and dried in shade, powdered with a food-grade blender. The fine powder was collected by passing over the sieve# 23. The 50 g powder was added to 250 ml of solvent hydroalcoholic solvent at 80% ethanol and 20% water by using a Soxhlet extraction apparatus. Preliminary phytochemical screening was done to measure the existence of phytoconstituents in the extract. The presence of amino acids and glycosides are present in this plant extract, and because of this constituent, it shows anthelmintic activity (Hindustan *et al.*, 2011; Ahad *et al.*, 2009; Johnson *et al.*, 2003; Abdul *et al.*, 2011).

### Preparation of Extract

The methanolic and hydroalcoholic extract of *E. monogynum* at different concentrations (50,100 mg/ml suspension) were made with 0.5% w/v of Carboxy Methyl Cellulose (CMC) as a suspending agent (Kumar *et al.*, 2014).

### Experimental Design and statistical analysis

The adult Indian earthworm (*Pheretima posthuma*) has anatomical and physiological similarity with the intestinal roundworm parasites so these were taken in this study (Patra *et al.*, 2008; Partap *et al.*, 2012).

**Preparation of experts**

*Pheretima posthuma* was kept in Petri dish with methanolic & hydroalcoholic extract of *E. monogynum* leaves (50 &100 mg/ml). Two worms placed in each Petri plate and detected for paralysis (no movement), and death (no moment even after external stimuli) was recorded (Panda., 2010; Yesupadam *et al.,* 2011). The test results were related to the reference drug (Albendazole-20 mg/ml). The mean and SD values were assessed statistically by ANOVA. The concentrations used in this study revealed in table 1.

**Table 1: Various concentrations used in the present investigation**

| Extract | Conc. (mg/ml) | *Pheretima posthuma* | |
|---|---|---|---|
| | | Paralysis (P) | Death (D) |
| Control (0.5% CMC) | - | - | - |
| Standard (Albendazole) | 20 | 28.71±1.86 | 58.90±2.85 |
| Standard (Piperazine citrate) | 10 | 32.86±1.90 | 62.83±1.50 |
| Methanolic extracts | 50 | 54.22±2.95 | 78.37±3.76 |
| | 100 | 44.90±2.59 | 58.03±2.25 |
| Hydro alcoholic extract | 50 | 63.25±1.10 | 86.66±4.69 |
| | 100 | 45.55±2.05 | 68.75±3.97 |

Values in mean ±S.D; trial made (n)=3

**Results and Discussion**

Initial phytochemical observation of methanolic extracts showed the presence of Alkaloids, flavones, saponins, steroids, Tannins and terpenoids. Whereas the aqueous extract contains Alkaloids, steroids, and Tannins. The observations illustrate that the methanolic extract showed anthelmintic potential at 100 mg/ml, even the hydroalcoholic extract also expressed the analogous effect at this concentration. The anthelmintic action of extracts is compared with standard drugs (Albendazole and Piperazine citrate). Evaluation of activities of medicinal plants demands to endow the anthelmintic stuff is gaining the attraction. The results of this study have displayed promising anthelmintic activity signifying the likely use of *E. monogynum* extracts in intestinal nematode regulation. The present study recommended that the methanol extract was more actual than the other extracts, even though all the extracts were gifted with anthelmintic stuff. The activity of the extracts was observed to be contrariwise relative to the time taken for paralysis/death of the earthworms (fig: 2 and 3).

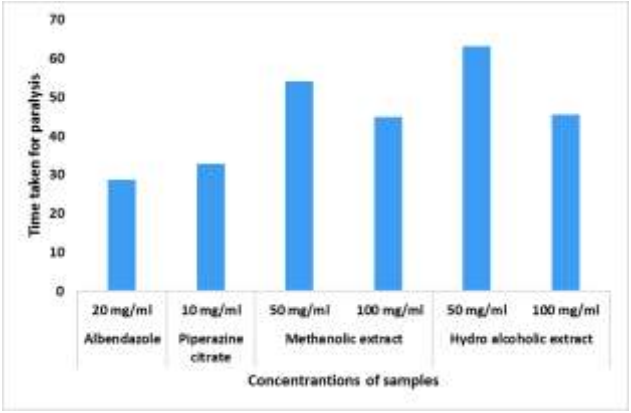


**Fig. 2: Time taken for Paralysis of *Pheretima posthuma***

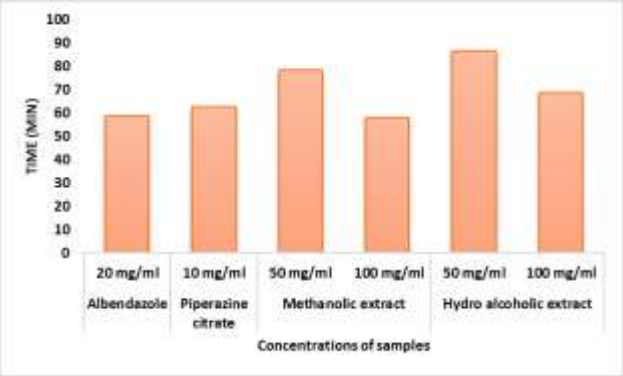


**Fig. 3: Time for the death of *Pheretima posthuma***

## Conclusion

The present work illustrates that the hydro alcoholic extract (100mg/ml) of *Erythroxylum monogynum* showed better response than the crude methanol extract against *Pheretima posthuma.* The existing examination leads to the assumption that the *E. monogynum* leaves have potent anthelmintic activity when likened with the conservatively used drug. Further studies using *in vivo* models and to isolate active residents from extract are obligatory to carry out and recognized the efficiency and pharmacological balance for the use of *E. monogynum* as an anthelmintic drug.

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## Disclosure statement

There are no conflicts of interest.

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