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IN VITRO ANTHELMINTIC ACTIVITY OF WATER AND ETHANOLIC EXTRACT OF STEM-BARK OF *DOLICHONDRONE FALCATA* (SEEM)

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ABSTRACT

Water and ethanolic extracts of *Dolichondrone falcata* (Seem) were evaluated for their anthelmintic activity using Indian mature earthworm called *Pheretima posthuma*. Various concentrations of water and ethanolic extract ranging from 10 to 100 mg/ml were made and tested on said earthworm. The bioassays were tested for these extracts which include time for paralysis and time for death of the worms. Water as well as ethanolic extract revealed good anthelmintic activity at concentration of 100 mg/ml. Lower concentrations did not produced any significant anthelmintic activity. The standard reference drug used is piperazine citrate at concentration of 10 mg/ml for comparing anthelmintic activity of these extracts.

Keywords: *Pheretima posthuma, Dolichondrone falcata* (Seem), Extraction, Anthelmintic activity, piperazine citrate etc.

INTRODUCTION

The earthworms are long cylindrical shaped with brown color; generally they live in burrows in moist earth of decaying vegetation or humus. They observed often in agricultural lands which increases the yield of crop. *Pheretima posthuma* lives for 3 to 10 years.

Figure 1: Earthworms (*Pheretima posthuma*)

Helminthiasis is a worm causing disease of humans and other animals even life stock and crops affecting health and food production respectively. The worms which cause helminthiasis are called as helminthes and the drugs which are used for treating helminthiasis are nothing but anthelmintic. There are various types of worms such as fluke worms, hook worms, round worms, tape worms etc. which causes helminthiasis. The nomenclature is given according to their shapes. The major organs which get affected in helminthiasis are stomach and intestine and major symptoms of sever helminthiasis include abdominal pain, diarrhea, general malaise and impaired cognitive development. Hook worm lead to chronic helminthiasis give rise to intestinal bleeding and anemia **[1]**.

Dolichondrone falcata (Seem) has long history of use by indigenous and tribal people of world and India. The medicinal value of leaves and bark of this plant is also mentioned in Ayurveda as meshsa-sringi. The plant is also known by synonyms as Bhersing, Medasingi, Kadalatti, Mesasrnga, Visanika etc. **[2]**.

The decoction of bark is given in the treatment of nodules. Leaves paste is mixed with Neem leaves and applied for curb swelling. Fruit paste and bark paste is applied with water three times to get relief from scorpion bite and snake bite. **[3],** Leaves juices taken orally with water acts an antidote to snake bite, relieve muscular pains and backache leaves are added in steam bath. Infusion of root bark or powder is given internally in the acute rheumatism **[4]**.

Figure 2: Flowering twig of *Dolichondrone falcata* (Seem)

In Indian ancient literature like Ayurveda plant is suggested for various medicinal purposes but till now very less research is done on evaluation of stem-bark for medicinal activities of *Dolichondrone falcata.* Hence the said research activity is undertaken for evaluation of anthelmintic potential against human adult worm **[5]**.

METHODOLOGY

Plant Collection & Authentication

Dolichondrone falcata (Seem) Stem-bark were collected from Trimbakeshwar region. Herbariums was produced and authenticated in botanical survey of India, Western Circle, Pune city (Maharashtra). The herbarium was kept in the museum and specimen number is given: NBA-02.

Preparation of Extract

Dolichondrone falcata (Seem) extracts

Dolichondrone falcata (Seem) stem-bark were dried in shade & powdered in domestic mixer. Coarsely powdered drug was extracted with ethanol in continuous hot percolator. The insoluble residue was dried and further extracted with ethanol and later extracted with water. The extracts was concentrated in the Rotary evaporator under vacuum condition and kept in refrigerator at temp. 2^0C to 4^0C **[6]**.

Collection of Animal and Authentication

Pharetima posthuma of 7-8 cm length and having weight about 2 to 3 gms were collected at night from burrows of moist soil from agricultural fields of Ashvi (BK) and were authenticated from the department of Zoology of Padmashri Vikhe Patil College, Pravaranagar. After authentication worms were used for anthelmintic activity. The rationale behind choosing these worms is that they resembles by anatomy and physiology with intestinal worm parasite of human being.

Drugs and chemicals

All chemicals used in the study are of analytical pure grade chemicals. Piperazine citrate was procured from S. Tech Industries - PUNE

Anthelmintic activity

The anthelmintic activity was carried out by using the method reported by Ajaiyeoba. Required changes were made in method as per necessity. 20 ml formulation containing three different concentrations of 20, 40 and 80 mg/ml of aqueous and ethanol extract were prepared and transferred in 9 different Petri plates. Six *Pheretima posthuma* worms of approximately same size and same length were placed in these Petri plates. Time for paralysis i.e. duration in which movement of worms stop is noted when Petri plates are shaken vigorously and also time of death i.e.

period required for death worms is also noted which is confirmed by shaking Petri dishes vigorously as well as by dipping Petri dishes in hot water for few minutes. Piperazine citrate was used in concentration of 10 mg/ml as reference standard and distilled water was used as control. Results are expressed in mean ± SEM of six worms in each group and are tabulated and graphically represented **[7]**.

RESULT AND DISCUSSION

Aqueous and ethanolic extract of stem-bark of *Dolichondrone falcata* (Seem) showed the promising anthelmintic activity. These extracts took the less time for producing paralysis and death of the earthworms. As shown in **Table 1 and Figure 1**, Ethanolic extract have more effective as that of aqueous extract for paralyzing the earthworm. Aqueous and organic extract showed necessary anthelmintic properties with 80 mg/ml giving a shortest time of paralysis in earthworm 10 ± 0.5 and 8 ± 0.7 min. respectively. Aqueous extract have more effective as that of organic extract for time taken to the death of earthworms. Aqueous and organic extract showed necessary anthelmintic properties with 80 mg/ml giving a shortest time of Death in earthworm 30 ± 0.8 and 31 ± 04 min. respectively. The function of the anthelmintic drugs like piperazine citrate acts by paralyzing the worms so that they are excluded in the feces of human and animals. The extracts not only confirmed this property but also caused death of the worms, especially at 80 mg/ml dose when compared with standard drug piperazine citrate both Aqueous and ethanolic extract of stem-bark of *Dolichondrone falcata* (Seem) showed significant anthelmintic activity at 80 mg/ml dose. In conclusion, the stem-bark of *Dolichondrone falcata* (Seem) has been confirmed to exhibit anthelmintic activities.

Table 1: Time taken for paralysis and death in minutes

Test substance	Conc. (mg/ml)	Paralysis time (Min)	Death time (Min)
Distilled water	-	-	-
Aqueous extract-I	20	26± 0.3	62 ± 0.4
Aqueous extract-II	40	16 ± 0.8	38 ± 0.6
Aqueous extract-III	80	10 ± 0.5	30 ± 0.8
Ethanolic extract-I	20	28 ± 0.4	66 ± 0.4
Ethanolic extract-II	40	14 ± 0.8	38 ± 0.5
Ethanolic extract-III	80	8 ± 0.7	31 ± 04
Piperazine citrate	10	21± 0.4	62 ± 0.4

Values represent mean ± SEM, One way ANOVA, P < 0.0001, followed by Dunnett's t-test, **P < 0.01

Where:

ADFB extract-I: Aqueous *Dolichondrone falcata* (Seem) Stem-Bark extract 20 mg/ml
ADFB extract-II: Aqueous *Dolichondrone falcata* (Seem) Stem-Bark extract 40 mg/ml
ADFB extract-III: Aqueous Dolichondrone falcata (Seem) Stem-Bark extract 80 mg/ml
EDFB extract-I: Ethanolic Dolichondrone falcata (Seem) Stem-Bark extract 20 mg/ml
EDFB extract-II: Ethanolic Dolichondrone falcata (Seem) Stem-Bark extract 40 mg/ml
EDFB extract-III: Ethanolic Dolichondrone falcata (Seem) Stem-Bark extract 80 mg/ml

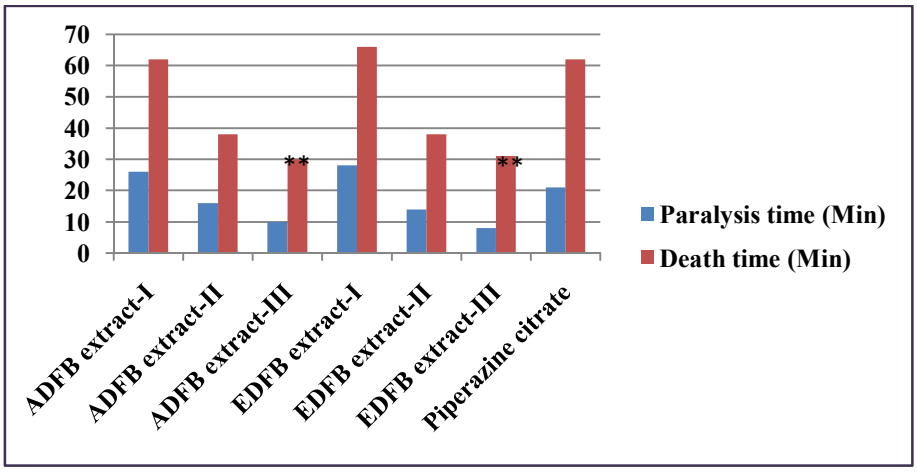

Figure 1: Paralysis time and Death time in minutes
Values represent mean ± SEM, One way ANOVA, P < 0.0001, followed by Dennett's t-test, **P < 0.01

SUMMARY AND CONCLUSION

In conclusion, the stem-bark of *Dolichondrone falcata* (Seem) has been confirmed to exhibit anthelmintic activities.

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