

## **Assessment of anthelmintic activity of *Jussiaea hyssopifolia* G. Don**

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### **ABSTRACT**

*The escalating pervasiveness of anthelmintic resistant strains of helminths, drug residues in animal products and high cost of conventional anthelmintics has created an interest in studying medicinal plants as an alternative source of anthelmintics. The plant “*Jussiaea hyssopifolia*” have great medicinal value and reported as astringent, carminative, laxative and diuretic properties. The methanolic extract of entire plant *Jussiaea hyssopifolia* were screened for anthelmintic activity on *Pheretima posthuma* (earth worm) in comparison to reference standard Albendazole. A significant anthelmintic effects were observed on live adult *Pheretima posthuma* worms in terms of the paralysis and death of the worms at different concentrations.*

**Key words:** *Jussiaea hyssopifolia*, Methanolic Extract, Anthelmintic Activity, *Pheretima posthuma*, Albendazole.

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### **INTRODUCTION**

Plants have provided man with all his needs in terms of shelter, clothing, food, flavours and fragrances. Plants have formed the basis of system among traditional medicine which has given rise to some important drugs still in use today. Many ancient nations have awakened to the importance of herbal medicine which brings more cures [1]. After decades of serious obsession with the modern medicinal system, people have started looking at the ancient healing systems like Ayurveda, Siddha and Unani. This is because of the adverse effects associated with synthetic drugs [2]. Indian medicinal plants also provide a rich source for antioxidants that are known to prevent/delay different diseased states. The antioxidant protection is observed at different levels [3].

Helminthes infections are among the most common infections in men, affecting a large proportion of the world’s population. In developing countries, they pose a large threat to public health and contribute to the prevalence of malnutrition, anemia, eosinophila and pneumonia. Although the majority of infections due to worms are generally limited to tropical regions, they can occur to those who visited these areas and some of them can develop in temperate climates [4]. Hence, the increasing prevalence of helminth parasites those are resistant to conventional

anthelmintics has been the spur for different research programs exploiting alternative approaches to parasite control [5]. For much of our past history for ages, plant parts or entire plant extracts have been used to combat parasitism and in many parts of the world such natural products are still in use for this purpose. *Jussiaea hyssopifolia* G. Don (Onagraceae) is one of the important medicinal plants growing in dumpy areas. In the historical documents the plant was used as an astringent, carminative, laxative and diuretic [6,7]. Literature survey reveals that till date no reports were found on the anthelmintic activity of entire plant extract of *Jussiaea hyssopifolia*. In this paper, we would like to describe the extraction and evaluation of anthelmintic activity of *Jussiaea hyssopifolia* G. Don.

## MATERIALS AND METHODS

### Drugs and Plant Materials

The plant *Jussiaea hyssopifolia* was collected from the dumpy field of Barpali in the district of Bargarh, in the state of Odisha. Then subsequently for more conformation the herbarium sheet of plant was authenticated from Botanical Survey of India, Howrah, Kolkata with the reference no.CNH/I-I/4/2010/Tech.II/195. Few authentic samples were preserved in our department for future reference. After authentication, the fresh plant were collected, the aerial plant of the plant were washed and shade dried and powdered in a pulverizer. It was passed through 60 mesh to get the powder of desired coarseness.

### Preparation of Plant Extract

The powdered plant material was extracted with methanol in a Soxhlet apparatus. After complete extraction, the extracts were cooled at room temperature, filtered and evaporated to dryness under reduced pressure in a rotary vacuum flask evaporator. A greenish semi-solid extract was obtained & was kept under refrigerator for further use. The methanolic extract of *J. hyssopifolia* is taken as test drug and used for the evaluation of anthelmintic activity.

### Anthelmintic activity

The entire plant extract of *Jussiaea hyssopifolia* were evaluated for anthelmintic activity in *Pheretima posthuma* (earth worm) of nearly equal size ( $6\pm 1$  cm) [8]. *Pheretima posthuma* is used due to its anatomical and physiological resemblance with the intestinal roundworm parasite of human beings [9-12]. Because of easy availability of earthworms, they have been used widely for the initial evaluation of the anthelmintic compounds [13,14] The worms were acclimatized to the laboratory condition before experimentation. The earthworms were divided into five groups of six earth worms in each and placed in eight Petri dishes containing the extract solutions or the reference drugs as mentioned below-

Group -1: Received 2% gum acacia which served as the control

Group-2: Received Albendazole suspension at a dose of 10mg/ml which served as the standard

Group-3: Received Methanolic extract at a dose of 100mg/ml

Group -4: Received Methanolic extract at a dose of 200mg/ml

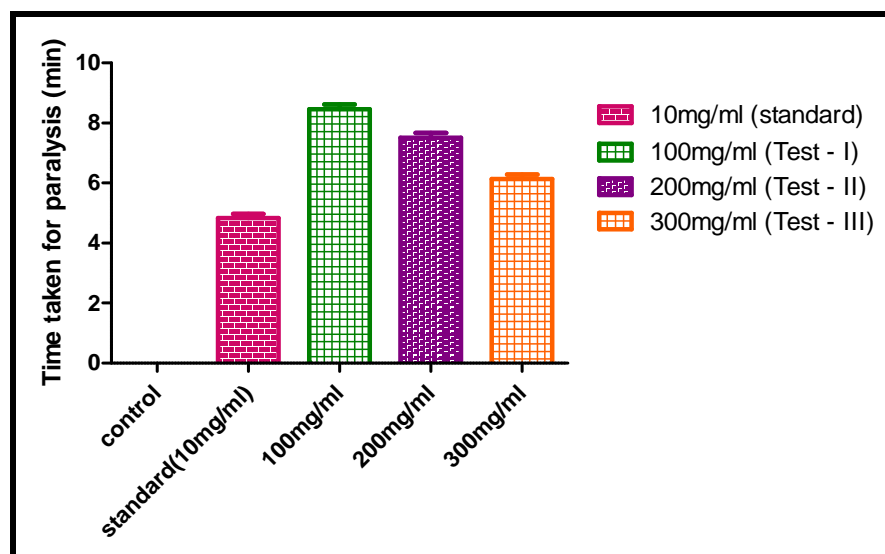
Group-5: Received Methanolic extract at a dose of 300mg/ml

All Petri dishes were kept under room temperature. The living or viable worms were kept under close observation. Observation were made for time taken to complete paralysis (PT) and death (DT) for individual worms. Each worm was frequently applied with external stimuli which stimulates and induce movement in earthworms, if alive. Paralysis was said to occur when the worms do not revive even in normal saline. Death was concluded when the worms lose their

motility followed with fading of the body colour. The motionless worms were then transferred at 40° C to confirm that they were dead.

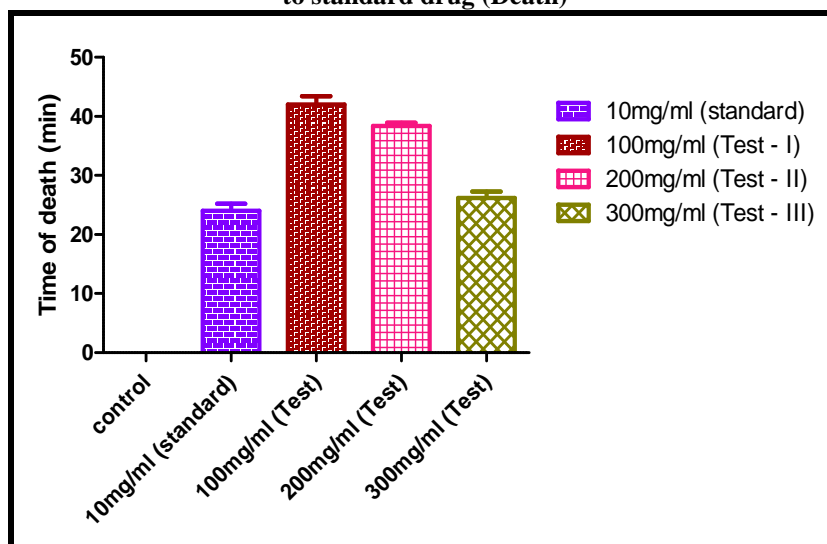
## RESULTS AND DISCUSSION

**Fig. I:** Graphical representation for the anthelmintic activity of *J. hyssopifolia* methanolic extract compared to standard drug (Paralysis)



Each value represents the mean  $\pm$  S.E.M.,  $n = 5$ ,  $***P < 0.001$ , compared with control, Dunnett's *t*-test after analysis of variance.

**Fig. II:** Graphical representation for the anthelmintic activity of *J. hyssopifolia* methanolic extract compared to standard drug (Death)



Each value represents the mean  $\pm$  S.E.M.,  $n = 3$ ,  $***P < 0.01$ , compared with control, Dunnett's *t*-test after analysis of variance.

The anthelmintic activity of entire plant extract of *Jussiaea hyssopifolia* G. Don. Was carried out on earth worm. Different concentrations of the methanolic extracts were used for the studies. The time taken for paralysis and death of earthworms were recorded in Table – I. The perusal of the data reveals that the methanolic extract at the concentration of 200mg, 300 mg/ml showed both paralysis and death time in 7,6 & 36, 28 mins. respectively. The effect increased with concentration. The extract caused paralysis followed by death of the worms at all tested dose levels. It was observed that the methanolic extract of *Jussiaea hyssopifolia* is more potent drug.

The extract showed paralysis followed by death of the worms at all tested dose levels. The potency of the extract was found inversely proportional to the time taken for paralysis of death of worms.

**Table I : Anthelmintic Activity of *Jussiaea hyssopifolia* entire plant extract in earth worms**

Treatment	Concentration (mg/ml)	Time taken for paralysis (min)	Time taken for death (min)
Gum Acacia (Vehicle)	-	-	-
Albendazole suspension	10 mg	4.8 ±0.12***	24.0 ±1.18***
Test (Methanolic extract)	100mg	8.4 ±0.16***	42.0 ±1.37***
	200mg	7.5 ±0.17***	38.40 ±0.51***
	300mg	6.1 ±0.14***	26.2 ±1.06***

The above finding justify the anthelmintic properties of this plant further study regarding the isolation and characterization of the active principle responsible for anthelmintic activity currently under progress.

### Statistical Analysis

The results are presented as mean ± SEM. “One-way ANOVA with Dunnett’s post test was performed using Graph Pad Prism version 3.00 for windows. Graph Pad Software, San Diego California USA, P < 0.01 were considered significance.

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