



INTERNATIONAL JOURNAL OF PHARMACY & LIFE SCIENCES  
(Int. J. of Pharm. Life Sci.)

**Comparative study of Anthelmintic activity of different  
extracts of *Gynandropsis pentaphylla* Linn.**

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**Abstract**

*Gynandropsis pentaphylla* Linn. is also known as Arkapushpika, Suryavarita in Sanskrit, Churota, Arkahuli in Hindi, Velai keerai, Thaivelai in Tamil, belonging to the family of *Cleomaceae* is an annual, erect, branched, 0.6-1.2 m in height, stems and branches striate, white spreading hairs. Leaves 3-5 foliolate, petioles 5-7.6 cm long, and seeds muricate dark brown. The plant has been traditionally used as an anthelmintic and rubefacient. Leaves are applied externally over the wounds to prevent the sepsis. The plant also used in the treatment of malaria, piles, rheumatism and in tumour. The present study is an attempt to explore the anthelmintic activity of different extracts of *Gynandropsis pentaphylla* linn. In this study, ethanolic, aqueous, chloroform, petroleum ether extracts were used and studied for paralysis and death of earthworm. All the extracts were found not only to paralyze (vermifuge) but also to kill the earthworms (vermicidal). The aqueous and ethanolic extract was found to be more effective to execute the earthworm.

Key-Words: Anthelmintic activity, *Gynandropsis pentaphylla* Linn, *Pheretima posthuma*

**Introduction**

The plant *Gynandropsis pentaphylla* Linn (Fam: Cleomaceae) (Syn. *Gynandropsis gynandra* L., *Cleome gynandra* L.), is commonly known as 'Hurhur' and 'Karaila' in India and 'Cat's whiskers' in English<sup>1</sup>. Cat's whiskers grow as a weed in most tropical countries. It has been used for several years in Indian traditional medicine as an anthelmintic and antimicrobial agent<sup>2</sup>. It is an annual, erect, branched, 0.6-1.2 m in height, stems and branches striate, white spreading hairs. Leaves 3-5 foliolate, petioles 5-7.6 cm long and seeds muricate dark brown. Seeds finely longitudinally striated, with slightly cristate transverse ridges. Flowers 1-2cm across, mostly white or pinkish; pedicels generally 1-2 cm long.

The plant has been traditionally used as an anthelmintic and rubefacient. Leaves are applied externally over the wounds to prevent the sepsis. The plant also used in the treatment of malaria, piles, rheumatism and in tumour<sup>3</sup>. The decoction of the root is used to treat fevers. The juice of the root is used to relieve scorpion stings.

The leaves, applied as a poultice, are used as a vesicant and rubefacient in the treatment of rheumatism. The juice of the leaves is a remedy for pain in the ear. The seeds are anthelmintic and rubefacient. Leaves with a high percentage of vitamin C is taken as a pot herb in soups, fresh or dried. The leaves are used as disinfectants. Inhalation of the leaves also relieves headaches; leaf juice and oil, for earache and eye wash. Stems are used as analgesic and anti-inflammatory agent<sup>4</sup>. A decoction or infusion of boiled leaves and/or roots is administered to facilitate childbirth, treat stomach-ache, constipation, and conjunctivitis or thread-worm infection. The seeds and roots also have anthelmintic properties<sup>5</sup>. The methanol extract possess very good antioxidant property<sup>6</sup>. The plant *Gynandropsis pentaphylla* also possess anti-inflammatory and lysosomal stability actions in adjuvant induced arthritic rats<sup>7,8</sup>. Literature survey revealed that, this plant has not been subjected to anthelmintic activity. Based on this, an attempt has been made to evaluate the anthelmintic activity of different extracts of *Gynandropsis pentaphylla* Linn.

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## Material and Methods

### Plant Material

The leaves of *Gynandropsis pentaphylla* Linn were collected from Yercaud foot hills, Salem, Tamil nadu, in the month of March 2012. The plant material was taxonomically identified and authenticated by the botanist Dr.A.Balasubramanian, Director, ABS Botanical garden, Salem, Tamil Nadu, India. A voucher specimen has been kept in the Department of Pharmacognosy of our College for further reference. The leaves were separated and shade dried at room temperature for 10 days and coarsely powdered with the help of a hand-grinding mill and the powder was passed through sieve no.40 and stored in air tight container and used for further extraction.

### Preparation of extracts

The dried and coarse powdered material of *Gynandropsis pentaphylla* was extracted separately by using soxhlet apparatus with different solvents<sup>9</sup> and aqueous for cold maceration. After extraction, the extracts were concentrated under reduced pressure.

### Animals

Indian adult earthworms (*Pheretima posthuma*) were used to study anthelmintic activity. The earthworms were collected from moist soil and washed with normal saline to remove all fecal matter. The earthworms of 3-5 cm in length and 0.1-0.2 cm in width were used for all experimental protocol. The earthworm resembles both anatomically and physiologically to the intestinal roundworm parasites of human beings, hence can be used to study the anthelmintic activity.

### Drugs

Albendazole (ABZ Kare health specialities Pvt.Ltd.) were used during the experimental protocol.

### Anthelmintic assay

The anthelmintic assay was carried out as per the method of Dinesh Kumar Mehta *et al*<sup>10</sup> with necessary modifications. It was performed in-vitro using adult earthworms (*Pheretima posthuma*) owing to its anatomical and physiological resemblance with the intestinal roundworm parasites of human beings for evaluation of anthelmintic activity. Aqueous, ethanolic, chloroform and petroleum ether extracts of leaves of *Gynandropsis pentaphylla* were investigated for their anthelmintic activity. All the extracts and the standard drug solution were freshly prepared before starting the experiment. Different extracts and the standard drug solution were poured in different petridishes. All the earthworms were washed in normal saline solution before they were released into 10 ml of respective formulation as follows: Vehicle (5% DMF in normal saline), Albendazole (20mg/ml), Aqueous extract

(20mg/ml), Methanol extract (20mg/ml), Chloroform extract (20mg/ml), Petroleum Ether extract (20mg/ml). Various concentrations (25, 50 & 100 mg/ml) of each extracts were tested in the assay, which involved determination of time of paralysis and time of death of worms. Albendazole was used as reference standard while saline water as control. Sixteen groups of approximately equal sized Indian earthworms consisting of six earthworms in each group were released into 50 ml of desired formulation. Observations were made for the time taken to paralyse or death of individual worms. All the results were expressed as a mean  $\pm$  SEM of six animals in each group.

### Results and Discussion

The percentage yield of various extracts leaves of *Gynandropsis pentaphylla* linn. was found to be 4.86%, 3.76%, 11.46%, 25.42% with petroleum ether, chloroform, ethanol and aqueous respectively. The results of anthelmintic activity observed that all the extracts have shown a certain degree of anthelmintic activity. The activity reveals concentration dependant nature of the different extracts. The results were shown in Table 1. The alcoholic extract exhibited significant activity [time of paralysis (P) of 30.42 min and time for death (D) of 52.78 min] at 25 mg/ml concentration compared with standard drug Albendazole [(P) of 28.78 min and (D) of 31.43 min] at same concentration. Likewise, the aqueous extract showed significant activity [time of paralysis (P) of 32.68 min and time of death (D) of 53.10 min] at same concentration. For petroleum ether, (P) was 66.86 min and (D) was 95.04 min at 25 mg/ml concentration, being the least active among all the extracts.

### Conclusion

From the above results, it is concluded that the different extracts of *Gynandropsis pentaphylla* Linn have potent anthelmintic activity when compared with the conventionally used drug and is equipotent to standard anthelmintic drug. Further studies using in vivo models are required to carryout and establish the effectiveness and pharmacological rationale for the use of *Gynandropsis pentaphylla* as an anthelmintic drug. The drug may be further explored for its phytochemical profile to identify the active constituent responsible for anthelmintic activity.

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**Table 1: In-vitro Anthelmintic activity of various extracts of *Gynandropsis pentaphylla* leaves**

Test substances	Concentration (mg/ml)	Time taken for paralysis(P) in min	Time taken for death of worms(D) in min
<b>Control (normal saline)</b>	-	-	-
<b>Albendazole</b>	<b>25</b>	<b>28.78±1.33</b>	<b>31.43±0.81</b>
	50	20.56±1.72	25.86±0.9
	100	15.66±0.79	22.32±1.9
<b>Alcoholic extract</b>	<b>25</b>	<b>30.42±0.58</b>	<b>52.78±1.43</b>
	50	22.53±0.8	39.08±1.71
	100	18.65±1.07	31.46±1.05
<b>Aqueous extract</b>	<b>25</b>	<b>32.68±0.98</b>	<b>53.10±1.89</b>
	50	25.04±0.32	40.44±0.83
	100	20.33±1.5	33.71±0.77
<b>Chloroform extract</b>	25	52.45±1.6	73.78±0.33
	50	46.57±1.31	64.47±1.06
	100	40.34±0.85	59.76±0.92
<b>Petroleum ether extract</b>	25	66.86±0.59	95.04±1.67
	50	55.72±0.78	86.48±0.79
	100	49.43±1.3	78.67±1.7

Values are expressed as Mean ± SEM (n=6)

#### How to cite this article

Thenmozhi S. *et al.*, (2014). Comparative study of anthelmintic activity of different extracts of *Gynandropsis pentaphylla* Linn.. *Int. J. Pharm. Life Sci.*, 5(1):3246-3248.

Source of Support: Nil; Conflict of Interest: None declared

Received: 6.11.13; Revised: 1.12.13; Accepted:17.12.13

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