

## Review Article

IN VITRO EVALUATION OF ANTHELMINTIC POTENTIAL OF LEAVES OF *CLEOME VISCOSA* LINNRaman R Chandak<sup>1</sup>, Nishikant K Bhairat<sup>\*1</sup>, Subhash J Devdhe<sup>2</sup>, Hiral F Majmudar<sup>3</sup>

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## ABSTRACT

Herbal drugs are traditionally used in various parts of the world to cure different diseases. The Ayurvedic and Siddha medical systems are very famous medical practices in Indian traditional medicines. In the present research studies, Alcohol and aqueous extracts from the leaves of *Cleome viscosa* were investigated for their anthelmintic activity against *Pheretima posthuma* and *Ascaridia galli*. Three concentrations (50, 100 & 150mg/ml) of each extracts were studied in activity, which involved the determination of time of paralysis and time of death of the worm. Both the extracts exhibited significant anthelmintic activity at highest concentration of 150 mg/ml. Albendazole in same concentration as that of extract was included as standard reference and distilled water as control. The anthelmintic activity of alcohol and aqueous extracts of *Cleome viscosa* has therefore been demonstrated for the first time.

**Keywords:** Anthelmintic Activity, *Ascaridia Gallii*, *Cleome viscosa*, *Pheretima Posthuma*.

## INTRODUCTION

*Cleome viscosa* Linn. (Capparidaceae) is also known as Tickweed, or Spider plant (fig 1). It is found throughout the greater part of India, often in waste places and is known as Hurhur (Hindi) in Indian traditional medicine<sup>1</sup>.



Figure 1: *Cleome viscosa* Linn

In Asia and Africa the leaves and seeds used as a rubefacient and vesicant and to treat infections, fever, rheumatism and headache. The whole herb is used in treatment of ringworm, flatulence, colic, dyspepsia, constipation, cough, bronchitis, cardiac disorders<sup>1-3</sup>. Inflammation of the middle ear and applied on wounds and ulcers. Traditionally, this plant is used in various disorders such as diarrhoea, fever, inflammation, liver diseases, bronchitis, skin diseases, and malarial fever. The juice is useful in piles, lumbago and earache<sup>3</sup>. The analgesic, antipyretic and anti-diarrhoeal activities of the extract have been reported by researchers. In our field studies of ethnomedicinal plants of Bundelkhand, it was noted that the fresh leaves of *Cleome viscosa* are widely used as medicine for jaundice. The seeds and its oil have anthelmintic properties but they are ineffective in treating roundworm infections<sup>4</sup>. An aqueous seed extract displayed significant analgesic activity in mice and local anaesthetic activity in guinea pigs<sup>5,6</sup>. In tests with rats the anti-diarrhoeal and antipyretic activities of the extracts

have been confirmed<sup>7-9</sup>. The leaf juice of *Cleome viscosa* is known to be effective against ringworm. Therefore the objective of this work was to explore the anthelmintic properties of *Cleome viscosa* leaves.

## MATERIALS AND METHODS

**Extraction:** The fresh leaves of *Cleome viscosa* were collected and authenticated from the local market of Aurangabad, Maharashtra state, India. Dried leaves ground to coarse powder. Powder was first defatted with Pet-ether and then extracted with Methanol which is further evaporated to dryness to obtain alcoholic extract. Aqueous extract were obtained by maceration for 24 hours.

**Experimental:** Alcohol and Aqueous extracts from the leaves of *Cleome viscosa* were investigated for their anthelmintic activity against *Pheretima posthuma* and *Ascaridia galli*. Various concentrations (60-150 mg/ml) of each extract were tested in the bioassay, which involved determination of time of paralysis and time of death of the worms.<sup>10</sup> With minor modifications the assay was performed on adult Indian earthworm, *Pheretima posthuma* due to its anatomical and physiological resemblance with the intestinal roundworm parasite of human beings<sup>11-13</sup>. Because of easy availability, earthworms have been used widely for the initial evaluation of anthelmintic compounds in vitro<sup>14-16</sup>. Indian adult earthworms (*Pheretima posthuma*) collected from moist soil and washed with normal saline to remove all faecal matter were used for the anthelmintic study. The earthworms of 3-5 cm in length and 0.1-0.2 cm in width were used for all the experimental protocol. *Ascaridia galli* worms are easily available in plenty from freshly slaughtered fowls and their use, as a suitable model for



screening of anthelmintic drug was advocated earlier<sup>17-21</sup>. In the first set of experiment, six groups of six earthworms were released in to 50 ml of solutions of Albendazole, aqueous and alcoholic extracts of leaves of *Cleome viscosa* (50,100 and 150 mg/ml each) in distilled water. Albendazole was used as reference standard while distilled water as control. Observations were made for the time taken to paralysis and death of individual worms.

Time for paralysis was noted when no movement of any sort could be observed except when the worms were shaken vigorously. Death was concluded when the worms lost their motility followed with fading away of their body colors. Same experiment was done for *Ascaridia galli* worms only the difference was solutions were prepared in normal saline solutions.

**Table 1:** Anthelmintic activity of extracts of *Cleome viscosa*

Extracts of LS	Concentration mg/ml	Pheretima posthuma		Ascaridia galli	
		P	D	P	D
Aqueous extract	50	85.03±0.5	115.21±0.6	52.15 ± 0.73	71.5 ± 0.32
	100	71± 0.3	100.98± 0.2	45.2 ± 0.20	61.2 ± 0.10
	150	62.73±0.8	94.63±0.1	25.5 ± 0.17	47.5 ± 0.43
Alcoholic extract	50	66± 0.12	70± 0.43	62.04 ± 0.8	77.5 ± 0.21
	100	41± 0.20	61± 0.12	47.7 ± 0.1	67.2 ± 0.1
	150	22± 0.9	32± 0.33	35.2 ± 0.5	44.75 ± 0.22
Albendazole	50	1.4± 0.7	52.5 ± 0.4	44.11 ± 0.14	52.5 ± 0.4
	100	0.8± 0.12	26.2 ±0.1	28.75 ± 0.5	29.1 ± 0.1
	150	0.3 ± 0.17	17.5 ±0.8	21.05 ± 0.9	24.5 ± 0.8
Control	-	-	-	-	-

P: Time taken for Paralysis (min), D: Time taken for Death of worms (min).

## RESULTS AND DISCUSSION

Preliminary phytochemical screening of alcoholic extract revealed the presence of anthraquinone glycosides, phenolic compounds and steroids while aqueous extract showed presence of glycosides and phenolic compounds. From the results shown in table no.1, the predominant effect of Albendazole on the worm is to cause a flaccid paralysis that result in expulsion of the worm by peristalsis. Albendazole inhibit cytoplasmic microtubule synthesis and blocks the glucose uptake of larvel and adult stage thereby depletion their glycogen stores and decreasing the formation of ATP and leading immobilization and death. The alcoholic leaves extract of *Cleome viscosa* demonstrated paralysis as well as death of worms in a less time as compared to albendazole especially at higher concentration of 150 mg/ml. While water extract also shown significant activity. Phytochemical analysis of the crude extracts revealed presence of flavonoids as one of the chemical constituent. Polyphenolic compounds show anthelmintic activity<sup>21-24</sup>. Some synthetic phenolic anthelmintics e.g. niclosamide, oxclozanide and bithionol are shown to interfere with energy generation in helminth parasites by uncoupling oxidative phosphorylation<sup>25-27</sup>. It is possible that phenolic content in the extracts of *Cleome viscosa* produced similar effects.

## CONCLUSION

In conclusion, the traditional use of leaves of *Cleome viscosa* as an anthelmintic have been confirmed as the leaves extracts displayed activity against the worms used

in the study. Further studies need to establish the mechanisms (S) of action are required.

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