

Original Article

In-vitro anthelmintic activity of *Cuscuta reflexa* whole plant in Indian earthworm
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ABSTRACT

Due to great inputs from ethno medicinal practices, Herbal medicine is now expanding at an astonishing pace. The present study is aimed at determining the anthelmintic activity of cuscuta species. Whole plant extracts of Cuscuta reflexa (convolvulaceae) were evaluated for in-vitro anthelmintic activity on Indian adult earthworms Pheritema postuma. The three concentrations (25, 50 and 100 mg/ml) of extracts were tested and results were expressed in terms of time for paralysis and time for death of animals. Both the extracts have shown dose dependent inhibition of motility of earth worms (paralysis) but methanolic extract exhibited more activity compared to ethyl acetate.

Keywords: Anthelmintic, Cuscuta, Herbal medicine

Introduction:

Medicinal plants are the most exclusive source of life saving drugs for the majority of world's population. India was one of the richest floristic region of the world and was well known for its ancient heritage regarding medicinal plants. Mass screening of plants in the search for new drugs is vastly expensive and inefficient but it would be cheaper and more productive, if we re-examine plant remedies described in ancient texts. The discovery of medicine was an effort of mankind over millions of years of search for eternal health, longevity and remedy to relieve pain and discomfort. Traditional system of medicine claims that almost every plant in the nature is having at least one medicinal property and when used in a right manner only they can be safely used. (1, 2)

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Helminths consume nutrients from their host, thereby causing or aggravating malnutrition which results in retarded growth and physical development. Consequently, symptoms like retarded cognitive development, iron-deficiency anemia, abdominal pains and related health problems are characteristic features of most heavy helminth infections

A decline in host immune status as a result of helminth infection thereby increasing the host susceptibility to other pathogens. Also worth considering is the fact that the immune response triggered by helminth infection may drain the body's ability to fight other diseases, making affected individuals more prone to co-infection, treatment of helminthiasis is also one of the very great practical therapeutic importance. (3, 4)

Cuscuta reflexa, belonging to family Cuscutaceae a division of Convolvulaceae is a leafless parasitic plant having yellow or orange thread like stem. The stem has been used as purgative, in protracted fever, bilious disorders, induration of liver, abortifacient and in melancholia. Externally it has been used for lichen and washing sores. Hence exploration of anthelmintic activity of various plants (5, 6, and 7)

2. Materials and methods:**2.1 Plant Material**

Fresh sample of the *C. reflexa* was collected from Barkas Hyderabad (Telangana,) and dried in the shade at room temperature and was coarsely powdered. The powdered material was passed through 120 mesh to remove fine powders and the coarse powder used for extraction

2.2 Authentication

The plant *C. reflexa* was authenticated by prasanna p.v officer in charge botanical survey of India attapur, Hyderabad by comparing morphological features and a sample voucher specimen of plant was deposited for future references voucher specimen number . (NASARI-1BSI/DRC/2011/593)

2.3 Preparation of Extracts:

The whole plant of *Cuscuta reflexa* Roxb. Were collected and dried in the shade and then pulverized in a grinder. The powdered material was passed through 120 mesh and used for extraction. Extraction was carried out by using 70% alcohol by macerating plant material for 7 days in a covered round bottom flask with vigorous intermittent extraction. The extracted solvent was then concentrated in rota vapour where the excessive pure solvent was collected separately and the concentrated extract was obtained. After evaporating, the extract was collected in a porcelain dish. The ethylacetate fraction we separated the remaining fraction obtained as the aqueous methanolic fractions were air dried and stored in airtight containers. These extracts were used for preliminary phytochemical screening (8, 9)

2.4 Experimental worms:

All the experiments were carried out in Indian adult earthworms (*Pheretima posthuma*) due to its anatomical resemblance with the intestinal roundworm parasites of human beings. They were collected from moist soil and washed with water to remove all fecal matters.

2.5 Administration of extract:

The suspension of methanol and ethyl acetate extracts of whole plant of *Cuscuta reflexa* of different concentrations (25, 50, 100 mg/ml) were prepared by using 1% v/v of CMC as a suspending agent and final volume was made up to 10 ml for respective concentration. Albendazole was used as standard. Groups of approximately equal size worms consisting of two earthworms individually in each group were released into in each 10 ml of desired concentration of drug and extracts in the petridish.

2.6 Administration of Albendazole:

Albendazole (20 mg/ml) was prepared by using 1% v/v CMC as a suspending agent as administered as per method of extract.

2.7 Experimental Design:

The *Pheretima posthuma* was placed in petridish containing three different concentrations (25, 50 & 100 mg/ml) of methanolic & ethyl acetate extracts of *Cuscuta reflexa*. Each petridish was placed with 3 worms of average length of 6cm and observed for paralysis or death. Mean time for paralysis was noted when no movement of any sort could be observed, except when the worm was shaken vigorously; the time death of worm (min) was recorded after ascertaining that worms neither moved when shaken nor when given external stimuli. The test results were compared with Reference compound Albendazole (20 mg/ml) treated samples and tabulated. (10)

3. Results and Discussion:

SCREENING OF IN VITRO ANTI HELMINTHIC ACTIVITY OF CRUDE EXTRACTS

From the Preliminary phytochemical study of methanolic and ethyl acetate extracts, Ethyl acetate fraction of *C. reflexa* showed the presence of carbohydrates, alkaloids, tannins, phenols, flavonoids, glycosides and steroids, methanolic extract of *C. reflexa* revealed the presence of carbohydrates, alkaloids, tannins, flavonoids and phenolics.

From the above results the ethanolic extract was found to be having more anti helminthic activity than ethyl acetate extract. The anti-helminthic activity of methanol extract could be due to the constituents present and the anthelmintic effect was comparable with that of the effect of standard drug Albendazole.

The present study suggested that the methanol extract was more effective than the ethyl acetate extract, even though the ethyl acetate extract was endowed with anthelmintic property. The activity was concentration dependent and the activity of the extracts was found to be inversely proportional to the time taken for paralyze/ death of the earth worms.

4. Conclusion:

Although the plants have the anthelmintic activity mainly due to their phytoconstituents specially due to secondary metabolites it has not been understood clearly the mechanism of action of herbs for their anthelmintic activity. Phytoconstituents, jointly or separately may act by inhibition of tubulin polymerization and blocking glucose uptake (Jain et al., 2011). Any damage to the mucopolysaccharide membrane of worms will expose the outer layer restricting their movement which finally may cause paralysis and ultimately death of parasite. Alkaloids may act on central nervous system and caused paralysis of the earthworm the effect can be due to presence of the steroidal alkaloid and oligo glycosides which may suppress the transfer of sucrose from the stomach to the small intestine together with their antioxidant effect which is capable of reducing the nitrate generation which can interfere in local homeostasis that is essential for the development of helminthes.

Table : Anthelmintic potency of methanolic and ethyl acetate extract of *Cuscuta reflexa*

S.No	Extract	Concentration (mg/ml)	Pheritima posthuma	
			Paralysis Time	Death Time(min)
1	Control(1% CMC)	-	-	-
2	Std. Albendazole	20(mg/ml)	25.33 ± 0.33***	56.66 ± 0.66***
3	Methanolic	25(mg/ml)	73 ± 0.33** *	128 ± 0.02**
		50(mg/ml)	58 ± 0.57***	103.66 ± 0.33***
		100(mg/ml)	44 ± 1.15***	81 ± 1.73***
4	Ethyl acetate	25(mg/ml)	75.66 ± 2.2***	135.33 ± 0.33***
		50(mg/ml)	63 ± 1.15** *	108.66 ± 0.88**
		100(mg/ml)	47.33 ± 0.66***	85.66 ± 0.66***

Values are given as Mean ± S.E.M (n=3);***p<0.001,**p<0.01,*p<0.05 compared with control

The results of the present study clearly indicate that the methanolic extract of *Cuscuta reflexa* posed significant anthelmintic activity at 100 mg/ml. Further studies are necessary to isolate and reveal the active constituents and to establish the mechanism of action.

References:

1. Kirthikar, basu B.D. Indian medicinal plants introduction book, 1993, 1-577.
2. K.M Nadhkarni, The Indian Materia Medica, Popular Prakashan, Mumbai, 2007, 419-420.
3. Geary TG, Sangster NC, Thompson DP. Frontiers in anthelmintic pharmacology Veterinary Parasitology.1999; 84; 275-295.
4. Rang HP Dale MM, Ritter V, Flower RJ, Rang and Dales Pharmacology, sixth edition Churchill Livingstone, Elsevier Publications, 2007, 712-713.
5. Khare CP, Indian Medicinal plants. An illustrated Dictionary. Springer, 2007, first edition, 189.

6. Krithikar KR and Basu, BD Indian medicinal plants, international book distribution Dehradun India. vol III, 2005, 1740-43.

7. Nadkarni KM, Indian Materia Medica, Popular Prakashan, Mumbai, 2002, vol.1: 419-420.

8. Kokate C K, Practical Pharmacognosy, Vallabh Prakashan, New Delhi, 1994, 4, pp 107-111.

9. Khandelwal K R, Practical Pharmacognosy, Nirali Prakashan, Pune, 2000, pp 149-155.

10. T Ghosh, TK Maity, Bose A, Dash GK. Indian Journal of Natural Product, 2009; 16-19.

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