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In- Vivo Anthelmintic Activity of *Cleome viscose* Seed Extracts

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Abstract

The development of anthelmintic resistance and the high cost of traditional anthelmintic drugs have led to the evaluation of medicinal plants as an alternative source of anthelmintic drugs. Parasitic roundworms (nematodes) cause significant morbidity and mortality in livestock and cause significant loss of productivity in farmers around the world. Control of these nematodes has relied heavily on the use of a limited number of anthelmintic drugs. However, resistance to many of these anthelmintic is now widespread, and new drugs need to be found to ensure sustainable and effective treatment and management in the future. In present study aimed to evaluate the anthelmintic activity of PEE, EAE, MEE & AEE extracts of *Cleome viscose* Linn seeds. The result revealed that ethyl acetate extract at 50 mg/mL was the most active against Pheretima posthuma.

Key words: Anthelmintic drugs, *Cleome viscose*, Pee, Eae, Mee & Aee Extracts.

INTRODUCTION

Herbalism is very important, especially in the healthcare system of developing countries. In ancient Indian literature, medicinal plants are defined by a very broad logic as a possible source of therapeutic ingredients [1]. The number of patients looking for alternative or herbal remedies is growing rapidly. For past era herbal medicine has integrated generations of practitioner treatment experience into the indigenous health system. Herbal medicines are not only cheap, but also culturally acceptable, very elastic to the human body, have few side effects in case of injury, and vary, so the demand for major medicines in poor countries is high [2]. In living beings, infection caused by helminths (helminthiasis) is a severe problem to health that results in hardship and stunted growth. In the developing world, helminthiasis (in human intestine) is the most common infectious disease. Presently helminths are resistant to commercially available medicinal agents and they are unaffordable too. Parasitic infections remain a major obstacle to live stock production around the world. Haemonchus contorn is a nematode parasite that feeds on the blood of small ruminants and causes anemia, loss of appetite, slow growth, and ultimately death of the host animal. H. contortus is a highly pathogenic parasite of small ruminants and is a major obstacle to the production of viable sheep and goats worldwide [3]. In order to overcome the problems, researchers are working to screen the anthelmintic agents from natural plant sources. In current era, focus is laid to investigate and identify the plants with anthelmintic potential. Currently chemical substance used in the treatment of helminthiasis is expensive, beneficial against only one group of organisms and lose their efficacy within 20 years [4].The qualitative phytochemical investigation of seeds extracts indicated the presence of terpenoids, phenolic compounds and saponins. The anthelmintic activity of *Cleome viscosa* L. seeds may be attributed to the presence of these active components. *Cleome viscosa* Linn. (Capparidaceae), generally known as "wild or dog mustard", it was discovered as a general weed in the level of India and in the tropical area of the world every year.

Cleome viscosa

The entire system and its parts (leaves, seeds, roots) are often used in medical and folklore systems. In traditional drug systems, plants are reported to have an effective effect as in traditional systems of medicine the plant is reported to possess beneficial effects as an anthelmintic, antiseptic, carminative, antiscorbutic, sudorific, febrifuge, and cardiac stimulant [5]. According to various conventional claims to use C Viscose (CV), as a treatment for many diseases, has made great efforts to verify its usefulness through scientific pharmacological screening.

Traditional uses	Pharmacological activity
Traditionally, *Cleome viscosa* Linn. Plant is used as an antimalarial and is useful in other conditions such as disorders of the blood, diseases of the uterus [6].	Analgesic, antiemetic, antidiarrhoeal, Heptoprotective, antifibrotic and antitumor activity [7-11].

Secondary metabolites present in Cleome viscosa L. seeds could then be responsible for the anthelmintic activities determined in PEE, EAE, MEE & AEE [12] in their previous reports on the anthelmintic activities of the leaves of Cleome viscosa Linn, showed that the alcoholic extract of the leaves was most active against Pheretima posthuma. In present study aimed to evaluate the anthelmintic activity of PEE, EAE, MEE & AEE extracts of *Cleome viscose* Linn. seeds.

MATERIAL AND METHODS

Selection of plants

The plants were selected on the basis of their anti inflammatory activities, chemical constituent and wide medicinal uses in the traditional literatures. The ease of availability of plant is also taken into consideration during selection.

Collection and Authentication

The mature seeds of *Cleome viscosa* L. were collected from Jammu and nearby areas. Authentication of the collected seeds along with the plant specimens was carried out by the renowned botanist Dr. G.P. Sinha (Scientist D), Botanical Survey of India (BSI), Jammu and Kashmir, India.

Extraction

Preparation of extracts

The powdered plant material was extracted successively with redistilled, analytical grade petroleum ether (PEE), Ethyl acetate (EAE), methanol (MEE) and water (AEE) by soxhelation.

Evaluation of Anthelmintic activity

The anthelmintic activity was carried out using three doses (10, 25, 50 mg/mL) of petroleum ether, ethyl acetate extract, methanolic extract and aqueous extract against the Indian earthworm (Pheretima posthuma) by adopting the standard procedures [13] (Fig.1). The earthworms of nearly the same size were used. Paralysis time (m) was noted when earthworms did not move except in the condition when the worms were robustly shaken. The death time (m) was noted after observing that the worms did not move when shaken forcefully and when they were dipped in hot water (51°C) [14] and followed by dullness of their original body colours. Albendazole (10 mg/mL) was used as the reference drug.

RESULT AND DISCUSSION

In living organisms, helminthic infections (pinworm disease) are serious health problems that cause illness and stunting. In developing countries, pinworm disease (in the human intestine) is the most common infectious disease. Today, helminths are resistant to over-the-counter medicines and are even more valuable. To overcome this problem, researchers are working to filter anthelmintic drugs from natural plant sources. Today, the focus is on the study and identification of potential anthelmintic plants. The chemicals currently used to treat pinworm disease are expensive, effective only for a group of organisms, and lose their effectiveness within 20 years. Qualitative phytochemical analysis of seed extracts revealed the presence of terpenoids, phenolic compounds, and saponins. *Cleome viscosa* L. Seed anthelmintic activity may be due to the presence of these active ingredients. Secondary metabolite of Cleomeviscosa L. Seeds can be involved in the anthelmintic effects identified in PEE, EAE, MEE, and AEE. Previous reports on leaf anthelmintic activity of *Cleome viscosa* Linn have shown that alcoholic leaf extracts are the most active against Pheretima posthuma. In this study PEE, EAE, MEE & AEE of *Cleome viscose* Linn. Seeds exhibited anthelmintic activities against *Pheretima posthuma* (Table 1).The ethyl acetate extract at 50 mg/mL was the most active against *Pheretimaposthuma*. The extract exhibited a paralytic effect at 4.1 min and caused actual death at 7.0 min. The PEE, EAE, MEE & AEE exhibited a dose dependent activity; however, the EAE effect at 50 mg/mL against *Pheretima posthuma* (earthworm) was not significantly different from that of albendazole, 10 mg/mL. A comparative analysis of this study (anthelmintic effect of *Cleome viscosa* Linn. seeds) and that of a previous study by Chandak *et al*., 2010 (anthelmintic effect of *Cleome viscosa* Linn. leaves) showed some similarities.

CONCLUSION

Heliminth infection is a parasitic disease common in human beings from several decades caused by parasites (roundworms, pinworms, hookworms etc).

These helminthes can be very dangerous for human health. They must be expelled via excreta using drugs. Several synthetic drugs are available to cure these diseases but these drugs are associated with serious side effects. To overcome this disadvantage, the researcher has surveyed flora literature. In conclusion, our data suggests that seeds of Cleome viscosa Linn. Showed potential anthelmintic activity that may be due to presence of secondary metabolites terpenoids, saponins, and phenolic compounds in *Cleome viscosa* L. seeds extracts. Out of these four extracts, EAE (50 mg/mL) was found to be most effective anthelmintic agent in comparison to other extracts.

Table-1: Effect of PEE, EAE, MEE & AEE of *Cleome viscosa* L. seeds on paralytic time and death time of Pheretima posthuma

Extract	Dose (mg/mL)	Mean length of worms (cm)	Paralytic time (min) Mean +SEM	Death time (min) Mean±SEM
PEE	10	10	102.1+4.6*	495+28.5*
	25	9	80.8+20.5 *	388+15.7*
	50	11	25.0+67.1 *	231+15.0*
EAE	10	6	30.5+2.50*	24.1+2.30
	25	7	10.1+2.49	12.3+5.09
	50	6	4.1+1.35	7.0+0.98
MEE	10	8	105.2+3.5*	500+30.3*
	25	7	82.9+21.6*	395+20.1*
	50	9	30.3+52.2*	243+16.1*
AEE	10	6	90.8+3.5*	375+29.1*
	25	8	60.1+19.6*	280+15.5*
	50	6	21.1+53.2*	175+16.1*
Albendazole	10	4	4.0+0.75	7.2+2.02

Fig-1: Earthworms used for Anthelmintic Activity

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