ISSN 2278- 4136

ZDB-Number: 2668735-5

IC Journal No: 8192

Online Available at www.phytojournal.com

Journal of Pharmacognosy and Phytochemistry

In-Vitro Anthelmintic Activity of *Luffa cylindrica* Leaves in Indian Adult Earthworm

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Different extracts of *L. cylindrica* were taken for anthelmintic activity against Indian earthworm *Pheretima posthuma*. Two concentrations (50 and 100 mg/ml) of various extracts were tested and results were expressed in terms of time for paralysis and time for death of worms. Albendazole (20 mg/ml) was used as reference standard and carboxy methyl cellulose (0.5%) as a control group. Dose dependent activity was observed in the plant extracts but methanolic extract exhibited more activity as compared to others. The anthelmintic activity of *Luffa cylindrica* leaves extract has therefore been demonstrated for the first time.

Keyword: Anthelmintic, *Luffa cylindrica*, *Pheretima posthuma*, Methanolic extract.

1. Introduction

Helminthes infections, repeatedly entitled helminthiasis are among the most pervasive infection and a foremost degenerative disease distressing a large proportion of world's population. In developing countries, they pose a large threat to public health and contribute to the prevalence of malnutrition, anemia, eosinophilia and pneumonia [1]. The helminths parasites mainly subsist in human body in intestinal tract, but they are also found in tissue, as their larvae migrate towards them [2]. Most diseases caused by helminths are of a chronic, debilitating nature; they probably cause more morbidity and greater economic and social deprivation among humans and animals than any single group of parasites.

Chemical control of helminthes coupled with improved management has been the important worm control strategy throughout the world. However, development of resistance in helminthes [3,4] against conventional anthelmintics is a foremost problem in treatment of helminthes diseases [5, 6]. Henceforth it is important to look for alternative strategies against gastrointestinal nematodes, which have led to the proposal of screening medicinal plants for their anthelmintic activity.

Luffa *L. cylindrica* (L.) Roem syn *L. aegyptiaca* Mill] commonly called sponge gourd, loofa, vegetable sponge, bath sponge or dish cloth gourd, is a member of cucurbitaceous family. The plant is widely distributed throughout India. Its fruit is used in the traditional medicine as an anthelmintic, carminative, laxative, depurative, emollient, expectorant, and diuretic and lactagogue and are useful in fever, syphilis, tumours, bronchitis, splenopathy and leprosy [7].

It is used as a vegetable either prepared like squash or eaten raw like cucumbers [8, 9]. Its seeds have been used in the treatment of asthma, sinusitis and fever [10]. The seed oil is reported to be used for skin infections in the form of tincture.

The fruit used in the treatment of ascites, jaundice and biliary and intestinal colitis and also in enlarged spleen and liver. The plant is reputed to have anti-tubercular and antiseptic properties. The extract of leaves has been used in snake-bites. Keeping in mind such astounding properties exhibited by the plant, the present study was intended to investigate anthelmintic activity of methanolic and aqueous extract of *L. cylindrica* (MELC & AELC) leaves in Indian earthworm.

2. Material and Method

2.1 Plant material

The leaves of *L. cylindrica* were collected in the month of July locally from Pakbara village, District Moradabad of Uttar Pradesh, India and were authentified by Dr. Beena Kumari, Taxonomist, Hindu College, Moradabad (India) as *L. cylindrica* (Cucurbitaceae) leaves. A voucher specimen has been kept in the herbarium (HC.MBD/HAP/BK/2010/5/168) of the Department of Botany, Hindu college, Moradabad (India).

2.2 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.

2.3 Preparation of Extracts:

The leaves of *Luffa cylindrica* were dried under shade and crushed in an electric blender to form coarse powder and subjected to Soxhlet extraction (Continuous hot extraction) by using methanol and water as solvent. The extracts were concentrated by rotary evaporator and used for testing anthelmintic activity. Preliminary phytochemical screening was carried out to assess the presence of phytoconstituents in the extract.

2.4 Administration of Albendazole:

Albendazole (20 mg/ml) was prepared by using 0.5% w/v of CMC as a suspending agent as administered as per method of extract.

2.5 Administration of extract:

The suspension of Methanolic and aqueous extract of leaves of *Luffa cylindrica* of different concentration (50,100 mg/ml) were prepared by using 0.5% w/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 Experimental Design:

The anthelmintic activity was performed according to the method [11]. On adult Indian earth worm *Pheretima posthuma* as it has anatomical and physiological resemblance with the intestinal round worm parasites of human beings. *Pheretima posthuma* was placed in petridish containing two different concentrations (50 &100 mg/ml) of methanolic & aqueous extract of leaves of *Luffa cylindrica*. Each petridish was placed with 2 worms 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.

3. Results and Discussion

Preliminary phytochemical analysis of methanolic extracts showed the presence of Flavonoids, Saponins, Tannins, Steroids, Terpenoids & Alkaloid whereas aqueous revealed the Tannins, Steroids & Alkaloid active phytoconstituents.

The data revealed that the methanol extract showed anthelmintic activity at a concentration of 100 mg/ml, whereas the aqueous extract also showed paralysis and death at similar concentrations. The other test concentrations of both the extracts showed marked degree of anthelmintic activity. The anthelmintic effect of

extracts is comparable with that of the effect produced by the standard drug albendazole.

Parasitic helminths affect animals and man, causing considerable hardship and stunted growth. Hundreds of millions if not billions of human infections by helminthes exist worldwide and increased world travel and immigration from the developing countries. However tremendous advances has been made during the previous decade and substantial number of synthetic precursors have been derived to cope up the damage caused by parasite, but unfortunately no effective medicine has been developed so far. Moreover the problems associated with the use of such drugs like some serious side effects and development of resistance drives the severity of infection to the next level. These factors paved the way for herbal remedies as alternative anthelmintics. Evaluation of activities of medicinal plants claimed for possessing the anthelmintic property is getting the attention these days. Screening and proper evaluation of the claimed medicinal plants could offer possible alternatives that may be both sustainable and environmentally acceptable. The results of this study have shown promising anthelmintic activity suggesting the possible use of *L. cylindrica* extracts in intestinal nematode control.

Table 1: Anthelmintic potency of methanolic and aqueous extract of *L. cylindrica*

Extract	Concentration (mg/ml)	*Pheretima posthuma*	
		Paralysis (P)	Death (D)
Control (0.5% CMC)	-	-	-
Standard (Albendazole)	20 mg/ml	28.71 ± 1.86	58.90 ± 6.85
Methanolic extract	50 mg/ml	54.22 ± 2.95	104.3 ± 3.76
	100 mg/ml	44.90 ± 2.59	89.03 ± 2.25
Aqueous extract	50 mg/ml	63.25 ± 8.10	105.2 ± 11.97
	100 mg/ml	45.55 ± 2.05	86.66 ± 4.69

All Values represent Mean± SD; n=6 in each group. Comparisons made between standard versus treated groups, P<0.05 was considered significant

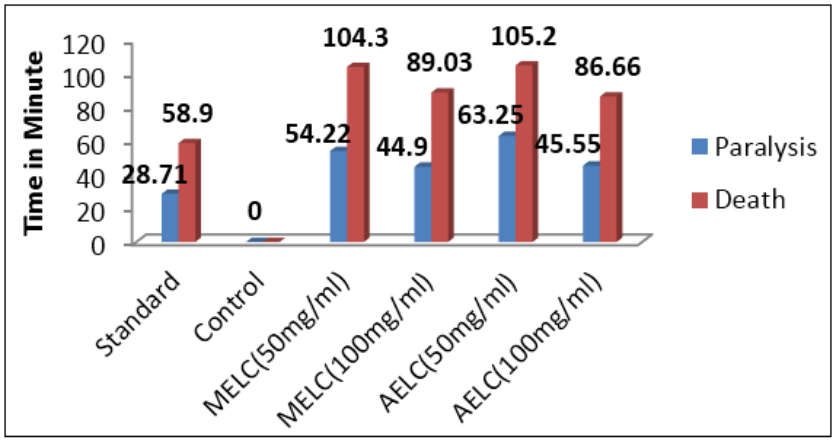

Fig 1: Anthelmintic activity of *Luffa cylindrica* leaves on *Pheretima posthuma*

The anthelmintic activity of methanol extracts could be due to the constituents present.

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

4. Conclusion

The results of the present study clearly indicated that the crude methanol extract of *Luffa cylindrica* did produce anthelmintic activity against Indian earthworm *Pheretima posthuma*.

The plant possesses significant anthelmintic activity at 100 mg/ml concentration measured by time taken for paralyse / death of the earth worms. The current investigation leads to conclusion that the leaves of *L. cylindrica* have potent anthelmintic activity when compared with the conventionally used drug. The results did not, however, exclude the possibility that doses of the extract with lower anthelmintic activity in this study might be efficacious against other species of helminths. Further studies using *in vivo* models and to isolate active constituents from extract are required to carry out and established the effectiveness and pharmacological rational for the use of *L. cylindrica* as an anthelmintic drug.

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