

## Analysis of Anthelmintic activity of *Chlorophytum borivillianum* Santapau & Fernandez against Earthworm (*Eisenia fetida*)

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### Research Article

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#### ABSTRACT

Anthelmintic properties of saponin extract of *Chlorophytum borivillianum* sant. & Fernandez (Liliaceae) was studied. The present investigation was carried out to find out the effect of Root Extract of *Chlorophytum borivillianum* for its anthelmintic activity against the Indian adult earthworm, *Eisenia fetida*. Methanol, acetone, Chloroform and water were used to prepare the extract. In present study Methanolic extract (ME), Crude saponin extract (CSE) and purified saponin fractions (PSF) were taken as test solution. Piperazine citrate and 2% w/v gum acacia in distilled water were used as standard and control respectively. Time of paralysis and time of death of the worms were considered as the parameters to assess the anthelmintic action. The result suggest that PSF found to be more active in compare to ME and CSE. The PSF confirmed paralysis as well as death of *Eisenia foedita* in less time as compare to piperazine citrate.

#### INTRODUCTION

Since the time immemorial, our traditional system of medicine and folklore claiming that medicinal plant as whole or their parts are being used for different type of disease successfully. Parasitoses have been of great concern to the medical field for centuries and the helminthes still cause considerable problems for human beings and animals. Most of the medicinal preparation now a day available in the market are either not effective up to the mark or has developed resistance resulting in reoccurrence again. Plant derived drug serve as prototype to develop more effective and less toxic medicines. The helmentic activity was evaluated on adult Indian earthworm, *Eisenia fetida* due to its anatomical and physiological resemblance with the intestinal roundworm parasites of human beings (Vidyarthi RD .1977 & Thorn et al 1977). Helmintic infections are now being recognized as cause of much chronic ill health and sluggishness amongst the tropical people. More than half of the population in the world suffers from worm infection of one or the other (Vigar Z.1984)4. Traditional system of medicine reports the efficacy of several natural products eliminating helmenthic & (Dwivedi S et al.2007) 5. The plant *Chlorophytum borivillianum* Santapau and Fernandes belongs to Liliaceae family. The plant is a short, rhizomatous herb, distributed in tropical & sub- tropical regions at an altitude of 1500 mts of the world. It is used as a natural aphrodisiac, improves immunity in human body. It has also been proved very effective for alleviating diabetes, arthritis and many other gynecological problems in women. A very few research have been reported on anthelmintic activity of root tubers of this plant. Therefore, it is worth conducting an investigation on the anthelmintic activity of root extract of C. borivillianum. The root contains carbohydrate, phenolic compounds, saponins and alkaloids. Saponins are reported to have anthelmintic activity hence

current research work was undertaken to prove the efficacy of *Chlorophytum borivillianum* root tuber extract against *Eisenia fetida* ( Red Worm )

## MATERIAL AND METHODS

### Plants Materials

Roots of *Chlorophytum borivillianum* Sant. & Farnandez were purchased from local market of Haridwar, Uttarkhand, India and authenticated by Dr. Kishan Pal at the Dept. of Microbiology, Shri Venkateswara University, U.P, India. Root tubers were made free from aerial parts and wiry rootlets and thoroughly washed, peeled and stored in airtight container for further research work.

### Preparation of the Extract

The tubers was washed, dried , powdered and defatted by petroleum ether . Marc then extracted with methanol for 3 hours at 55 0°C which is further concentrated to give methanol extract ( ME ) . In order to get crude Saponins, ME extract was again dissolved in methanol and then acetone was added (1:5 v/v ) to precipitate the Saponins as described by Yan et al. The precipitates were dried under Vacuum. The Whitish amorphous powder thus obtained as a crude saponin extract (CSE).

### Isolation of Pure Extract

To get the pure saponin fraction ( PSF), certain amount of CSE was fractionated with silica gel – 60 ( 230-400 mesh ) column chromatography and eluted successfully with chloroform –methanol –water ( 70:30:10 ) as described by Favel et al . Eluted fraction were combined to give saponin fraction ( PSF ) .

### Analysis of Anthelmintic Activity

#### Animal (*Eisenia fetida* )

I have selected Indian adult earthworm *Eisenia fetida* (Sav.) (Oligochaeta, Lumbricidae ) to conduct my experiment owing to its anatomical and physiological resemblance with the intestinal roundworm parasite of human beings .

**Scientific Name :** *Eisenia fetida*

**Common Name :** Red worm , Red Wiggler , Tiger Worm , Manure Worm , Stink Worm , Fish Worm , Dung Worm , Fecal Worm , Striped Worm , Angleworms , Bandlings

**Habitat :** Usually found in garden compost but also occurs in wet, decaying leaf litter, organic-rich soils and manure heaps

**Size :** Typical size of adult is 6 cm

The earthworm ( *Eisenia fetida* ) collected from Local Garden and washed with normal saline to remove all feecal matter were used for the anthelmintic study .

The earthworm of 4-5 cm in lenth and 0.1 to 2.5 in width were used for all the experimental protocol .

### Experimental

Anthelmintic activity of *Chlorophytum borivillianum* of different root extract namely as Methanolic Extract ( ME ) , Crude Saponin Extract ( CSE ) , purified Saponin fractions ( PSF ) were tested against the Earthworm *Eisenia fetida* .Various concentration ( 10-30 mg/ml ) of each extract were tested in the bioassay , Which involved determination of time of paralysis and time of death of the worms. The anthelmintic assay was carried as per the method of Ajaiyeoba et al with minor modifications.

In this experiment , six groups of five earthworms were taken in to 30 ml solutions of piperazine citrate , ME , CSE and PSF extracts of tubers of *Chlorophytum borivillianum* in distilled water . Piperazine citrate was included as standard drug and distilled water as control .

## Observations

After releasing the earthworm in the 30 ml solutions of different root extract of *Chlorophytum borivillianum* Sant. Farnandez observation were made for the time taken to paralysis and death of individual worms . Time for paralysis was noted when no movement could be observed except when the worms were shaken vigorously . Death was concluded when the worm lost their mortality followed with fading away of their body colours .

## RESULT AND DISCUSSION

It is observed that the crude extract of *Chlorophytum borivillianum* contain Saponins as the chief chemical Constituents and presence of Saponins have established biological evidence to be an anthelmintic agent. The result of present evaluation of anthelmintic activity of Saponins of *Chlorophytum borivillianum* Sant.& Fernandez on Indian earthworm (*Eisenia fetida* ) is depicted Table - I for time taken for paralysis and death of earthworms after treatment with test drugs .

From the result shown in Table - I , the predominant effect of piperazine citrate on the earthworm is to cause a flaccid paralysis that result in expulsion of the worm by peristalsis . Piperazine citrate by increasing chloride ion conductance of worm muscle membrane produce hyperpolarisation and reduced excitability that leads to muscle relaxation and flaccid paralysis.

The comparative data for different fractions for the time paralysis and time of the death of *Eisenia fetida* have been depicted in the Figure no. 1 and 2 .

From all the three figures it has been calculated and analyzed that PSF found to be more active and potent in compare to ME and CSE . The PSF confirmed paralysis as well death of *Eisenia fetida* in less time ( 23.19 min. ) as compare to piperazine citrate (25.88) especially at higher concentration of 25 mg/ml .

**Table 1: Anthelmintic Activity of roots extract of *C. borivillianum* Sant. & Fern.**

Extract	Concentration mg/ml	Time for Paralysis	Time for Death
ME	5	63.73 ± 1.2	108.09 ± 0.6
	10	50.98 ± 0.21	101.83±0.35
	15	47.62 ± 0.6	96.32 ± 0.44
	20	37.93 ± 0.32	89.99± 0.2
	25	33.67 ± 0.66	81.11 ± 0.69
	30	30.32±0.63	79.56±0.47
CSE	5	70.98 ± 1.9	107.96 ± 0.6
	10	67.66 ± 0.63	90.79 ± 0.06
	15	42.57 ± 0.3	81.30 ± 0.12
	20	36.9 ± 0.12	73.90 ±0.52
	25	30.21 ± 0.66	60 ± 0.01
	30	26.96±0.52	53.03±0.21
PSF	5	30.33 ± 0.2	65.8 ± 0.2
	10	26.5 ± 0.7	55.9 ± 0.25
	15	17.9 ± 0.6	45.65 ± 0.8
	20	15.20 ± 0.07	32.98 ± 0.98
	25	11.5 ± 0.11	23.1± 0.5
	30	09.46±0.65	19.32±0.32
PC	5	27.22 ± 1.1	63.65± 0.7
	10	21.99 ± 1.12	53.89± 1.35
	15	16.92± 0.90	45.32 ± 0.4
	20	14.01 ± 0.9	34.76± 0.6
	25	12.5± 0.5	25.88± 0.4
	30	10.32±0.32	22.65±0.63
Control	-	-	-

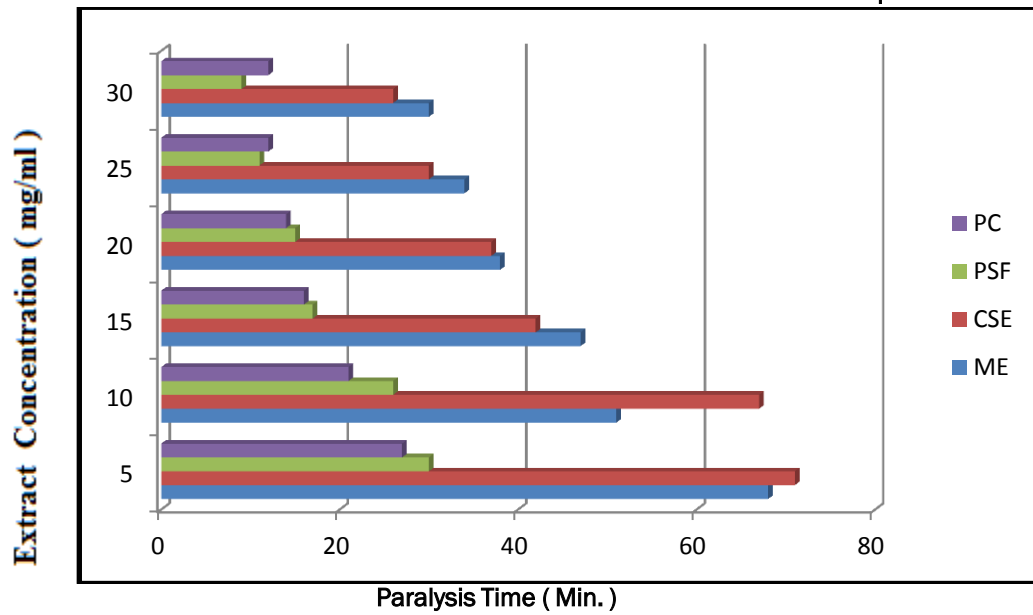


Figure 1: Comparative data of paralysis time for *Eisenia fetida*

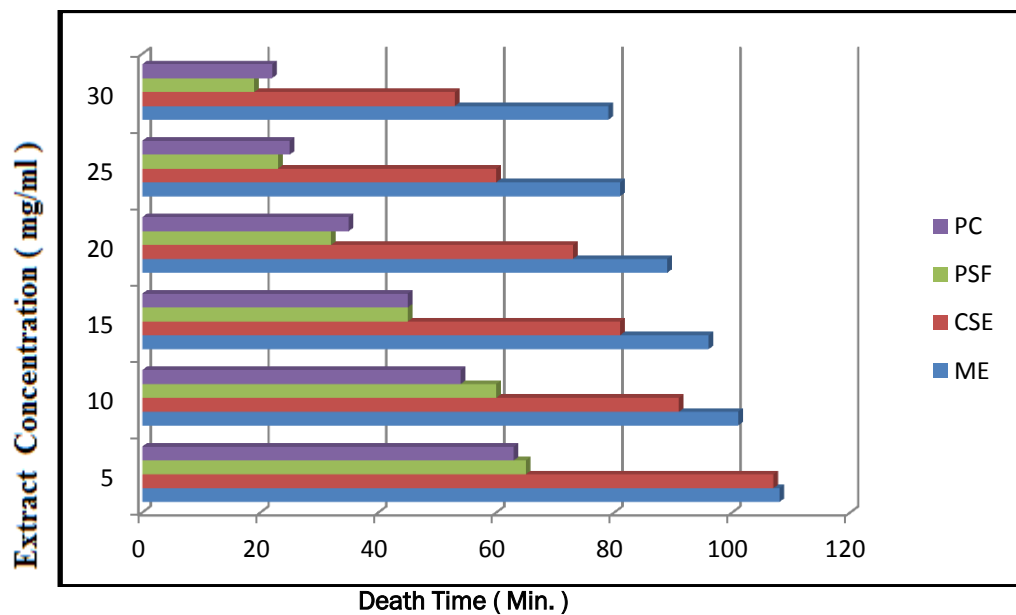


Figure 2: Comparative data of death time for *Eisenia fetida*

### CONCLUSION

In the present study, we may conclude that the tubers of *Chlophytum borivillianum* can be used as anthelmintic.

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