

ANTHELMINTIC ACTIVITY OF *Curcuma neilgherrensis* Wt. FROM SESHACHALAM HILLS

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ABSTRACT

Objectives: Gastro intestinal disorders are very much troubling the human health system in recent years due to infections caused by various intestinal worms. Herbal drugs plays an important role since ages as anthelmintics. Hence the herbal drug *Curcuma neilgherrensis* (*Zingiberaceae*) against worm infections was tested for its scientific confirmation.

Materials and Methods: *C.neilgherrensis* and *Zingiber officinale* were collected from Tirumala and Piler (DC 921,922; DC 820) and the herbaria were prepared as per the standard methods of Jain and Rao, Anthelmintic activity assay was performed with Rhizome extracts as per the method of Gosh.

Results: The most effective activity was observed with the 1:1 ratio, rhizome extracts of *C.neilgherrensis* + *Z.officinale* methanol, alcohol extracts at 5, 10 and 15 mg followed by hot water and cold water extracts as in the time taken for paralysis and the death of the worms than the individual rhizome extracts and also to that of control drug Albendazole.

Conclusion: *C.neilgherrensis* may also consist volatile oils and oleoresins to that of other *Curcuma* species. Hence it may act as stimulant and astringent by which its activity as anthelmintic is proved.

Keywords: *Pheretima posthuma*, *Albendazole*, Gastrointestinal, Astringent, *Zingiber officinale*.

INTRODUCTION

Helminthes are the most common infections in man, affecting a large portion of the world's population, causes severe morbidities including lymphatic filariasis (a cause of elephantiasis), onchocerciasis and schistosomiasis [1-2]. Most of the commercially available anthelmintics became a severe problem worldwide [3].

An endemic medicinal plant *Curcuma neilgherrensis* (*Zingiberaceae*) is reported from Araku valley and also from Seshachalam Hill Ranges of Tirumala and Talakona regions of Eastern Ghats [4-5]. It is commonly called as "Manjakoova" [6]; "Katter-kalvazhai" [7]. The plant has lot of medicinal properties as anti-inflammatory, cholagogue, hepatoprotective, blood purifier, antioxidant, taoxifier, antiasthmatic, antitumor, stomachic, worm infestation, carminative and regenerator of liver tissue [8]. It is also used for chronic hepatitis, antiarthritis, antiseptic and menstrual disorders [9]. According to the traditional data from the local herbalists, and from Yandi tribes of Seshachalam hill ranges the rhizomes of *C. neilgherrensis* are used to treat cuts, boils, wounds, skin diseases, jaundice, pimples, bone fractures, bone common cold, ulcers, swellings, small pox, chicken pox, snake bites, worm infestation and wound infections. It is also used in their common diet to control the cholesterol levels. A study on anthelmintic activity of *C.neilgherrensis* is to prove its herbal use against worm infestation.

MATERIALS AND METHODS

Plant Material Collection

Plant material *C. neilgherrensis* was collected from Tirumala, Talakona along the Seshachalam Hill Ranges during the months of April – September, 2011. *Zingiber officinale* were collected from cultivated lands of piler during the months of April-June, 2011, the plant material was authenticated by Prof. N.Yasodamma and a voucher specimen No's DC 921, 922; DC 820 were prepared and preserved in herbarium Department of Botany, S.V.University, Tirupati as per the standard method [10]. Rhizomes were collected, thoroughly washed and cut in to pieces and further dried under shade at $28 \pm 2^\circ\text{C}$ for about 10 days. The dried parts were ground well in to a fine powder in a mixer grinder and sieved to particle size of 50 – 150mm. The powders were stored in a polythene bags at room temperatures.

Preparation of aqueous extracts

Dried rhizome powders (70 g) were extracted with cold and hot water. The plant material was soaked for 72 hr. and the filtrate was dried on water bath stored at 4°C in refrigerator.

Preparation of organic solvent extracts

Dried rhizome powders (40 g) were extracted in a Soxhlet apparatus using alcohol and methanol each 200 ml respectively. The filtrates were concentrated on rotavapour, dried and stored at 4°C in refrigerator.

Worm collection

The earthworms *Pheretima posthuma* of approximately equal size were collected from Ram Mohan Organic Inputs, (Licence No: 4447/2006 issued by C&DA (A.P).Hyderabad Brahmanakalva (Vil), Pathi Puttur (Post) Ramachandrapuram (M), Chittoor Dist., A.P.

Reference Drug

Albendazole: It was prepared by dissolving in distilled water at the concentrations of 5, 10 and 15mg.

Preparation of Desired Formulation of Plant Drug

By dissolving 5, 10, 15mg of cold water, hot water, Alcohol and Methanol extracts each in 25 ml of Distilled Water.

Experimental procedure

The anthelmintic assay was carried as per the standard method [11]. *C.neilgherrensis* and *Z.officinale* cold water, hot water, alcoholic and methanolic rhizome extracts were investigated for their anthelmintic activity against *P. posthuma*. Various concentrations 5, 10, 15 mg of each extract and also *C. neilgherrensis* + *Z. officinale* (1:1) extracts were tested in the bioassay, which involved the determination of time of paralysis and time of death. Albendazole used as standard reference drug and distilled water as control. Worms were washed with normal saline to remove all fecal matters and selected approximately each worm of 8cm in length and 0.5-0.8 cm in width. Forty one groups consisting two worms in each were released into 25ml of desired formulation. Five groups were prepared as control distilled water, warm water, reference drug *Albendazole* 5, 10,15mg and remaining as drug cold water, hot water, alcohol and methanol extracts each 5, 10, 15mg of *C.neilgherrensis*, *Z.officinale* and *C.neilgherrensis* + *Z.officinale* extracts. Observations were made for the time taken for 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 color.

RESULTS

Anthelmintic Activity (Table: I)

More efficient activity was observed with *C. neilgherrensis* + *Z. officinale* extracts of 1:1 ratio the time taken for paralysis with methanol and alcohol extracts at 5, 10, 15mg ranging from 6.9min to

1.9min and the time taken for death between 15.6min-7.2min. With the *C. neilgherrensis* and *Z. officinale* methanol and alcohol extracts time taken for paralysis ranges from 10.2min -3.4 min and 18min - 10min for the death of the worms. Overall results of the plant extracts are more effective than the control drug Albendazole as the time for paralysis 91min-34 min and time for death 110min - 41 min.

Table I: Anthelmintic Activity Time for Paralysis and Death of Worms:

S. No.	Extracts	Conc in mg	Time for Paralysis			Time for Death		
			C.n	Z.o	C.n+Z.o	C.n	Z.o	C.n+Z.o
1	Coldwater extract	5	30.0±0.16	27.6±0.54	25.6±0.47	38.3±1.08	36.5±0.63	31.1±0.74
		10	22.3±0.20	20.9±0.32	18.9±0.20	30.1±0.28	28.8±0.16	27.2±0.49
		15	11.3±0.29	9.5±0.43	8.1±0.21	20.5±0.12	19.3±0.37	17.6±0.40
2	Hot water extract	5	13.9±0.24	12.6±0.52	11.4±0.45	20.8±0.45	19.1±0.50	16.9±0.49
		10	10.7±0.35	9.3±0.66	7.8±0.81	15.8±0.20	14.4±0.68	12.2±0.70
		15	9.3±0.24	8.4±0.36	7.1±0.14	13.5±0.49	11.9±0.49	11.0±0.82
3	Alcohol	5	10.2±0.24	8.4±0.40	6.9±0.20	18.2±0.24	17.1±0.33	15.6±0.40
		10	7.6±1.24	5.5±0.95	4.9±0.91	12.4±0.16	10.7±0.30	9.7±0.20
		15	6.6±0.36	5.9±0.61	4.8±0.69	9.8±0.28	8.2±0.35	6.7±0.74
4	Methanol	5	10.3±0.41	8.2±0.46	6.4±0.32	20.3±0.30	18.5±0.51	16.6±0.49
		10	6.5±0.32	5.5±0.24	4.7±0.38	11.7±0.69	9.7±0.49	8.8±0.69
		15	3.4±0.24	2.2±0.12	1.9±0.08	10.2±0.95	8.3±0.65	7.2±0.47
5	Albendazole	5	90.9±0.84			110.1±0.12		
		10	62.1±0.12			71.2±0.16		
		15	34.4±0.21			41.0±0.43		
6	Distilled Water	15ml	-			-		
7	Warm Water	15ml	-			-		

C.n: *Curcuma neilgherrensis* Z.o: *Zingiber officinale*

C.n + Z.o: *Curcuma neilgherrensis* + *Zingiber officinale*

All the Values are represented in Mean ± S.D; n=2 in each group.

DISCUSSION

Anthelmintic activity of rhizome hydro alcoholic extracts of *C.longa*, *Z. officinale*, *C.longa* + *Z. officinale* 1:1 ratio with 10, 20 and 15 mg concentrations, time taken for the paralysis and time taken for the death of the worms was more effective with *C.longa* + *Z. officinale* extracts than the other extracts. But all the three extracts are equally effective to that of the control drug *Piperazine citrate*, at 20 mg ranging 6.2min-7.2 min time taken for paralysis and 16min-27min for death [12]. *C.amada* and *C.caesia* petroleum ether, dichloromethane, ethanol and aqueous extracts at 50, 100 and 150 mg resulted most effective activity with ethanol extracts at 150mg with *C.caesia* when compared to 10mg *Piperazine citrate* [13]. Rhizome extracts of *Z. officinale*, *Z. zerumbet* and *C.longa* ethanol extracts with 10, 25 and 50 mg concentrations and also *Z. officinale* + *C.longa* (1:1) and *Z. zerumbet* + *C.longa* (1:1) extracts, time taken for the paralysis is more effective with *Z. officinale* + *C.longa* extracts between 5.5 to 12.5min and time taken for death ranges between 15-34min when compared with control drug 22min and 46.5 min. The moderate activity was observed with *Z. zerumbet* + *C.longa* and least activity was observed with *Z. zerumbet* extracts 60min-108min and 110min- 165 min [14]. When compare with the above literature the present results reveals as *C. neilgherrensis*, *C.longa*, *Z. officinale* individual extracts and also with *C. neilgherrensis* + *Z. officinale* extracts are more effective anthelmintic herbal drugs with aqueous, ethanol and methanol extracts at 10 mg concentrations to that of the control drug Albendazole and Piperazine citrate 10mg concentration. *C.caesia*, *C.amada* and *Z. zerumbet* are not much effective to that of the control drugs at 10mg concentrations.

CONCLUSION

C. neilgherrensis all extracts and in combination with *Z. officinale* are more effective than the control drug Albendazole and also to that of the other species of *Curcuma* and *Zingiber*. It also supports the presence of volatile oils and oleoresins may acts as stimulant and astringents. Further studies in the isolation of active compounds may be recommended for the anthelmintic drug preparations.

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