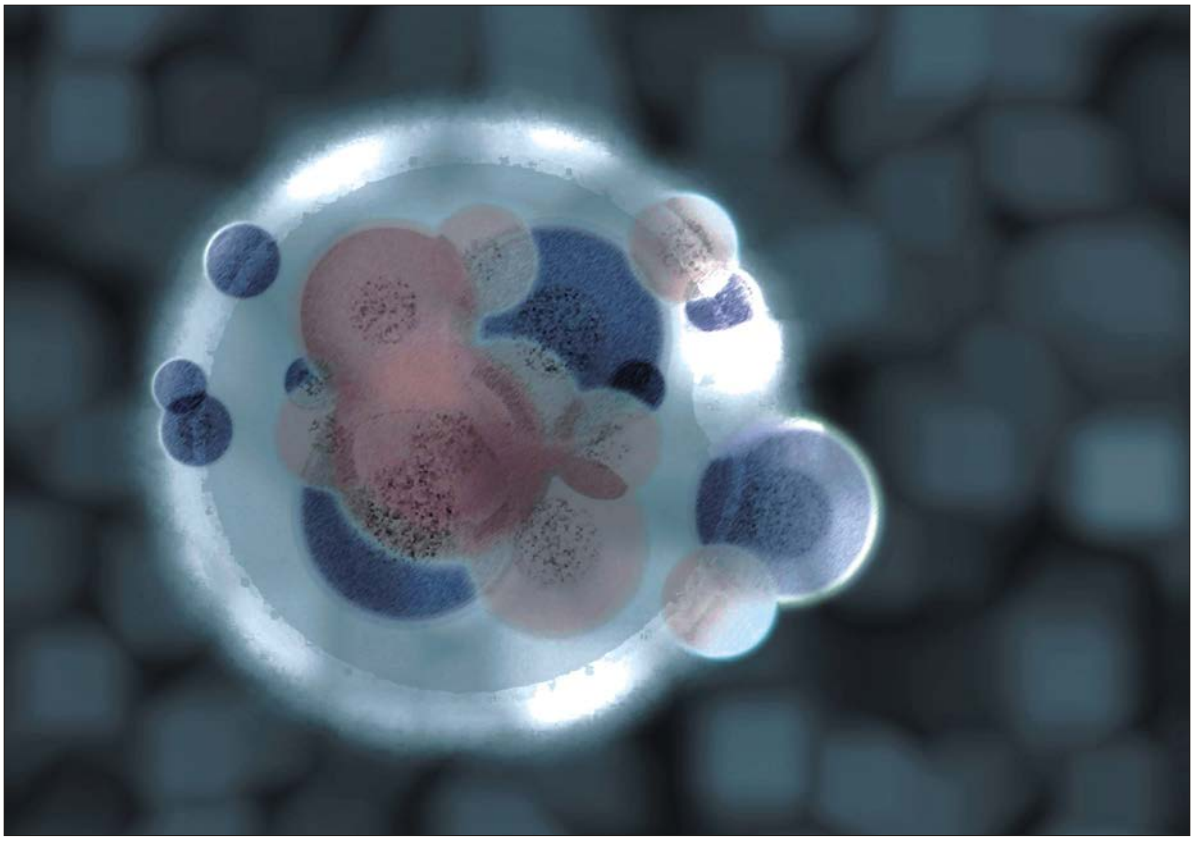

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Anthelminthic Activity of *Cansjera rheedii* J. Gmelin (Opiliaceae)

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Abstract: The ethanol, water and chloroform extracts of the aerial parts of *Cansjera rheedii* J. Gmelin (Opiliaceae) were investigated for activity against Indian earthworms *Pheretima posthuma*. Various concentrations (5-40 mg mL^{-1}) of each extract were tested, which involved determination of time of paralysis and time of death of the worms. All three extracts exhibited considerable anthelminthic activity. All the extracts (i.e., aqueous, chloroform and ethanol) at the tested dose (5-40 mg mL^{-1}) level produced significant activity ($p<0.001$) when compared with piperazine citrate (15 mg mL^{-1}) and albendazole (20 mg mL^{-1}) which were included as standard reference and normal saline as control. The present study indicates the potential usefulness of *Cansjera rheedii* aerial parts as anthelminthic activity.

Key words: *Cansjera rheedii*, anthelminthic activity, *Pheretima posthuma*

INTRODUCTION

Cansjera rheedii (Family:Opiliaceae) is a climbing shrub, sometimes armed, commonly known as Kalimanakeerai in Tamil is generally found in India through Malaya to Hong Kong and North Australia. (Gamble, 1981; Matthew, 1991). The whole plant of *C. rheedii* was used for the treatment of post-natal pain (Ravikumar and Vijaya Sankar, 2003). The tribes of Nilgiris in Tamil Nadu, India using the plant extract for the treatment of intermittent fever (Hosagoudar and Henry, 1996). The extracts of *Cansjera rheedii* has been reported to have hepatoprotective effect (Mounnissamy *et al*., 2008) and cytotoxic effect (Mounnissamy *et al*., 2007).

Traditional medicines are still commonly used in India for anthelminthic purposes. In our way to investigate the local medicinal plants for their potential therapeutic uses, the present study was undertaken to investigate the anthelminthic activity of ethanol, water and chloroform extracts of the plant *Cansjera rheedii* (Family:Opiliaceae).

MATERIALS AND METHODS

Plant material: The aerial parts of the plant *Cansjera rheedii* (Opiliaceae) were collected in and around Auroville, Puducherry, India in the month of June 2006 and it was identified and authenticated by Auro-Herbarium Sakthi Botanical Survey Department, Auroville. A voucher specimen has been kept in our laboratory for future reference (VS-12). The whole plant of *Cansjera rheedii* were cut into small pieces, shade dried, powdered by a mechanical grinder and was passed through No. 40 mesh sieves and stored in an airtight container for further use.

Preparation of extract: The powdered plant material was extracted successively with chloroform, ethanol (95% v/v) and water using soxhlet apparatus. The solvents were then removed under reduced pressure, which obtained sticky residues (Harbone, 1973). Chloroform, ethanol and aqueous extracts were referred as CECR, EECR and AECR, respectively. The dried extracts were dissolved in normal saline (vehicle) and used for anthelminthic activity study.

Drugs and chemicals used: Piperazine citrate (Noel, Mumbai) and Albendazole (Pfizer, Mumbai) were used as reference standards. Chemicals: Ethanol (95% v/v) and Chloroform AR (SD Fine Chemicals, Mumbai).

Anthelminthic activity: The anthelminthic activity was evaluated in adult Indian earthworm (*Pheretima posthuma*) due to its anatomical and physiological resemblance with the intestinal roundworm parasites of human beings (Vidyarthi, 1977; Thorn *et al*., 1977; Vigar, 1984). The anthelminthic screening (Nirmal *et al*., 2007; Ravindra *et al*., 2007) was followed.

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Table 1: Anthelminthic activity of chloroform, ethanol and aqueous extracts of *Cansjera rheedii*

Groups	Treatments	Concentration used (mg mL^{-1})	Time taken for paralysis (min)	Time taken for death (min)
1	Normal saline (control)	-	-	-
2	Piperazine citrate	15	6.13±0.22	8.52±0.37
3	Albendazole	20	2.20±0.03	2.34±0.02
4	Chloroform extract	5	-	-
5	Chloroform extract	10	40.43±0.05*	86.94±0.37*
6	Chloroform extract	20	20.16±0.01*	50.50±0.03*
7	Chloroform extract	40	19.93±0.13*	40.93±0.17*
8	Ethanol extract	5	32.23±0.03*	-
9	Ethanol extract	10	23.04±0.04*	47.43±0.03*
10	Ethanol extract	20	12.14±0.01*	23.09±0.77*
11	Ethanol extract	40	12.63±0.16*	15.12±0.25*
12	Aqueous extract	5	27.53±0.12*	42.91±0.44*
13	Aqueous extract	10	20.24±0.03*	23.01±0.41*
14	Aqueous extract	20	12.13±0.02*	14.99±0.18*
15	Aqueous extract	40	11.32±0.05*	14.50±0.03*

Results are expressed as Mean±SEM from six observations, -: worms alive up to 24 h of observation, *p<0.001 when compared to albendazole and piperazine citrate as standard references

The 15 groups of approximately equal sized Indian earthworms consisting of six earthworms in each group were released into 50 mL of desired formulation. Each group was treated with one of the following: Vehicle (Normal saline), Piperazine citrate (15 mg mL^{-1}), Albendazole (20 mg mL^{-1}), CECR (5, 10, 20 and 40 mg mL^{-1}), EECR (5, 10, 20 and 40 mg mL^{-1}) and AECR (5, 10, 20 and 40 mg mL^{-1}). Observations were made for the time taken to paralyse and/or death of individual worms. Paralysis was said to occur when the worms do not revive even in normal saline. Death was concluded when the worms lose their motility followed with fading away of their body colour (Table 1).

Statistical analysis: The values were expressed as mean±SEM. Statistical analyses were performed by one way Analysis of Variance (ANOVA) followed by student's t-test.

$p<0.001$ was considered significant when compared with standard references (Armitage, 1971).

RESULTS AND DISCUSSION

Anthelminthic activity was observed that the all three extracts were potent, even though all the three extracts were endowed with anthelminthic property the order of activity was AECR>EECR>CECR ($p<0.001$ when compared with reference standard). The activity revealed concentration dependence nature of the different extracts. Potency of the extracts was found to be inversely proportional to the time taken for paralysis/death of the worms (Table 1). The present study revealed that the anthelminthic activity increases with increasing polarity. Results of preliminary phytochemical screening show the presence of saponins, carbohydrates, tannin, gums and mucilage, flavonoids, phytosterols and glycosides in both ethanol and aqueous extracts. Triterpenoids, Saponins and Alkaloids are present in chloroform extract. The above findings may suggest the anthelminthic activity due to the presence of bitter principles like condensed tannins in the plant since maximum activity was observed in bitter principle enriched ethanol and aqueous extracts (Hoste *et al*., 2006). The immobilizing and lethal action of these extracts might be by blocking glucose uptake in the parasite and depletion of its glycogen synthesis (Tripathi, 2006). Present results from the present study indicate the potential usefulness of aerial part of the plant *Cansjera rheedii* in the treatment of helminthiasis. Attempts for the isolation and characterization of the active constituents responsible for such activities are currently under progress. Further studies are necessary to understand the exact mechanism of action.

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