Research Article

Available online through
www.ijrap.net

IJRAP
ISSN 2229-3566

IN VITRO ANTHELMINTIC ACTIVITY OF *ACALYPHA INDICA* LEAVES EXTRACTS

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Received on: 01/01/2011 Revised on: 02/02/2011 Accepted on: 11/02/2011

ABSTRACT

Ethanol extract from the *Acalypha indica* leaves of investigated for their anthelmintic activity against *Pheretima posthuma*. Three concentrations (1%, 2.5% and 5%) of extract were studied in activity, which involved the determination of time of paralysis and death of the worm. Both the extracts exhibited significant anthelmintic activity at highest concentration of 100 mg/ml. Piperazine citrate in same concentration as that of extract was included as standard reference and distilled water as control. The anthelmintic activity of ethanol extract of *Acalypha indica* leaf therefore been demonstrated for the first time.

KEYWORDS- Anthelmintic Activity, *Acalypha indica* Linn**,** *Pheretima posthuma,*

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INTRODUCTION

The WHO estimates that a staggering two billion people harbor parasitic worm infections. Parasitic worm also infect livestock and crops, affecting food production with a resultant economic impact. Despite this prevalence of parasitic infections, the research on anthelmintic drug is poor. As per WHO, only few drugs are frequently used in the treatment of these parasite infections.[1]

Helminthiasis is among the most important animal diseases inflicting heavy production losses. The disease is highly prevalent particularly in third world countries[2] due to poor management practices. Chemicalcontrol of helminthes coupled with improved management has been the important worm control strategy throughout the world. However, increasing problems of development of resistance in helminths[3] against anthelmintics have led to the proposal of screening medicinal plants for their anthelmintic activity. The plants are known to provide a rich source of botanical anthelmintics [4]. A number of medicinal plants have been used to treat parasitic infections in man and animals.[5]

Acalypha indica Linn. is an annual erect herb found throughout various parts of India, Bangladesh, Sri Lanka,the Philippines and tropical Africa. The plant is commonly known as *Indian acalypha* and it belongs to the family Euphorbiaceae, The common names of *Acalypha indica* are sans. –Arittamanjarie, Eng. –Indian acalypha, Hind. – Kuppu, Khokali. Ben. –Muktajhuri, Guj.-Vanchi, Tam. – Kuppivaeni; Kuppaimeni, Oriya.—Indramaris. Tel. – Kuppichettu; Harita-manjiri; Kuppinta German -Brennkraut, Brazil- alcalifa and Spanish – Ricinela.The plant has wide uses in the traditional medicines of various countries and reportedly possesses diuretic, purgative and anthelmintic properties, besides being also used for bronchitis, asthma, pneumonia, scabies and other cutaneous diseases.[6] *Acalypha indica* leaves contains acalyphine which is used in the treatment of sore gums and have a post-coital antifertility effect[7], anti venom properties[8], wound healing effects[9], antioxidant activities[10], anti-inflammatory effects[11], acaricidal effects[12], diuretic effects[13] and antibacterial activities[14].

The *Acalypha indica* leaves has been traditinaly used as anthelmintic activity[15], but no detailed scientific investigations have been carried out to define the anthelmintic activity of *Acalypha indica* leaves, thus the present investigation sets out to study the anthelmintic activity of *Acalypha indica* leaves extract. The effect produced by *Acalypha indica* leaves was compared with that of Piperazine citrate, a standard drug.

MATERIALS AND METHODS

Collection of plant materials

The Fresh Plant of *Acalypha indica* were collected in the month of August from the local field in Etawah, Uttar Pradesh state, India, and authenticated by Dr.Harish Kr. Sharma, Ayurvedic Medical College, Davangere, and Karnataka, India. A voucher specimen was submitted at Institute's herbarium department for future reference. The fresh leaf were collected and fixed immediately using FAA (formalin: Acetic acid: ethyl alcohol) as fixative agent for anatomical studies.

Preparation of extract

Dried leaves were ground to coarse powder. Powder was first defatted with pet.ether and then extracted with ethanol which is further evaporated to dryness to obtain alcoholic extract. Aqueous extract were obtained by maceration for 24 hrs. The extract was stored at 0-4^{O}C. This extract was used for Experiment.

Phytochemical screening: Qualitative assay, for the presence of plant phytoconstituents such as carbohydrates, alkaloids, glycosides, flavonoids, tannins and saponins were carried out on the powdered leaf following standard procedure[16, 17].

Animal

Healthy adult Indian earthworms, *Pheretima postuma,* due to its anatomical and physiological resemblance with the intestinal roundworm parasites of human beings[18,19,20] were used in the present study. All earthworms were of approximately equal size (15 cm). They were collected from local moist place, washed and kept in water.

Drugs

Piperazine citrate was purchased from GSK Pvt.Ltd. The solvents and other chemicals of analytical grade were used during experimental protocol.

Anthelmintic activity

Ethanolic and aqueous extracts from the *Acalypha indica* leaves were investigated for their anthelmintic activity against *Pheretima posthuma*. The anthelmintic assay was carried as per the method of Ajaiyeoba *et al*.[21] with minor modifications.Deore S.L.*et al* [22]. Six groups of six earthworms were released in to 50 ml solutions of three different concentrations (25, 50 and 100 mg/ml each) of Piperazine citrate, ethanolic and aqueous extracts of *Acalypha indica* leaves in distilled water. Observations were made for the time taken to 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 neither moved when shaken vigorously nor when dipped in warm (500C) followed with fading away of their body colors.

RESULTS AND DISCUSSION

The leaves extracts of *Acalypha indica* displayed a significant anthelmintic activity ($p<0.05$) in dose dependent manner as shown in **Table 1**. The anthelmintic activity of both the ethanolic and aqueous extracts was comparable with that of standard drug at100mg/ml. The predominant effect of Piperazine citrate on the worm 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 produces hyperpolarisation and reduced excitability that leads to muscle relaxation and flaccid paralysis. Both the extracts demonstrated paralysis (AE 12 min, EE 10 min) as well as death (AE 32 min, EE 29 min) of worms at a time comparable to Piperazine citrate (P 08 min and D20 min) especially at higher concentration of 100 mg/ml. Phytochemical screening of the crude extracts revealed the presence of flavonoids and Alkaaloids like “acalypus” and “acalyphine is the major chemical constituents. The leaves extracts of *Acalypha indica* contains cynogenic glycosides, inositol methylether, resin, triacetomamine and volatile oils[23]. The presence of terpenoids, flavonoids and polyphenols shown anthelmintic activity.

CONCLUSION

It is concluded based on the findings of the present study that the *Acalypha indica* leaves possess varying degree of anthelmintic activities. However, dose and the form in which they be used require standardization. Moreover, phytochemical studies and mechanism are also needed to lay down recommendation on scientific grounds.

ACKNOWLEDGEMENT

The authors are thankful to Mr.Vivek Yadav, Chairman and Dr.U.K.Sharma, Director. Sir Madanlal Group of Institutions, Etawah (UP) for providing necessary facilities to carry out this research work.

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Table 1: In vitro Anthelmintic activity of *Acalypha indica* leaves extracts

Extracts	Concentrations mg/ml	Pheretima	Posthuma
AE		P	D
	25	25 ± 0.15	66 ± 0.17
	50	19 ± 0.14	49 ± 0.11
	100	12 ± 0.13	32 ± 0.10
EE	25	24 ± 0.14	6 3 ± 0.14
	50	17 ± 0.11	43 ± 0.10
	100	10 ± 0.07	29 ± 0.15
PC	25	21± 0.08	53 ± 0.13
	50	14 ± 0.10	38 ± 0.10
	100	08 ± 0.07	20 ± 0.9
Control	---	---	---

Values are mean ± S.E.M.from six observation**.**
*P<0.05 vs. standard group.
Where AE: Aqueous extract, EE: Ethanolic extract,
PC: Piperazine citrate
P: Time taken for Paralysis (min), D: Time taken for Death of worms (min)

Source of support: Nil, Conflict of interest: None Declared