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Evaluation of anthelmintic activity of *Ipomoea carnea* Jacq leaf extract

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ABSTRACT

In the present investigation leaf extract of Ipomoea carnea Jacq was subjected to evaluation of anthelmintic activity. The leaf extracts of Chloroform, ethanol, methanol, and petroleum ether were tested on earthworm Pheretima posthuma. The trend of anthelmintic activity was in order as chloroform > methanol > ethanol > petroleum ether. Among the screened different extracts, chloroform extract 25 mg/ml showed efficient anthelmintic activity with paralysis time (8.2 min) and death time (15.5 min). The chloroform extract showed highest anthelmintic activity than other extract, compared with Piperazine citrate. But all the extracts were less potent when compared with reference drug Piperazine citrate. The test of 't' and 'f' were performed with in group and between the groups were significant at 0.05% level.

Keyword: Anthelmintic, *Ipomoeacarnea*, *Pheretima posthuma*, Piperazine citrate.

INTRODUCTION

Ipomoea carnea Jacq is popularly known as Besharam, Behava in India and Morning glory in English. It is large diffuse shrub with milky juice. The flowers are pale rose, pink or light violet, dichotomously branched axillary and terminal, pediculate cymes, fruits have a glabrous capsule, seeds silky. The plant belongings to family Convolvulaceae [1]. The plant possesses various bioactive compounds such as glycoside, alkaloids, reducing sugar, flavonoids, fatty acids, esters, and tannins [2]. The leaves of *Ipomoea carnea* shwoed the presence of thirteen compounds which includes hexadecanoic acid, steric acid, diethyl phthalate, n-octadecanol, octacosane, hexatriacontane, tetracontane, and 3-diethylamino-1-propanol, etc [3,4].

Approximately three million people are infected with helminthes worldwide. The infection is commonly found in villages of developing countries and being recognized as cause of much acute or chronic illness among the human and cattle's. Hence, the treatment of helminthes infection is of utmost needed. The high cost of modern anthelmintic has limited the effective control of these parasites. However, the increasing the problem of drug resistance in helminthes against anthelmintic have lead to proposal of screening medicinal plants for their anthelmintic activity [5].

The *Ipomoea cornea* plant has also having several medicinal values. Several workers reported medicinal values such as glycosidase inhibitant [6], anti-inflammatory [7], antioxidant [8], antidiabatics [9], antimicrobial [10], antibacterial [11], wound healing [12], immunomodulation [13], inotropic cardiovascular [14], embryotoxic [15], antifungal [16], impact central nervous system [17] and anxiolytic activities [18]. But the survey of literature not reported or not observed any reports on anthelmintic activity of various extracts of *Ipomoea carnea* leaf or other part

of plant is available. Therefore it was thought worthwhile to explore this plant for its activity against earth worm *Pheretima posithuma.* Due to their ready availability earthworms have been used widely in the evaluation of anthelmintic compounds.

MATERIALS AND METHODS

Plant material: A fresh leaves of *Ipomoea carnea* were collected from local area of Loni (located at $74^0$35'-37'N latitude and $19^0$24-28'E longitude) District Ahmednagar, MS, India. The plant was identified, authenticated and a voucher specimen was kept in herbarium.

Extract preparation: The leaves were collected and washed thoroughly in distilled water, chopped, air dried for a week at 35-40^0C and pulverized in electric grinder. About 100 gm of powder was subjected to soxhlet apparatus using solvents such as methanol, ethanol, petroleum ether and chloroform. The solvent was then removed under reduced pressure in to residues and diluted in normal saline according to concentrations. The prepared extracts were screened for the anthelmintic activity. The extracts were encoded as CIC, EIC, MIC and PEIC (Table 1).

Anthelmintic activity: The anthelmintic activity was performed on same sized, aged and weight of earthworm. The species was selected for anthelmintic activity because of anatomical and physiological resemblances with the intestine of round worm parasites of human beings [19]. Piperazine, the standard drug was diluted with normal saline to obtain desired concentrations. Ten petri plates of equal size were taken and numbered. Ten individuals were used for experimentation. The observations were made for the time taken to paralysis and death in individual worms. The death was concluded when the worms lost their entire activity followed with fading away of their body colour. Time of paralysis was noted down when no movement of any worm observed. The time of death for worm was recorded after ascertaining that the worms were neither moved nor vigorously moved when deepen in warm (50^0C) water. The paralysis time and death time were recorded in term of minutes.

Study protocol: In the study purpose six groups with control and Piperazine standard control were designed in triplicate. Approximately equal size and weight worms of ten individuals were used for the present study. The concentrations were made as 5, 10, 15, 20,and 25 mg/ml for each one extracts and observation recorded (Table 1).
Statistical analysis: The data on biological studies were reported as mean ± S. E. M.. The analysis of variance (ANOVA) at 5 % level significant was employed. $P \leq 0.05$ were considered significant [20].

RESULTS AND DISCUSSION

In the present investigation, *Ipomoea carnea* plant leaf was sequentially extracted as ethanol, methanol, petroleum ether and chloroform as the solvent system. In the study our interest was in the helminthes infection and biological properties of *Ipomoea carnea* plant. The activity of different extracts of the same plant were tested on adult earth worm and revealed that chloroform extract performed highest anthelmintic activity where as petroleum ether performed lowest activity.The trends of activity was in order as chloroform > methanol > ethanol > petroleum ether. The chloroform extract showed highest anthelmintic activity than other extractswhen compared with Piperazine citrate and normal saline. The test of 't' and 'f' were performed with in group and between the group were significant at 0.05% level.

Chloroform extract at the concentration of 25 mg/ml showed the time of paralysis and death at 8.2 and 15.5 min respectively. For concentration of 20 mg/ml the paralysis and death time was found to be 9.5 and 16.9 min respectively. At the concentration of 15 mg/ml noticed times taken to paralysis as 11.5 and death time 22.5 min respectively. Among the various concentrations tested, Chloroform extract at 25 and 20 mg/ml showed significant anthelmintic activity (Table 1).

The earthworms were more sensitive to chloroform extract to those of referencing drug Piperazine citrate at 10 mg/ml level. The chloroform extract was more effective in causing death of worms as well as promoting paralysis. Most of the worms expelled to Piperazine citrate caused paralysis of the worms so that they are expelled in the feces. The extract of leaves of the plant not only demonstrated this property but also killed the worms. The anthelmintic activity may be due to the presence of polyphenol compounds [21]. The leaf of *Ipomoea carnea* contained thirteen bioactive compounds in which any one should have been an anthelmintic property. Hence, there is need to find out fractionation of leaf contents of *Ipomoeacornea.*

The bioactive compound of plant should be responsible for specific activity and need to be isolate, evaluate and need mass production in order to help human health and wealth. The wormicidal property of the methanolic extract described here is against the earthworm suggesting that it would be effective against the parasitic infections of humans [22]. Durga [23] reported best cytological and anthelmintic activity from methanolic extracts of *Parthenium hysterophorus*. Another worker [24] noticed best anthelmintic activity from *Cassia tori*. Herbal drugs have been used and best effective and could be of value of preventing the development of drug resistance. They noticed moderate amount of alkaloids, flavonoid, saponin, and tannin [25] polyphenol [26] reflecting anthelmintic activity. Phenolic and tannin compound show anthelmintic activity by binding to glycoprotein on the cuticle of the parasite and thus lead to death of the worm [27].

Table 1. Anthelmintic activity of extracts of *Ipomoea carnea*

Sr No	Extracts	Concentration (mg/ml)	Time required (in minutes)	
			Paralysis X± S.E.M.	Death X± S.E.M.
1	CIC	5	19.1±0.61	31.6±0.89
2		10	15.4±0.35	31.5±1.10
3		15	11.5±0.24	22.5±0.54
4		20	9.5±1.01*	16.9±0.85*
5		25	8.2±0.32*	15.5±0.89*
6	MIC	5	34.3±0.32	71.3±0.58
7		10	26.7±0.19	54.5±0.59
8		15	24.9±0.51	47.1±0.67
9		20	22.8±0.61	45.9±0.64
10		25	19.3±0.67	39.4±0.84
11	EIC	5	41.1±0.89	69.3±1.23
12		10	37.2±0.28	65.4±0.23
13		15	34.5±0.49	59.5±0.45
14		20	31.4±0.61	54.9±0.21
15		25	29.5±0.63	40.3±0.54
16	PEMIC	5	63.3±0.37	89.8±0.54
17		10	62.3±0.29	78.3±0.31
18		15	54.2±0.28	72.2±0.69
19		20	43.8±0.54	65.3±0.57
20		25	37.5±0.36	55.5±0.51
21	Standard control (Piperazine citrate)	10	10.5±0.59	17.2±0.89
22	Control (Normal saline)	10	--	--

MIC= Methanol Ipomoea carnea extract, EIC= Ethanol Ipomoea carnea extract, PEIC= Petroleum ether Ipomoea carnea extract and CIC= Chloroform Ipomoea carnea extract.
**Significant at 0.05% level.*

Table 2. Showing ANOVA of the performed experiment

Source of variation	*Df*	SS	MS	*f*	*t*	*P**
Between the group	4	232.54	97.83	2.24	3.11	0.021
Within group	21	754.74	171.23			
Total	22	987.28				

**Significant at 0.05% level.*

The anthelmintic drug available in the market which produces many side effects, hence to improve the status of therapy, various ailments of plant base like *Ipomoea carnea* will be much useful. From the result obtained, it is clear that if a research is carried out on the chloroform extracts of *Ipomoea carnea* leaf have useful for drug may be developed for the treatment of anthelmintic action and it is future need.

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