



Evaluation of *Evolvulus alsinoides* Linn. for anthelmintic and antimicrobial activities

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Abstract

Objective: To study the anthelmintic and antimicrobial activities of the ethanolic extract of *Evolvulus alsinoides* Linn. **Materials and methods:** The anthelmintic activity was evaluated on adult Indian earthworm *Pheretima posthuma* due to its anatomical and physiological resemblance with the intestinal roundworm parasites of human beings. The antibacterial activity of the crude ethanolic extract was performed by agar cup plate method. **Results:** The ethanolic extract caused paralysis followed by death of the worms at all tested dose levels. It was observed that the ethanolic extract of *Evolvulus alsinoides* is more potent than the reference control piperazine citrate. Potency of the extract was inversely proportional to the time taken for paralysis/ death of the worms. The activity confirms the dose dependency nature of the extract. The results of antimicrobial activity revealed that the extract exhibited activity against *Pseudomonas aeruginosa* and *Escherichia coli* but inactive against *Staphylococcus aureus* and *Candida albicans*. None of test concentrations exhibited comparable activity with the reference control ampicillin trihydrate. **Conclusion:** The present study concludes that the plant is also endowed with potential anthelmintic property in addition to its other popular uses in the traditional system of medicine.

Key words: *Evolvulus alsinoides* Linn., anthelmintic, antimicrobial, piperazine citrate, ampicillin trihydrate, amphotericin B.

1. Introduction

Evolvulus alsinoides Linn. (Fam. Convolvulaceae) is a diffuse, densely hispid, perennial herb with a woody branched root-stock and many spreading branches found wild in most parts of India in the plains and other tropical and subtropical countries [1]. In Ayurveda, the plant

is considered to be a powerful brain stimulant, toning up the intellectual powers, and an aphrodisiac. The plant is bitter, alexiteric, anthelmintic, febrifuge and is useful in bronchitis, biliousness, epilepsy, leucoderma, promotes growth of hair, improves complexion

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and appetite [1 - 3]. Reports on biological activities are scarce. The ethanolic (95%) extract is reported to possess CNS depressant activity with LD₅₀ 7.5 g/kg [4].

The plant is also reported to be effective in learning enhancement and memory retention improvement at a dose of 0.5 g/kg in mice when administered orally [5]. The vast ethnomedical uses made us interesting to study the anthelmintic and antimicrobial properties of the plant in a scientific manner.

2. Materials and methods

2.1 Plant material

The plant material (whole plant) was collected from the rural belt of Salipur in the district of Cuttack, in the state of Orissa during early winter at blooming stage and identified by the botanists of Department of Botany, Ravenshaw college, Cuttack by comparing with the voucher specimen present in the herbarium.

After authentication, fresh plant material was collected in bulk, washed under running tap water to remove adhering dust, shade dried and pulverised in a mechanical grinder. The powder was passed through sieve no. 40 and used for further studies.

2.2 Preparation of extract

The powdered plant material was extracted with ethanol (75%) by maceration in a closed vessel for 72 h. The solvent was then removed under reduced pressure which yielded a dark brown coloured greasy residue (yield- 8.42% w/w on Dried Material Basis). The dried extract (residue) was suspended in 1% gum acacia in normal saline (vehicle) and used for the anthelmintic studies. For the antimicrobial study, the extract was mixed in DMSO.

2.3 Drugs and chemicals

All the chemicals used were of analytical grade obtained from standard suppliers. Piperazine

citrate served as reference standard for the anthelmintic screening. Ampicillin trihydrate and amphotericin B served as reference standards for the antimicrobial study.

2.4 Anthelmintic activity

The anthelmintic activity was evaluated on adult Indian earthworm, *Pheretima posthuma* due to its anatomical and physiological resemblance with the intestinal roundworm parasites of human beings [6, 7, 8]. The method of Mathew *et al.* [9] was followed for the anthelmintic screening. Five groups of approximately equal size Indian earthworms consisting six earthworms in each group were released in to 50 ml of desired formulation.

Each group was treated with one of the following: Vehicle (1% gum acacia in normal saline), piperazine citrate (15 mg/ml) or extract (25, 50 or 100 mg/ml). 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 loose their motility followed with fading away of their body colour.

2.5 Antimicrobial activity

The antibacterial activity of the crude ethanolic extract was performed by Agar cup plate method [10]. The extract was dissolved in DMSO at a concentration of 10, 20 and 40 mg/ml respectively. Ampicillin trihydrate (1000 µg/ml) in DMSO was used as reference standard for the antibacterial study. Amphotericin B (1000 µg/ml) in DMSO served as reference control for the antifungal study. Solvent control (only DMSO) was also maintained throughout the experiment. The selected microorganisms included *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Escherichia coli* and *Candida albicans*, respectively.

Table.1

Anthelmintic activity of ethanolic extract of *Evolvulus alsinoides* Linn.

Group	Treatment	Concentration used (mg/ml)	Time taken for paralysis (min)	Time taken for death (min)
I	Vehicle	-	-	-
II	Piperazine citrate	15	28.17 ± 1.49	-
III	Ethanolic extract	25	27.67 ± 0.77	33.17 ± 0.72
IV	Extract	50	21.00 ± 0.67	24.33 ± 1.17
V	Extract	100	7.00 ± 0.67	10.67 ± 0.65

Results expressed as Mean ± SEM from six observations.

Table. 2

Antimicrobial activity of ethanolic extract of *Evolvulus alsinoides* Linn.

Test substance	Concentration mg/ml	Zone of inhibition (mm)			
		<i>Staphylococcus aureus</i>	<i>Pseudomonas aeruginosa</i>	<i>Escherichia coli</i>	<i>Candida albicans</i>
Ethanolic extract	10	-	11	14	-
Extract	20	-	16	19	-
Extract	40	-	23	26	-
Ampicillin trihydrate	01	32	28	29	-
Amphotericin B	01	-	-	-	29

3. Results and discussion

Table 1 depicts the time taken for paralysis and death of earthworms after treating with the test substances. It is observed that the ethanolic extract of *Evolvulus alsinoides* is more potent than the reference control piperazine citrate. It caused paralysis followed by death of the worms at all tested dose levels. Potency of the extract was inversely proportional to the time taken for paralysis/death of the worms. The activity confirms the dose dependency nature of the extract.

The results of antimicrobial activity reveals that the ethanolic extract exhibited activity against *Pseudomonas aeruginosa* and *Escherichia coli* but inactive against *Staphylococcus aureus* and *Candida albicans*. None of the test concentrations exhibited

comparable activity with the reference control ampicillin trihydrate (Table 2).

4. Conclusion

Evolvulus alsinoides Linn. is considered very popular in Ayurveda for its powerful brain stimulant activity together with toning up effect on the intellectual powers. Many times this activity is claimed to be comparable with *Centella asiatica* and *Bacopa monnieri* by the tribes of Orissa.

It might be one of the reasons for which the plant is used as one of the ingredients in ayurvedic formulations recommended for the purpose. In the present study, we may conclude that the plant is also endowed with potential anthelmintic property. It would be interesting to isolate the possible constituents those are responsible for the anthelmintic activity.

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