Journal of Advanced Pharmacy Education & Research
2: 184-188 (2011) ISSN 2249-3379

Evaluation of aqueous extract of *Rotula aquatica Lour* for *In vitro* Anthelmintic Activity

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ABSTRACT:

The root of *Rotula aquatic Lour* belongs to the family Boragenaceae is widely distributed in India from kumaun to Assam and western to southern India. *Rotula aquatica* is used as remedies for many ailments such as in the treatment of diabetes, urinary disorder and for anti- oxidant activity. This study was undertaken to evaluate the anthelmintic effect of aqueous extract of *Rotula aquatica* on adult earthworms' pheritma posthuma, using piperazine citrate 15 mg/ml as standard drug. Dose dependent activity was observed in different concentration of aqueous extract of *Rotula aquatica.* The result shows that the aqueous extract has shown anthelmintic activity compared to standard drug piperazine citrate.

Key words: *Rotula aquatica Lour*, Anthelmintic effect, Piperazine citrate.

INTRODUCTION:

The use of medicinal plant is growing worldwide because of the increasing toxicity and allergic manifestations of the synthetic drugs. Helminth infections are among the most common infections in man, affecting a large proportion of the world's population [1].

This infection can affect most populations in endemic areas with major economic and social consequences [2]. A range of medicinal plants with anthelmintic properties is widely used by traditional healers, but still there is need for research into medicinal plant claim to be effective in the management of helminth infection.

The plant *Rotula aquatica* belongs to the family Boragenaceae reported to contain baunerol [3], steroids alkaloids [4] and allantoin [5]. The root extract of *Rotula aquatica* showed antimitotic activity [4]. A decoction of root of *Rotula aquatica* showed diuretic activity [5] due to the presence of allantoin and it is also used as a laxative, treatment of

piles and in vineral disease. The alcoholic extract of *Rotula aquatica* (Boraginaceae) also reported affect against ethylene glycolinduced urolithiasis in albino rat [6].

Literature survey reveals that there are no reports on aqueous extract for anthelmintic activity. Hence, this leads us to study for anthelmitic activity of aqueous extract of *Rotula aquatic* [7].

MATERIALS AND METHODS:

Plant Material:

Root of *Rotula aquatica* was collected and authenticated by Dr. S. N. Dwivedi, Head of the department of botany, Janata Post Graduate College A. P. S. University Rewa-486002 M. P. India. The whole plant is then dried, powdered and stored in airtight containers for further use.

Drug and chemicals:

The drug piperazine citrate purchased from commercial sources and all other chemicals were of analytical grade.

Preparation of Extract:

The powdered material was subjected to soxhlet extraction with various solvents ranging from non-polar to polar. The solvents used were Petroleum ether, benzene, chloroform, alcohol and water. Each time before extraction with next solvents the marc was air-dried. All the extracts were concentrated by distilling the solvent at low temperature. They were then weighed and percentages of different extractive values were calculated with respect to air-dried substance. Aqueous extract was selected for anthelmintic activity on the basis of phytochemical screening and literature survey.

Phytochemical procedure:

The preliminary phytochemical screening of the aqueous extract of *Rotula aquatica* was carried out in order to ascertain the presence of its constituents by utilizing standard conventional protocols (Trease and Evans, 1989).

Anthelmintic activity:

Anthelmintic activity was carried as per the method reported by Rajesh R *et al* [1] with minor modifications. The assay was performed on adult Indian earth worm *Pheritima posthuma* due to its anatomical and physiological resemblance with the intestinal round worm parasite of human beings. Different concentrations of aqueous extracts (25, 50,

75 mg/ ml normal saline) were prepared and six worms were placed in it. All the extracts and the standard drug solution were freshly prepared before starting the experiments [8]. Mean time for paralysis (in min) was noted when no movement of any sort could be observed except when the worm was shaken vigorously; time for death of worms (in min) was recorded after ascertaining that worms neither moved when shaken vigorously nor when dipped in warm water (50°C). Piperazine citrate (15 mg/ml) was used as reference standard [9].

Statistical analysis

The data are represented as mean ± S.E.M. (n=6)

T able: 1 Anthelmintic activity of aqueous extract of *Rotula aquatica*

Treatment	Concentration used	Time taken for Paralysis (min)	Time taken for death (min)
Piperazine citrate	15 mg/ml	15.18± 0.1641	26.95 ±0.1565
Aqueous extract	25 mg/ml	28.60± 0.2989	36.98±0.3763
Aqueous extract	50 mg/ml	21.02± 0.2286	30.35±0.4403
Aqueous extract	75 mg/ml	16.95± 0.3575	22.33± 0.5445

Value are expressed as mean ± SEM (n=6)

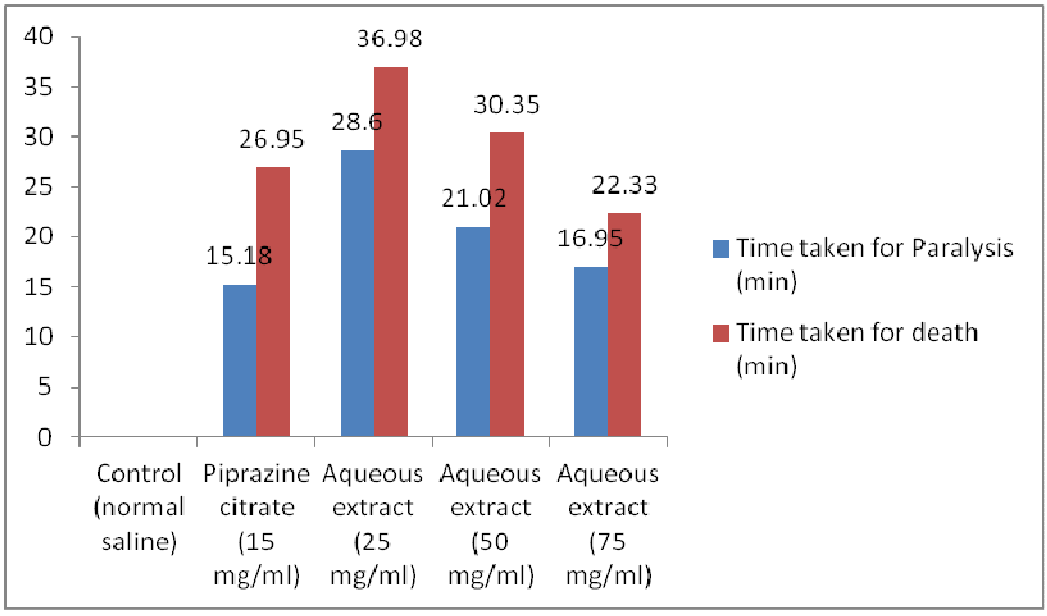

Figure: 1 Anthelmintic activity of aqueous extract of *Rotula aquatica*

RESULT AND DISCUSSION:

The chemical composition of the essential oil from the aerial parts of *Rotula aquatica* reported presence of six constituents i.e. rutin, baunerol, rhabdiol, alpha-amyrin, beta-amyrin, allantoin.

Preliminary phytochemical screening studies on revealed the presence of carbohydrate, tannins and flavonoids. Some of these phytoconstituents may be responsible to show a potent anthelmintic activity. The result shows that the aqueous extract of *Rotula aquatica* show an more effective anthelmintic activity at concentration 75mg/ml when compared to standard drug (Table 1 & Figure 1).

Each crude aqueous extract of *Rotula aquatica* at the concentration of 25, 50 and 75 mg/ ml produced anthelmintic activity in dose dependent manner giving shortest time of paralysis (P) and death (D) with 75 mg/ml concentration. Aqueous extract of *Rotula aquatica* at concentration of 75 mg/ ml caused paralysis in 16.95 min and death in 22.33 min, while concentration 50 mg/ml extract showed paralysis in 21.02 min and death in 30.35 min and concentration 25mg/ml showed paralysis in 28.60 min and death in 36.98 min against *Pheritima postuma*. The reference drug piperazine citrate 15mg/ml showed the paralysis in 15.18 min and death in 26.95 min. The predominant effect of piperazine citrate on the worm is to cause a flaccid paralysis that result in expulsion of the worm by peristalsis.

CONCLUSION:

In conclusion, the data (Table & Figure: 1) reveals that aqueous extract of *Rotula aquatica* at concentration 75 mg/ml was more effective than the other concentration of aqueous extract of *Rotula aquatica* against Pheritma postuma. Further studies are necessary to isolate the active compound in the crude extract of *Rotula aquatica* responsible for activity.

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