

Anthelmintic Activity of Extracts of Some Medicinal Plants

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Abstract

Development of anthelmintic resistance and high cost of conventional anthelmintic drugs led to the evaluation of medicinal plants as an alternative source of anthelmintics. In the current study, experiments were conducted to evaluate the possible anthelmintic effects of crude alcoholic extracts of *Clitoria ternatea* Linn., *Guazuma ulmifolia* Lam. and *Madhuca indica* Gmel. using *Pheretima Posthuma*. Various concentrations (25, 50, 100mg/ml) of all extracts were tested and results were expressed in terms of time for paralysis and time for death of worms. Piperazine citrate (10 mg/ml) was used as a reference standard and distilled water as a control group. Dose dependent activity was observed in all plant extracts but *Madhuca indica* shows more activity as compared to *Clitoria ternatea* and *Guazuma ulmifolia*.

Keywords: *Pheretima Posthuma*, *Clitoria ternatea*, *Guazuma ulmifolia*, *Madhuca indica*, anthelmintic

Introduction

Helminthiasis is among the most important animal diseases inflicting heavy production losses. Helminths are the most common infectious agents of humans in developing countries and produce a global burden of disease and contribute to the prevalence of malnutrition, anaemia, eosinophilia, and pneumonia. The disease is highly prevalent particularly in third world countries [1] due to poor management practices. However, increasing problems of development of resistance in helminths [2], [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], [5]. As we know very well, now a days the medicinal preparation available in the market from which most of them either not effective up to

the mark or has to develop resistance resulting in reoccurrence again. Plant derived drug serve as a prototype to develop more effective and less toxic medicines.

Clitoria ternatea Linn, member of family Fabaceae, is a perennial twinning herb; stems terete, more or less pubescent. Natural habitat to tropical and subtropical region, known as the *aparajita*. This plant is used as laxative, diuretic, brain tonic, antiulcer, in the treatment of headache and snakebite [6], [7]. Also the anthocyanins, flavonoids and flavanol glycosides were isolated [8].

Guazuma ulmifolia Lam., commonly known as “mutamba”, is a member of the Sterculiaceae family. In traditional medicine, the bark of *Guazuma ulmifolia* is used in the treatment of diarrhea, hemorrhages, fever, coughs, bronchitis, asthma, gastrointestinal pain and hypertension, and as stimulant for uterine contractions [9], [10].

Madhuca indica Gmel, of family Sapotaceae which is use from ancient to cure various ailments. It is an important economic tree growing throughout the sub tropical region of the Indo-Pak sub continent. Mahua seeds are of economic importance as they are good source of edible fats [11] which is satisfactory for production of washing soaps. Leaves are astringent and distilled juice of the flower is considered a tonic both nutritional & cooling & also in treatment of helminthes, acute & chronic tonsillitis, pharyngitis [12].

Materials and Methods

The methodology adopted to evaluate the anthelmintic activity of three plants viz *Clitoria ternatea*, *Guazuma ulmifolia* and *Madhuca indica* hereunder.

Plant materials and Preparations

Extracts were prepared from 3 plants commonly used in traditional medicines. The plant material was authenticated at Department of Botany, University of Rajasthan, Jaipur where a voucher specimen was deposited. For ethanolic extraction, powdered dry plant material (50 gm) was extracted with 100 ml ethanol for 24 hrs. by using Soxhlet apparatus. The extracts were filtered and concentrated under vacuum sounding apparatus for 30 min. All the extracts were stored at 4°C.

Worm Collection and Authentication

The Indian earthworm *Pheritima posthuma* (Annelida) was collected from Durgapura Agriculture University, Jaipur and authenticated from the Department of Vermiculture, Agriculture University, Jaipur.

Anthelmintic Activity

The anthelmintic activity was performed according to the method of Ghosh *et al.*, [12] on adult Indian earthworm *Pheritima posthuma* as it has anatomical and physiological resemblance with the intestinal roundworm parasites of human beings. Five groups

of approximately equal sized Indian earthworms consisting of six earthworms in each group were released into 50 ml of desired formulation. Group first serve as control, receive only normal saline, Group second serve as test-1, receive different concentrations of (25,50,100 mg/ml)ethanolic extract of *C. ternatea*, Group third serve as test-2, receive different concentrations of (25, 50,100 mg/ml) ethanolic extract of *G. ulmifolia*, Group fourth serve as test-3, receive different concentrations of (25,50,100 mg/ml) ethanolic extract of *M. indica*, and Group five serve as standard, receive standard drug Piperazine citrate (10mg/ml) Observations were made for the time taken to paralyse or death of individual worms. Paralysis was said to occur when the worms do not receive even in normal saline. Death was concluded when the worms lose their motility followed with fading away of their body colour. Results are shown in Table-1.

Table -1 Anthelmintic activity of *Clitoria ternatea*, *Guazuma ulmifolia* and *Madhuca indica*

| Groups | Conc. (mg/ml) | Time taken for paralysis(min) | Time taken for death (min) |
|--------------------------|---------------|-------------------------------|----------------------------|
| Normal Control | - | - | - |
| <i>Clitoria ternatea</i> | 25 | 37 ±3.03 | 70.25 ±2.74 |
| | 50 | 24.5 ±2.03 | 35.65 ±1.17 |
| | 100 | 15.5 ±1.04 | 27.5 ±1.10 |
| <i>Guazuma ulmifolia</i> | 25 | 94.20 ±2.96 | 465.75 ±5.3 |
| | 50 | 28.8 ±2.25 | 245.5 ±12.7 |
| | 100 | 18 ±1.52 | 82 ±1.28 |
| <i>Madhuca indica</i> | 25 | 28 ±2.64 | 47 ±2.08 |
| | 50 | 14 ±2.08 | 15.7 ±0.97 |
| | 100 | 3.5 ±0.60 | 11.25 ±0.80 |
| Piperazine citrate | 10 | 23.36 ±1.5 | 62 ±6.8 |

All values represent Mean +SD; n= 6 in each group.

Results and Discussion

Preliminary phytochemical screening has shown the presence of saponin, steroids, carbohydrates, alkaloids, tannins, proteins, flavonoids in ethanolic extracts of plants. From the results shown in the Table No1.ethanolic extract of *Madhuca indica* exhibited anthelmintic activity in dose dependent manner giving shortest time of paralysis and deaths compared to Piperazine citrate. From the results it is observed that *Madhuca indica* shown potent anthelmintic activity while the *Guazuma ulmifolia* has taken long time for death of worms. *Clitoria ternatea* was taken 15-20 min to bring paralysis and 28-30 min. to bring death of worms. *Madhuca indica* is showing paralysis within 3-5 min while death is comparable with that of piperazine citrate as death of worms was observed at 62 min. The predominant effect of Piperazine citrate

on worm is to cause a flaccid paralysis those results 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 to relaxation and flaccid paralysis [13]. Future scope involves need of isolation of phytoconstituents responsible for activity.

Conclusion

The wormicidal activity of alcoholic extracts suggests that it is effective against parasitic infections of humans. Further, in future it is necessary to identify and isolate the possible active phytoconstituents responsible for the anthelmintic activity and study its pharmacological actions.

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