



IN VITRO ANTHELMINTIC ACTIVITY OF FRUIT EXTRACT OF *BARLEEIA PRIONITIS* LINN. AGAINST *PHERETIMA POSTHUMA*

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ABSTRACT

The present study was undertaken to evaluate anthelmintic activity of aqueous (AQE) and ethanolic (EE) extracts of whole plant of *Barleria prionitis* Linn. (Acanthaceae) against *Pheretima posthuma*. Various concentrations (50-100mg/ml) aqueous and ethanolic extracts were evaluated in the bioassay involving determination of time of paralysis (P) and time of death (D) of the worms. Albendazole (Std.) was used as standard anthelmintic drug and distilled water was used as control. The results of present study indicated that the ethanolic and aqueous extracts significantly exhibited paralysis ($P < 0.01$) in worms in lower doses (50, 75 and 100mg/ml) and also caused death of worms especially at higher concentration of 100mg/ml, as compared to standard drug. Further studies are in process to isolate the active principle/s responsible for the activity.

Keywords: Albendazole, Anthelmintic activity, Whole plant extract of *Barleria prionitis* Linn, *Pheretima posthuma*

INTRODUCTION

Barleria prionitis (Family Acanthaceae; Hindi—Katsareya; Sanskrit—Karunta), is an annual shrub, 1-3 feet high, found throughout tropical Asia (India and Sri Lanka) and in South Africa. The white flower variety is bitter and in indigenous system of medicine in India the leaves are used in fever, toothache and liver ailments, aerial parts are used in inflammation, bark in cough, the whole plant and especially the roots are used as tonic and diuretic¹⁻⁴. Juice of the leaves is used in ulcer and fever. Paste of the roots is applied to disperse boils and glandular swellings^{5,6}. Leaves are also used by some tribal communities for the treatment of piles and to control irritation⁷.

MATERIALS AND METHODS

Plant Collection and authentication

The whole plant of *Barleria prionitis* Linn. (Acanthaceae) were collected from Sangli (Maharashtra); and authenticated by Botanical Survey of India, Pune (Maharashtra). A voucher specimen has been deposited at the herbarium of CHECHA1.

Preparation of extraction

The whole plant of *Barleria prionitis* Linn. were dried at room temperature (25-35 °C) and powdered with the help of an electric grinder. The coarse material was extracted successively with ethanol and the plant mark was finally macerated with distilled water. The extracts were dried at 50°C in a water bath. The percentage yields obtained of the different successive extracts were 11.50% and 7.31%, respectively.

Worms Collection and authentication

Indian earthworms *Pheretima posthuma* (Annelida) were collected from the water logged areas of soil worms were obtained from freshly slaughtered fowls (*Gallus gallus*). Worm types were identified at the Agriculture Research Station, Aland road, Gulbarga.

Preparation of test sample

Samples for in-vitro study were prepared by dissolving and suspending 2.5 g of each extract (ethanolic and aqueous) in 25 ml of distilled water to obtain a stock solution of 100 mg/ml. From this stock solution, different working dilutions were prepared to get concentration range of 50, 75 and 100 mg/ml.

Anthelmintic assay

The anthelmintic assay was carried out as per the method of Ajayieoba et al with minor modifications⁸. The assay was performed on adult Indian earthworm *Pheretima posthuma*, due to its anatomical and physiological resemblance with the intestinal roundworm parasites of human beings⁹. *Pheretima posthuma* worms are easily available and used as a suitable model for screening of anthelmintic drug^{10,11}. The 50 ml formulations containing four different concentrations of each ethanolic and aqueous extract (50, 75 and 100 mg/ml in distilled water) were prepared and six worms (same type) were placed in it. Time for paralysis was noted when no movement of any sort could be observed except the worms were shaken vigorously. Time for death of worms were recorded after ascertaining that the worms neither moved when shaken vigorously nor when dipped in warm water at 50 °C^{12,13}. Albendazole (20 mg/ml) was used as reference standard while distilled water as the control.

RESULTS AND DISCUSSION

As shown in table -1 & figure 1 & 2 showed aqueous and ethanolic extract of whole plant of *Barleria prionitis* exhibited anthelmintic activity using *Pheretima posthuma* worms in dose-dependant manner giving shortest time of paralysis (P) and death (D) with 100 mg/ml concentration. The ethanolic extract caused paralysis at 2.58 ± 0.15 min. and time of death of 7.12 ± 0.65 min. while aqueous extract revealed paralysis of 5.25 ± 0.51 and time of death of 9.00 ± 0.68 min respectively against the earthworm *Pheretima posthuma*. The standard drug Albendazole showed the same paralysis at 11.06 ± 0.22 and time of death of 16.47 ± 0.19 minutes.

Albendazole by increasing chloride ion conductance of worm muscle membrane produced hyperpolarization and reduced excitability that led to muscle relaxation and flaccid paralysis¹⁴. The whole plant extracts of *Barleria prionitis* not only demonstrated paralysis, but also caused death of worms especially at higher concentration of 100 mg/ml, in shorter time as compared to standard drug Albendazole. Phytochemical analysis of the crude extract revealed the presence of tannins among other chemical constituents contained within them. Tannins were shown to produce anthelmintic activities. Chemically tannins are polyphenolic compounds¹⁵. It is possible that tannins contained in the whole extracts of *Barleria prionitis* produced similar effects. Reported

anthelmintic effect of tannins is that they can bind to free proteins in the gastrointestinal tract of host animal or glycoprotein on the cuticle of the parasite and may cause death.

Table 1: Anthelmintic activity of whole plant extracts of the *Barleria prionitis*

Test sub	Concentration mg/ml	Time taken for paralysis (P) and for death of worms (D) in min	
		P	D
Vehicle	-	-	-
Albendazole (Std.)	20	11.06± 0.22	16.47±0.19
Aqueous extract (AQE)	50	20.08±0.68	29.03± 0.68
	75	13.50±0.76*	24.08± 0.73*
	100	5.25± 0.76**	9.00±0.68**
Ethanollic Extract (EE)	50	10.37± 0.38*	18.50± 0.76*
	75	6.41± 0.39**	13.50± 0.76**
	100	2.58± 0.15***	7.12± 0.65***

Values are expressed as MEAN±SEM, One way ANOVA followed by Dunnett's test.

Note: n=6 in each group. *P<0.05, **P<0.01, ***P<0.001

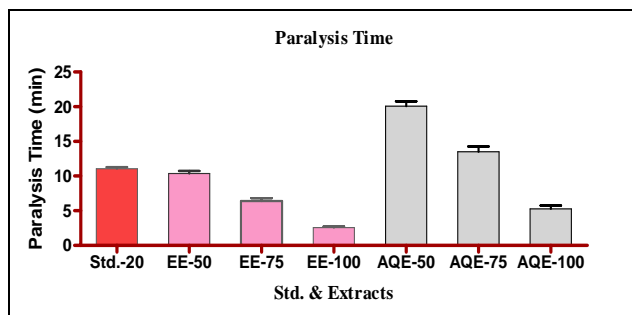


Fig. 1: Paralysis time of ethanollic & aqueous extracts

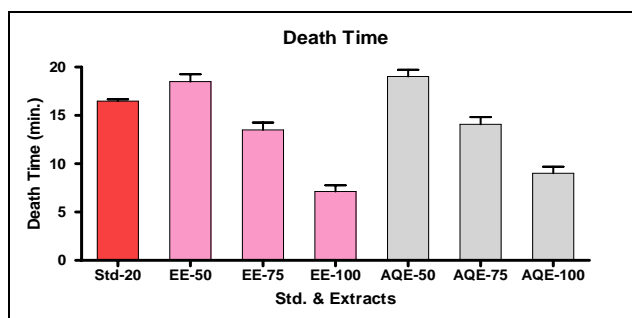


Fig. 2: Death time of ethanollic & aqueous extracts

CONCLUSION

The study has shown that ethanollic and aqueous extracts of whole plant of *Barleria prionitis* have significantly determined anthelmintic activity. But ethanollic extracts of *Barleria prionitis* shown most significant anthelmintic activity as compare to the aqueous extracts. Further studies are in process to identify the possible Phytoconstituents responsible for anthelmintic activity.

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REFERENCES

- Chopra, R.N., Nayar, S.L., Chopra, I.C., *Barleria prionitis* Linn. In: Glossary of Indian Medicinal Plants. Council of Scientific and Industrial Research Publication, New Delhi, India 1956.p. 33-34.
- Chopra, R.N., Chopra, I.C., Handa, K.L., Kapur, L.D., *Barleria prionitis* Linn. In: Chopra's Indigenous Drugs of India, 2nd ed. U.N. Dhar and Sons Pvt. Ltd., Calcutta, India 1958.p. 595
- Kiritkar, K.R., Basu, B.D., *Barleria prionitis* Linn. In: Caicus, E.J.F., Mhaskar, K.S. (Eds.), Indian Medicinal Plants, Vol. III, Revised and Enlarged, 3rd ed. Sri Satguru Publications, Indian Book Centre, Delhi, India 2000.p. 2587-2590.
- Nadkarni, A.K., *Barleria prionitis* Linn. In: Dr. K.M. Nadkarni's Indian Materia Medica, 3rd ed. Reprint vol. 1, Popular Book Depot, Mumbai, India 1994.
- Bhalla NP, Sahu TR, Mishra GP, Dakwala RN. J Econ Taxon Bot 1992; 3:23.
- Jain S.K., Defillips RA. Medicinal plants of India. New Delhi 7 CSIR; 1991.
- Singh H. Anc Sci Life 1988; 8:167.
- G. K. Dash, B. Mishra, A. Panda, P. Patro and S. Ganpaty. Ind. J. Nat. Prod. 2003; 28: 19-24.
- V. D. Tambe, S. A. Nirmal, R. S. Jadhav, P. B. Ghogare, R. D. Bhalke, A. S. Girme and R. S. Bhamber. Ind. J. Nat. Prod. 22(3): 27-29.
- R. G. Mali, S. G. Mahajan and A. A. Mehta. PHCOG MAG. 2007; 3(10): 73-76.
- G. K. Dash, P. Suresh, S. K. Sahu, D. M. Kar, S. Ganpaty and S. B. Panda. J. Nat. Rem. 2002; 2(2): 182- 85.
- V. D. Szewezuk, E. R. Mongelli and A. B. Pomillo. Mole. Med. Chem.2003; 1: 5457.
- Y. M. Shivkar, V. L. Kumar. Pharm. Biol.2003; 41(4): 263-65.
- R. G. Mali, S. Mahajan, K. S. Patil. Anthelmintic activity of root bark of *Capparis spinosa*. Ind. J. Nat. Prod. 2005; 21(4): 50-51.
- R. J. Martin. Br. J. Pharmacol. 1985; 84(2): 445-61.