

INVESTIGATION OF IN VITRO ANTHELMINTIC ACTIVITY OF THESPESIA LAMPAS (CAV.)

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Satpuda hills region of Maharashtra is inhabited by several tribes and they are using several plants or plant-based preparations for the treatment of various ailments in their traditional system of medicine. During our course of studies on ethnomedicine of this region, the plant being used as anthelmintic is root of *Thespesia lampas* (Cav.). This plant has a wide reputation among natives of being curative for intestinal-worm infections in the form of aqueous extract. Based on this, an attempt has been made to evaluate the anthelmintic potential of this plant.

The aqueous extract of *Thespesia lampas* (Cav.) roots (Ranibhendi) was investigated for anthelmintic activity using earthworms (*Pheretima posthuma*), tapeworms (*Raillietina spiralis*) and roundworms (*Ascaridia galli*). Various concentrations (10-50 mg/ml) of plant extract were tested in the bioassay. Piperazine citrate (10 mg/ml) was used as reference standard drug whereas distilled water as control. Determination of paralysis time and death time of the worms were recorded. Extract exhibited significant anthelmintic activity at highest concentration of 50 mg/ml. The result shows that aqueous extract possesses vermifugal activity and found to be effective as an anthelmintic.

Keywords : Anthelmintic, Satpuda hills, ethnomedicine, *Thespesia lampas* (Cav.), vermifugal.

INTRODUCTION

Helminth infections are among the most widespread infections in humans, distressing a huge population of the world. Although the majority of infections due to helminths are generally restricted to tropical regions and cause enormous hazard to health and contribute to the prevalence of undernourishment, anaemia, eosinophilia and pneumonia¹. Parasitic diseases cause ruthless morbidity affecting principally population in endemic areas². The gastro-intestinal helminthes becomes resistant to currently available anthelmintic drugs therefore there is a foremost problem in treatment of helminthes diseases³. Hence there is an increasing demand towards natural anthelmintics.

Thespesia lampas (Cav.) Malvaceae, commonly known as Ranibhendi, Jangali bhendi and bendi is a tall and undershrub growing on hill slopes wildly throughout forests. Leaves are 11-18 cm long, angular or shallowly 3-lobed, broadly ovate, thinly hairy above and petiolate. Flowers are yellow. Capsules are ovoid, 4-5 valved and blackish brown. Seeds are light black and dorsally rounded⁴. Leaves were useful in inflammation, ringworm, skin diseases. Roots were used as general tonic⁵. Plant contains Kaemferol and its glycosides, herbacetin, quercetin, rutin, gossypol, lupeol and B- sitosterol⁶.

Satpuda hills region of Maharashtra is inhabited by several tribes and they are using several plants or plant-based preparations for the treatment of various ailments in their traditional system of medicine. During our course of studies on ethnomedicine of this region, the plant being used as anthelmintic is roots of *Thespesia lampas* (Cav.).

This plant has a wide reputation among natives of being curative for intestinal-worm infections. This plant is being used by the tribals of Satpuda hills as an anthelmintic in the form of extract, prepared by soaking powdered material in water for 10-12 hours. This extract is taken orally once a day for three days to treat intestinal-worm infections. Based on this, an attempt has been made to evaluate the anthelmintic potential of *Thespesia lampas* (Cav.)

MATERIALS AND METHODS

Plant material

The bark of *Thespesia lampas* (Cav.) was procured from Toranmal hills region (Maharashtra) in September 2007. The plant and plant material were identified and authenticated in Department of Botany, S. S.V.P.S. society's Dr. P. R. Ghogrey Science College, Dhule and Voucher herbarium specimens was deposited in the Department of Pharmacognosy of our College. The plant material was dried in sunlight, pulverized, passed through sieve no. 40 and stored in air tight container and used for further extraction.

Preparation of extract

Aqueous extract (Maceration method)

Powdered material of *Thespesia lampas* (Cav.) roots (200 gm) was kept for maceration with 1000 ml of distilled water for 12 hrs. The extract was double filtered by using muslin cloth and Whatman no.1 filter paper and concentrated by evaporation on water bath. The extract was dried and used as a powder. The percentage yield of extract was found to be 3.56 percent.

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TABLE - 1 Anthelmintic activity of *Thespesia lampas* (Cav.) aqueous extract

	Groups	Concentration (mg/ml)	<i>Pheretima posthuma</i> (Earthworm)		<i>Ascaridia galli</i> (Roundworm)		<i>Raillietina spiralis</i> (Tapeworm)	
			Time taken for paralysis (P) in min. (Mean & SEM)	Time taken for death (D) in min. (Mean & SEM)	Time taken for paralysis (P) in min. (Mean & SEM)	Time taken for death (D) in min. (Mean & SEM)	Time taken for paralysis (P) in min. (Mean & SEM)	Time taken for death (D) in min. (Mean & SEM)
01	Control (Water Only)	-----	-----	-----	-----	-----	-----	-----
02	<i>Thespesia lampas</i> (Cav.)	10	27±0.41	68±1.20	22±1.60	59±1.52	29±1.24	62±1.07
		20	19±0.46	50±1.18	15±1.21	43±0.86	18±0.68	43±0.74
		50	08±0.58	31±1.36	09±0.82	33±0.98	11±0.60	27±0.56
03	Piperazine citrate (Standard)	10	23±1.15	61±0.88	11±1.43	39±1.26	23±0.64	55±0.68

Each value represents mean ± SEM (N=6).

Animals

Adult earthworms (*Pheretima posthuma*), Roundworm (*Ascaridia galli*) and Tapeworms (*Raillietina spiralis*) were used to evaluate anthelmintic activity *in vitro*. Earthworms were collected near the swampy water along Karvand road Shirpur, roundworms and tapeworms were obtained from intestine of freshly slaughtered fowls. Infested intestines of fowls were collected from the local slaughter house and washed with normal saline solution to remove all the faecal matter. These intestines were then dissected and worms were collected and kept in normal saline solution. The average size of earthworm was 6-8 cm, average size of round worm was 5-7 cm and average size of tapeworm was 6-8 cm. Earthworm and helminths were identified in Dept. of Zoology, SES Science College Shirpur and services of veterinary practioners were utilized to confirm the identity of worms.

Drugs and chemicals

Piperazine citrate (Glaxo Smithkline) was used during the experimental protocol.

Anthelmintic activity

The anthelmintic assay was carried out as per the method of Ajaiyeoba et al⁷. The assay was performed *in vitro* using adult earthworm (*Pheretima posthuma*) owing to its anatomical and physiological resemblance with the intestinal roundworm parasites of human beings for preliminary evaluation anthelmintic activity^{8,9,10}. Use of *Ascaridia galli* and *Raillietina* species as a suitable model

for screening of anthelmintic drug was advocated earlier^{11,12}.

Test samples of the extract was prepared at the concentrations, 10, 20 and 50 mg/ml in distilled water and six worms i.e. *Pheretima posthuma*, *Ascaridia galli* and *Raillietina spiralis* of approximately equal size (same type) were placed in each nine cm Petri dish containing 25 ml of above test solution of extracts. Piperazine citrate (10 mg/ml) was used as reference standard and distilled water as control^{13,14,15,16}. This procedure was adopted for all three different types of worms. All the test solution and standard drug solution were prepared freshly before starting the experiments. Observations were made for the time taken for paralysis was noted when no movement of any sort could be observed except when the worms were shaken vigorously. Time for death of worms were recorded after ascertaining that worms neither moved when shaken vigorously nor when dipped in warm water (50°C). All the results were shown in Table.1 and expressed as a mean ± SEM of six worms in each group.

RESULTS AND DISCUSSION

From the observations made, higher concentration of extract produced paralytic effect much earlier and the time to death was shorter for all worms. Aqueous extract showed anthelmintic activity in dose-dependent manner giving shortest time of paralysis (P) and death (D) with 50 mg/ml concentration, for all three types of worms. Extract exhibited more potent activity at lower concentration (10

mg/ml) against (roundworm) *Ascaridia galli*. Evaluation of anthelmintic activity was compared with reference standard Piperazine citrate (Table.1). Preliminary phytochemical screening of extract revealed the presence of glycosides, phenolic compounds and mucilage.

From the above results, it is concluded that *Thespesia lampas* (Cav.) used by tribals traditionally to treat intestinal worm infections, showed significant anthelmintic activity. The experimental evidence obtained in the laboratory model could provide a rationale for the traditional use of this plant as anthelmintic. The plant may be further explored for its phytochemical profile to recognize the active constituent accountable for anthelmintic activity.

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