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EVALUATION OF ANTHELMINTIC ACTIVITY OF *DALBERGIA SISSOO* ROXB.

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ABSTRACT

The ethanolic extract of bark of *Dalbergia sissoo* Roxb. was investigated for its activity against Indian earthworms *Pheretima posthuma* and nematode *Ascardi galli*. Various concentrations (10, 20, 50 mg/ml) of ethanolic extract were tested, which involved determination of time of paralysis and time of death of the worms. It was compared with Piperazine citrate (15 mg/ml) and Albendazole (20 mg/ml) as standard reference and normal saline as control. The study indicated the potential usefulness of *Dalbergia sissoo* Roxb. against helminthic infections

INTRODUCTION: *Dalbergia sissoo* Roxb. (Papilionaceae) is commonly known as 'Shisham' in Hindi. The plant is found throughout India, Pakistan, Bangladesh and Nepal up to 900 m. It is a medium to large deciduous tree, maximum 25 m in height, young parts pubescent, branches numerous and spreading. Trunks are often crooked when grown in the open. Leaves are leathery, alternate, pinnately compound and about 15 cm long. Flowers are whitish to pink, fragrant, nearly sessile, up to 1.5 cm long and in dense clusters 5-10 cm in length. Pods are oblong, flat, thin, strap-like 4-8 cm long, 1 cm wide, and light brown. They contain 1-5 flat bean-shaped seeds 8-10 mm long [1].

The extract of *Dalbergia sissoo* Roxb was reported as anti-inflammatory [2], antidysentric [3], analgesics and antipyretic [4]. The bark and wood are bitter, hot and acrid used as aphrodisiac, abortifacient, expectorant, antihelmintic, antipyretic and diseases of the blood, leucoderma, dyspepsia and dysentery is mentioned in Ayurveda. The wood is good for diseases of the eye, and of the nose, used in scabies and syphilis. A decoction o the leaves are given in the acute stage of gonorrhea. The whole plant has long been employed in ancient Yunani preparations [5, 6]. In spite of its traditional use as antihelmintic, there are no reports on systematic and scientific study of antihelmintic activity of *Dalbergia sissoo* Roxb. So the present study was focused investigate the antihelmintic activity of ethanolic extracts of *Dalbergia sissoo* Roxb.

MATERIALS AND METHODS:

Plant material: The barks of *Dalbergia sissoo* Roxb were collected from the rural belt of Anand district, Gujarat and is Authenticated by Taxonomist, Bioscience Department, Sardar Patel University. Vallabh Vidyanagar, Gujarat, India.

Preparation of extracts: The barks of *Dalbergia sissoo* Roxb. were dried in sun and coarsely powdered. It was then passed through the 40 mesh sieve. A weighted quantity (200 gm) of the powder was subjected to continuous hot extraction in Soxhlet Apparatus exhaustively. The extract was evaporated under pressure using rotary evaporator until all solvent has been removed to give an extract sample. Percentage yield of ethanol extract 5.3% w/w.

Drugs and chemicals used: Piperazine citrate (Noel, Mumbai) and Albendazole (Pfizer, Mumbai) were used as reference standards. Chemicals: Ethanol (95% v/v) (Rexol Ecofuels P. Ltd. Mumbai) and gum acacia.

Phytochemical screening: The Phytochemical examination of ethanolic extract of *Dalbergia sissoo* Roxb bark was performed by standard methods [7].

Animals: Indian adult earth worm (*Pheritima posthuma*) was collected from water logged areas of Anand (Gujarat) and *Ascardia galli* (nematode) worm were obtained from freshly slaughtered fowls. Both worm types were identified at the Zoology department, Sardar Patel University. Vallabh Vidyanagar, Gujarat, India.

Evaluation of antihelmintic activity: The antihelmintic activity was evaluated on adult Indian earthworm *Pheritima posthuma* as well as on worm parasites of human beings *Ascardia galli* (nematodes) which are available in slaughtered fowls[8, 9]. Six groups of worms were used to assess the antihelmintic properties of ethanolic extracts of *Dalbergia sissoo* Roxb. bark.

Groups 1 were the control worms placed in normal saline; groups 2-4 were treated with 10, 20 and 50 mg/ml of ethanolic extracts *Dalbergia sissoo* Roxb. in 1% gum acacia in normal saline; group 5 with Piperine citrate in normal saline; and group 6 with Albendazole in normal saline. Each group included six worms of each type. Observations were made for the time taken to set paralysis and death of the individual worms. Mean time for the paralysis (P) in min. was noted when no movement of any sort could be observed, except when the worm was shaken vigorously; time of death (D) in min. was recorded

after ascertaining the worms neither moved when shaken vigorously nor when dipped in warm water (50°C). Piperazine citrate (15 mg/ml), albendazole (20 mg/ml) were included as reference compound[10].

RESULTS:

Phytochemical Screening: The results of preliminary phytochemical screening of the ethanolic extract of *Dalbergia sissoo* Roxb. bark showed the presence of alkaloids, carbohydrates, saponins, flavonoids, glycosides (Cardiac glycosides, anthraquinone glycoside and saponin glycosides) and steroids.

Antihelmintic activity of Ethanolic Extract of *Dalbergia sissoo* Roxb. bark: In this antihelmintic assay, extract of *Dalbergia sissoo* Roxb. not only produced paralysis but also cause death of both species of worms. As shown in Table, ethanolic extract exhibited antihelmintic activity in dose-dependent manner giving shortest time of paralysis (P) and death (D) with 50 mg/ml concentration. Similar effects were observed for the tested standard drugs (i.e., Piperazine citrate and Albendazole), Piperazine citrate and Albendazole caused paralysis and death to the worms (**Table 1**). Moreover, the antihelmintic effect of ethanolic extract of *Dalbergia sissoo* Roxb bark was comparable with the standard drugs, although it caused both paralysis and death of the worms similar to piperazine citrate and albendazole.

TABLE: ANTHELMINTIC ACTIVITY OF ETHANOLIC EXTRACT OF *DALBERGIA SISSOO* ROXB.

Group	Concentration (mg/ml)	Time taken for paralysis (P) and death (D) of worms (mins)			
		P. posthuma		*A. galli*	
		P	D	P	D
Control	-	-	-	-	-
Ethanolic extracts	10	25.60 ± 0.41	65.11 ± 0.98	15.50 ± 0.58	44.37 ± 0.57
	20	18.77 ± 0.76	45.08 ± 0.42	9.51 ± 0.52	25.24 ± 0.45
	50	9.12 ± 0.19	28.24 ± 0.65	5.94 ± 0.42	17.06 ± 0.58
Piperazine citrate	15	18.00 ± 0.36	52.21± 0.36	11.05 ± 0.91	35.02 ± 0.34
Albendazole	20	33.66 ± 0.52	60.83 ± 0.89	23.15 ± 0.45	38.09 ± 0.27

Results are expressed as Mean ± SEM from six observations

DISCUSSION: In this study, antihelmintic assay was performed on adult Indian earthworm, *Pheretima posthuma* due to its anatomical and physiological resemblance with the intestinal roundworm parasite of human beings [11-14]. Because of easy availability, earthworms have been used widely for the initial evaluation of antihelmintic compounds *in vitro* [15-20]. *Ascardia galli* worms are easily available in plenty from freshly slaughtered fowls and their use, as a suitable model for screening of anthelmintic drug was advocated earlier [21]. Piperazine citrate causes flaccid paralysis of worms that resulting expulsion of worms by peristalsis. Piperazine citrate and albendazole has causes death of the parasite. The lethal effect of Albendazole was attributed to its inhibition of tubulin polymerization and blocking glucose uptake [22].

Therefore, it is concluded that ethanolic extract of *Dalbergia sissoo* Roxb. bark have potent antihelmintic activity when compared the conventionally used drug and is equipotent to standard antihelmintic drug tested against worm species. It justifies its Ayurvedic use in curing helminthic infections.

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