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Research Article

ANTHELMINTIC ACTIVITY OF *DALBERGIA SISSOO* (FABAACAE)

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ABSTRACT

The present study deals with anthelmintic activity of bark of *Dalbergia sissoo* (Fabaaceae), a potential medicinal plant, distributed in open forests in India. The plant is used in traditional medicine for Dyspepsia and Dysentery. Expectorant, Aphrodisiac, Abortifacient, Anthelmintic, Antipyretic and Diseases of the blood, Leucoderma, The petroleum ether, ethyl acetate, methanol and ethanol were evaluated for its anthelmintic activity against adult Indian earthworms (*Pheretima posthuma*). Three concentrations (25, 50 and 75mg/ml) of each extract were studied, which involved for the determination of time of paralysis and time of death of the test worms. It was found that ethanol and Petroleum ether extracts exhibited significant anthelmintic activity. Albendazole in same concentration as that of extract was used as standard reference and saline water as control.

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INTRODUCTION

Helminthiasis is a worldwide and one of the common diseases of all ages especially in third world countries. The parasitic diseases cause severe morbidity by affecting population in endemic areas with major economic and social consequences [1]. Helminth infections are among the most common infections in man, affecting a large proportion of the world's population. In developing countries they pose a large threat to public health and contribute to the prevalence of malnutrition, anemia, eosinophilia, and pneumonia. Although the majority of infections is due to. Worms are generally limited to tropical regions, they can occur to travellers who have visited those areas and some of them can develop in temperate climates [2]. Helminthiasis is a disease in which a part of the body is infested with worms such as pinworm, roundworm or tapeworm. Typically, the worms reside in the gastrointestinal tract but may also burrow into the liver and other organs, infected people excrete helminthes eggs in their faeces, which then contaminate the soil in areas with inadequate sanitation [3]. Other people can then be infected by ingesting eggs or larvae in contaminated food, or through penetration of the skin by infective larvae in the soil (hookworms). Parasitic diseases

cause severe morbidity, including filariasis, onchocerciasis, and schistosomiasis [4]. As per WHO only synthetic drugs are frequently used in the treatment of helminthes infestations in human beings but these synthetic drugs are out of reach of millions of people and have a lot of side effect. In view of this, an attempt has been made to study the anthelmintic activity of herbal drug.

India and Iran are the countries where *Dalbergia sissoo* is cultivated. It is commonly known as North Indian rosewood. *Dalbergia sissoo* is also known as Indian rosewood. Leaves of *Dalbergia sissoo* are about 16 cm long these are leathery, alternate, and pinnately compound. Barks are 2.5 cm in thickness, sheds in narrow strips. Plant contains large number of upper branches which supports spreading crown. Flowers are sessile, pinkish to white in colour upto 2 cm long while if present in dense cluster it is 6 to 12 cm in length. Pods are flat, thin, and oblong and strap like in shape. Pods are 5-10 cm long, 1 cm wide and brown in colour. Plant contains 1-5 seeds which are flat in shape. Seeds are 8-10 mm long these are flat, thinner and kidney shaped. Seeds are light brown in colour. Plant contains fruits which are very hard and dry. Plant contains ramifying lateral roots; it contains a long taproot within short time.

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Experimental Work

Plant Material

The bark of *Dalbergia sissoo* was collected in the month of August 2012. The plant material was washed with water and shade dried, pulverized in mechanical grinder and stored in an airtight container till further successive extractions.

Preparation of Methanol, Ethanol, pet. ether and ethyl acetate extract

The dried powder (70g) extracted in a soxhlet apparatus using methanol (95%) and ethyl acetate, at a temperature range of 45°C to 60°C. The filtrate was evaporated to dryness at reduced pressure in vacuum evaporator [5].

Drugs and Chemicals

The following drugs and chemicals were used. Drugs: Albendazole (Glaxo Smithkline) Chemicals: ethanol A.R. (PCL, Pune), petroleum ether (60- 80°C) (PCL, Pune), ethyl acetate A.R., methanol and saline water (Claris Life Sciences Ltd., Ahmednagar).

Administration of Albendazole

Albendazole (20 mg/ml) was prepared by using 0.5% w/v of CMC as a suspending agent as administered as per method of extract.

Administration of extract

The suspension of alcoholic and ether extract of bark of *Dalbergia sissoo* of different concentration (25, 50, 75 mg/ml) were prepared by using 0.5% w/v of CMC as a suspending agent and final volume was made up to 10 ml for respective concentration. Albendazole was used as standard. Groups of approximately equal size worms consisting of two earthworms individually in each group were released into in each 10 ml of desired concentration of drug and extracts in the petridish.

Experimental Design

The anthelmintic activity was performed according to the method [6]. On adult Indian earth worm *Pheretima posthuma* as it has anatomical and physiological resemblance with the intestinal round worm parasites of human beings. *Pheretima posthuma* was placed in petridish containing three different concentrations (25, 50 & 75 mg/ml) of alcoholic and ether extract of bark of *Dalbergia sissoo*. Each petridish was placed with 2 worms and observed for paralysis or death. Mean time for paralysis was noted when no movement of any sort could be observed, except when the worm was shaken vigorously; the time death of worm (min) was recorded after ascertaining that worms neither moved when shaken nor when given external stimuli. The test results were compared with Reference compound Albendazole treated samples.

Table 1 Anthelmintic activity of *Dalbergia sissoo* bark extracts

Treatment	Conc. (mg/ml)	Paralysis time (min)	Death time (min)
Pet. Ether	25	55	78
	50	49	50
	75	40	48
Ethyl acetate	25	86	100
	50	51	67
	75	39	60
Methanol	25	65	80

	50	35	52
	75	22	41
	25	34	39
Ethanol	50	30	32
	75	22	25
	25	22	24
Albendazole	50	16	20
	75	12	17
Control	--	--	--

RESULTS AND DISCUSSION

Preliminary photochemical analysis showed the presence of alkaloids, phenols, flavonoids, steroids and tannins like phytoconstituents in the extracts of *Dalbergia sissoo*. Some of these phytoconstituents may be responsible to show a potent anthelmintic activity. From the observations made all the extracts of whole plant of *Dalbergia sissoo* was found to show a potent anthelmintic activity when compared to the standard drug. Ethanolic extract of at 75 mg/ml concentration shows paralysis at 22 min and death 25 min by the earth worm *Pheretima posthuma*. Among the four extracts Ethyl acetate extracts show least anthelmintic activity. [Table1].

Albendazole exhibits anthelmintic activity by blocking glucose uptake and depletion of glycogen stores in test parasite. The Petroleum ether and Ethanol extracts of *Dalbergia sissoo* not only demonstrated paralysis, but also caused death of worms especially at higher concentration of 75 mg/ml in shorter time as compared to that of Albendazole. Phytochemical screening of the extracts revealed the presence of alkaloids, flavonoids, tannins and steroids. Tannins chemically polyphenolic compounds [7], were shown to produce anthelmintic activities [8]. Reported anthelmintic effect of tannins, can bind to free proteins in the gastrointestinal tract of host animal [9] or glycoprotein on the cuticle of the parasite and may cause death. Further studies are under process to identify the possible phytoconstituents responsible for anthelmintic activity.

CONCLUSION

It could be concluded and confirmed that the ethanolic and petroleum ether extracts of whole plant of *Dalbergia sissoo* have anthelmintic activity on dose dependent manner when comparable with standard drugs, which 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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