

Anthelmintic activity of the leaf of *Saraca indica* Linn.

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ABSTRACT

The present study reports anthelmintic activity of various extracts obtained from the leaves of *Saraca indiaca* Linn (*Leguminosae*) against adult earth worms *Pheretima posthuma*. Among all the extracts tested at 40 mg/ml concentration, methanol extracts showed better anthelmintic activity when compared with the standard drug albendazole.

Key words: *Saraca indiaca* Linn; anthelmintic, *Pheretima posthuma*; methanol extract; albendazole.

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INTRODUCTION:

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 pneumonia¹. *Saraca indica* L. (Family: Leguminosae) is a medium sized evergreen tree up to 9 m in height with numerous spreading and drooping glabrous branches commonly known as Asoka. The bark of the plant is dark brown to grey or black; flowers are fragrant, numerous, dense and orange or red color; leaves are pinnate, 15-25 cm long having 4-6 pairs of oblong-lanceolate leaflets¹. The plant is popularly known as Asok or Asoka (Hindi, Oriya, Bengali, Gujarati, Assamese, Marathi and Punjabi), Ashokadamara (Kannada), Asogam (Tamil), Asokam (Malayalam), Ashokapatta (Telugu). *Saraca indica* is one of the important indigenous medicinal plants and

found throughout India. Bark of the plant is bitter and traditionally used as astringent anthelmintic, demulcent, emollient, stomachic and in blood disease, biliousness, colic, piles, ulcers, fractures, menorrhagia, metropathy, dyspepsia, visceromegaly. Leaves are useful in stomachalgia and flower are used in vitiated condition of pitta, syphilis, hyperdipsia, inflammation, dysentery, haemorrhoids and scabies in children³⁻⁵. Stem bark of *Saraca indica* is astringent, antileucorrhoeic, antibilious and uterine sedative; flowers are used as uterine tonic, antidiabetic and antisyphilitic traditionally. Plant is also important for CNS depressant activity as aerial part is important for its CNS active, hypothermic, CNS depressant and diuretic activity^{6, 7}. Chemical investigation found the presence of β -sitosterol, flavonoids, flavones glycosides, anthocyanins, fixed oil in flower; bark contain different catechols, sterols, tannins, flavonoids, glycosides, leucopelargonidin and

leucocyanidin. Seed and pod contains oleic, linoleic, palmitic and stearic acids, catechol, epicatechol and leucocyanidin; leaves and stem found to contain quercetin, quercetin-3-O- α -L-rhamnoside, kaempferol 3-O- α -L-rhamnoside, amyrin, ceryl alcohol and β -sitosterol⁸⁻¹⁰. The antidiabetic, oxytocic, anticancer, peptic ulcer, antimicrobial, antibacterial and antioxidant activities of the plant have been reported¹¹⁻¹⁷. Advance in modern science and technology has contributed to an enormous development in the quality of human life. Though, stress in modern life responsible for the surge in incidence of variety of psychiatric disorders. Drugs currently used in treatment of different neuropsychiatric and neurological disorders like anxiety, depression, schizophrenia, epilepsy, parkinsonism either refractory or have serious side effects or possess unfavourable drug-drug/drug-food interactions. Psychoneural drugs like benzodiazepines commonly employed in anxiety, depression, epilepsy and insomnia but possess side effects like cognitive function, physical dependence and tolerance^{18, 19}. Plants are used as medicine since time immemorial. Drugs from plant sources are being used by about 80% of the world population. Herbal medicines have stood the test of time for their safety, efficacy, acceptability and lesser side effects^{20, 21}.

MATERIALS AND METHODS

Saraca indica Linn. leaves were collected in August 2009 from Gonda region of Uttar Pradesh, India. Plant was authenticated by Kamala Nehru Krishi Vigyan Kendra, Sultanpur, Uttar Pradesh. The herbarium was prepared and a voucher specimen (Sample No 01, Ref no KVK/Gen/2009-10/3012) was deposited to the Department of Pharmacognosy, AND College of Pharmacy, Gonda, Uttar Pradesh, India.

Drugs and Chemicals

The following drugs and chemicals were used. Albendazole (Bandy Mankind Pharma Ltd., New Delhi). All organic solvents and chemicals were

purchased from S D Fine Chemicals Ltd., Mumbai and were of analytical grade.

Preparation of extracts

Fresh leaves of *Saraca indica* were collected, washed thoroughly and dried under shade and then made into a coarse powder using dry grinder, passed through sieve no. 40 and stored in an airtight container at 25°C, used it for further study. Powdered plant material (1.2 kg) were successively extracted using soxhlet apparatus using petroleum ether (60-80°C), acetone, chloroform, methanol and water in order of increasing polarity. Each time the marc was dried and later extracted with other solvents. All the extract were concentrated by distilling the solvent in a rotary vacuum evaporator and evaporated to dryness. The yield was found to be 7.99, 1.46, 2.46, 12.15 and 12.90% w/w respectively with reference to the dried plant material.

Preliminary phytochemical investigation

The individual leaf extracts like petroleum ether (PSI), chloroform (CSI), methanol (MSI) and water (WSI) were subjected to qualitative chemical investigation for the identification of different phytoconstituents like sterols, glycosides, saponins, carbohydrates, alkaloids, flavonoids, tannins, proteins, triterpenoids. Phytochemical screening of the extracts was performed using the standard procedures^{22, 23}.

Earthworms

Indian adult earthworms (*Pheretima posthuma*; Annelida, Megascolecidae) collected from moist soil and washed with normal saline to remove all matters were used for all study. The earthworm of 3-5 cm in length and 0.1-0.2 cm in width were used for all the experimental protocol due to its anatomical and physiological resemblance with the intestinal roundworm parasites of human beings²³.

Anthelmintic activity

The anthelmintic activity was evaluated as per the method of Dash et al with slight modification²⁴. The

extracts were suspended in Tween 80 (0.1%) in normal saline. All the drugs and extracts were prepared freshly before starting the experiment. Eleven groups of six²⁵ earthworms each were released into 10 ml of desired formulation as follows; vehicle (Tween 80 (0.1%) in normal saline, Albendazole (40 mg/ml), petroleum ether, acetone, chloroform, methanol and aqueous extract (40 mg/ml, each) in Tween 80 (0.1 %) in normal saline. Observation was made for the time taken to paralysis and death of individual worms up to 4 hrs of the test period. Paralysis was said to occur when the worms did not revive even in normal saline. Death was concluded when the worms lost their motility followed by fading away of their body colors²⁶.

RESULT

From the Table, it is very clear that methanol, chloroform and aqueous extracts showed better

anthelmintic activity when compared with standard drug at the same concentration. Methanol extract took the least time to cause paralysis and death of the worms followed by chloroform and aqueous extract respectively. Petroleum ether and acetone extract tested only at 20 mg/ml concentration also showed anthelmintic activity when compared with albendazole. Preliminary phytochemical screening of methanol extract showed the presence of alkaloids, tannins, saponin, flavonoids; chloroform extract contains alkaloids and steroids; aqueous extract contain alkaloids, tannins and flavonoids glycosides. This phytoconstituents may be responsible for the anthelmintic activity. These results may lend support for the traditional use of the plant. Further investigation is needed for the phytoconstituents responsible for anthelmintic activity.

The results of the anthelmintic activity are given in the Table 1.

Table 1: Anthelmintic activity of different extract of *Saraca indica* leaves

Drug tested	Concentration (mg/ml)	Paralysis time (min)	Death time (min)
Vehicle (Tween 80 (0.1%) in normal saline	---	----	----
Albendazole	40	245	305
Pet ether extract	40	65	180
Acetone extract	40	45	60
Chloroform extract	40	40	60
Methanol extract	40	20	30
Aqueous extract	40	25	41

Results are expressed as mean \pm SD of six determinations; Vehicle worms were alive up to 24 hrs of observation.

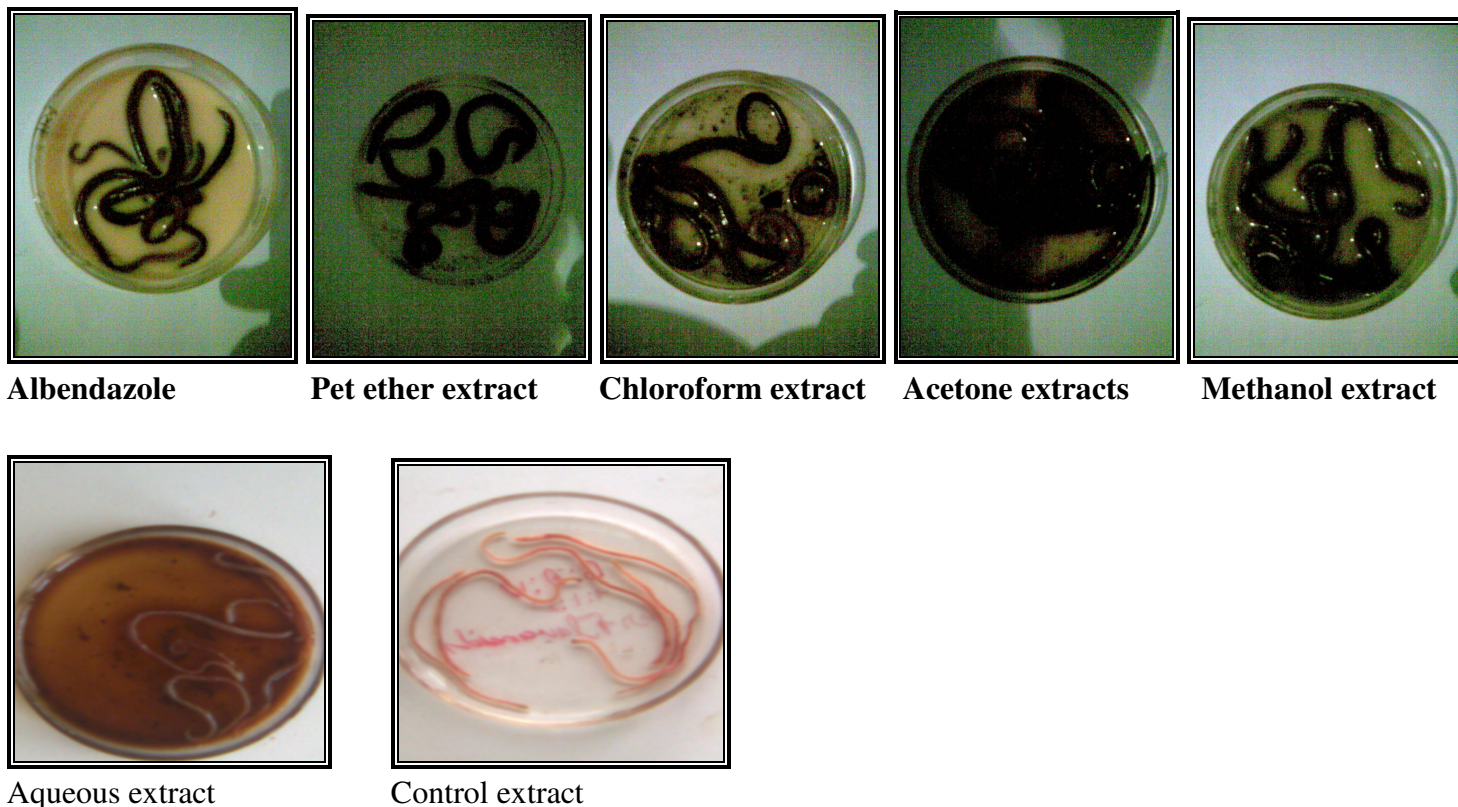


Fig. Showing ANTI HELMINTIC ACTIVITY OF *Saraca indica* Linn Leaf

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