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IN VITRO ANTHELMINTIC ACTIVITY OF *SESBANIA GRANDIFLORA* (L.) POIR. BARK  
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**ABSTRACT:**

**Aim:** The aim of present study was to evaluate anthelmintic potential of methanol and aqueous extract of bark of *Sesbania grandiflora* (L.) Poir. using *Pheretima posthuma* as test worms.

**Method:** Various concentrations (10, 20, 30, 40 and 50 mg/ml) of methanol and aqueous extract were tested in the bioassay, which involved determination of time of paralysis and time of death of the worms. Piperazine citrate (10, 20, 30, 40 and 50 mg/ml) was included as standard reference and normal saline as control.

**Result:** The results of present study indicated that the methanol and aqueous extract significantly demonstrated paralysis, and also caused death of worms especially at higher concentration as compared to standard reference Piperazine citrate.

**Conclusion:** In conclusion, the use of the bark of the plant *Sesbania grandiflora* (L.) Poir. as an anthelmintic have been confirmed and further studies are suggested to isolate the active principle/s responsible for the activity.

**Keywords:** Anthelmintic Activity, *Pheretima posthuma*, Piperazine citrate, *Sesbania grandiflora* (L.) Poir.

**Introduction:**

*Sesbania grandiflora* (L.) Poir. (Fabaceae) is a short-lived, quick-growing, soft-wooded tree, 6-9 m high and 0.6 m in girth. It is a native of Malaysia and is grown in many parts of India such as Punjab, Dehli, Bengal, Assam and the Andaman (14). The bark of *Sesbania grandiflora* (L.) Poir. possesses astringent, cooling bitter tonic, and anthelmintic and antipyretic properties (15). Leaves are poulticed onto rheumatic bruises. Swellings are poulticed or rubbed with aqueous decoctions of the powdered roots of *Sesbania grandiflora* (L.) Poir. The fruits

are believed to be laxative and stimulant. It has also been used in treatment of anaemia, bronchitis, fever, pain, thirst and tumours. The root is used for inflammation, the bark is astringent; leaves are alexeteric, anthelmintic and used for epilepsy, gout, itch and leprosy (16). The leaf is tonic and antipyretic and cures night blindness (17).

Parasitic diseases cause severe morbidity by affecting population in endemic areas with major economic and social consequences (1). A number of medicinal plants have been used to treat parasitic infections in man and animals (2-5). Anthelmintics are those agents that expel parasitic worms (helminthes) from the body, by either stunning or killing them. More than half of the population of the world suffers from various types of infections and majority of cattle suffer from worm infections (6). Intestinal infections with worms can be more easily treated than those infections occurs in other locations in the body, because the worms need to be killed by the drug and the drug need not be absorbed when given by oral route. However, increasing problems of development of resistance in helminthes (7, 8) against anthelmintics have led to the proposal of screening medicinal plants for their anthelmintic activity. Therefore an attempt has been made to evaluate anthelmintic activity of bark of *Sesbania grandiflora* (L.) Poir. on adult earthworm (*Pheritima posthuma*).

## **Materials and Methods:**

### **Collection of plant**

The fresh barks of *Sesbania grandiflora* (L.) Poir. were collected in the month of July from Paramathi, Namakkal, Tamil nadu state, India, and authenticated by Prof. P Jayaraman, Ph.D., Plant Anatomy Research Centre, Chennai, Tamil nadu.(Reg.No: PARC/2010/577). The voucher specimen was deposited at the department for future reference.

### **Extraction of Plant Material**

The barks were shade dried and were ground to coarse powder. Powder was first defatted with pet. ether and then extracted with methanol which was further evaporated to dryness to obtain dry residue. Aqueous extract was also obtained by decoction method with fresh bark powder by heating upto 1.5 hours (9).

### **Experimental Procedure**

Methanol and aqueous extracts from the bark of *Sesbania grandiflora* (L.) Poir. were investigated for their anthelmintic activity against *Pheretima posthuma*. Various concentrations (10, 20, 30, 40 and 50mg/ml) of each

extract were tested by bioassay, which involved determination of time of paralysis and time of death of the worms. Piperazine Citrate was used as standard reference and distilled water as control. The assay was performed on adult Indian earthworm, *Pheretima posthuma* due to its anatomical and physiological resemblance with the intestinal roundworm parasite of human beings (10-13). Because of easy availability, earthworms have been used widely for the initial evaluation of anthelmintic compounds *in vitro* (18, 19). Indian adult earthworms (*Pheretima posthuma*) collected from moist soil near B.Komarapalayam, Namakkal district, Tamil nadu and washed with normal saline to remove all faecal matter and were used for the anthelmintic study. The earthworms of 3-5 cm in length and 0.1- 0.2 cm in width were used for all the experimental protocol. Sixteen groups of six earthworms were released into 10 ml of Normal saline. Then Piperazine Citrate, aqueous and methanol extracts of bark of *Sesbania grandiflora* (L.) Poir. (10, 20, 30, 40 and 50 mg/ml each) in distilled water were added to their respective group. Observations were made for the time taken to paralysis and death of individual worms. Time for paralysis was noted when no movement of any sort could be observed except when the worms were shaken vigorously. Death was concluded when the worms lost their motility when dipped in warm water (50°C) followed with fading away of their body colors. All the values are expressed as mean  $\pm$  S.E.M for groups of six earthworms each. Analyzed by one way ANOVA and compared by using Tukey- Kramer multiple comparison test.

### **Results and Discussion:**

Preliminary phytochemical screening of bark of *Sesbania grandiflora* (L.) Poir. showed the presence of alkaloids, tannin, terpenoids, flavonoids and gums. It was found that methanol and aqueous extract exhibited anthelmintic activity in dose dependant manner giving shortest time of paralysis and death with 50 mg/ml concentration. The methanol extract of *Sesbania grandiflora* (L.) Poir. Caused paralysis in 11.72 min and time of death in 21.01 min while aqueous extract caused paralysis and death in 15.72 and 27.41 min respectively against the earthworm *Pheretima posthuma*. The reference drug Piperazine Citrate showed the same at 5.44 and 13.43 min, respectively. Piperazine Citrate by blocking glucose uptake and depletion of glycogen stores in the parasite exhibits anthelmintic activity. The alcoholic extract of *Sesbania grandiflora* (L.) Poir. not only demonstrated paralysis, but also caused death of worms especially at higher concentration of 50 mg/ml in shorter

time as compared to reference drug Piperazine Citrate. Phytochemical screening of the extracts revealed the presence of alkaloids, flavonoids, terpenoids, tannins and steroids. Tannins were shown to produce anthelmintic activities (20) chemically tannins are polyphenolic compounds (21). It is possible that tannins contained in the extracts of *Sesbania grandiflora* (L.) Poir. produce similar effects. Reported anthelmintic effect of tannins, can bind to free proteins in the gastrointestinal tract of host animal (22) 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.

**Table-1: Anthelmintic activity of bark extracts of *Sesbania grandiflora* (Linn) Poir.**

S. NO	TREATMENT	DOSE(mg/ml)	TIME FOR PARALYSIS(min)	TIME FOR DEATH(min)
1	Control	-----	-----	-----
2	Methanol extract	10	20.34±0.24*	32.35±0.42**
3	Methanol extract	20	18.66±.38*	29.24±0.09**
4	Methanol extract	30	16.32±1.40	26.55±0.43*
5	Methanol extract	40	14.55±0.40	22.42±0.40
6	Methanol extract	50	11.72±0.20	21.01±0.10
7	Aqueous extract	10	24.44±0.86***	39.54±3.90***
8	Aqueous extract	20	21.31±3.76***	36.33±1.69***
9	Aqueous extract	30	19.22±2.98**	32.10±2.89***
10	Aqueous extract	40	17.43±1.62**	31.51±2.11***
11	Aqueous extract	50	15.72±0.78***	27.41±3.44***
12	Standard drug	10	12.05±1.86	20.21±1.59
13	Standard drug	20	10.55±1.12	17.00±2.69
14	Standard drug	30	9.04±0.78	16.42±1.77
15	Standard drug	40	7.21±0.37	14.12±1.04
16	Standard drug	50	5.44±0.53	13.43±0.70

Each value represents mean  $\pm$  S.E (n=6) and was analysed by ANOVA Tukey-Kramer multiple comparison

test.\* P<0.05, \*\*P<0.01, \*\*\*P<0.001

### **Conclusion:**

In conclusion, the traditional use of the bark of *Sesbania grandiflora* (L.) Poir. as anthelmintic has been confirmed using the different extracts and showed good anthelmintic activity. Further it would be interesting to isolate the possible phytoconstituents which are responsible for the anthelmintic activity and the mechanism of action.

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