



## Anthelmintic activity of leaves of *Cajanus cajan* Linn on Indian earthworm

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### ABSTRACT

Modern synthetic medicines are very effective in curing diseases but also cause a number of side effects. Parasites are of concern to the medical field for centuries and the helminthes considered causing considerable problems for human beings and animals. To investigate the anthelmintic activity of *Cajanus cajan*. Dried powder was taken and subjected to successive extraction with petroleum ether, ethyl acetate, ethanol and water in soxhlet apparatus. The anthelmintic activity was evaluated on adult Indian earthworm *pheritima posthuma* due to its anatomical and physiological resemblance with the intestinal roundworm parasites of human beings. The earthworms were divided in nine groups, each group consisting of six earthworms of approximately equal size were released into 50 ml of the extract. Albendazole using as a standard drug, both alcoholic and aqueous extracts has shown significant anthelmintic activity compared to standard drug albendazole. The data reveals that the aqueous extract shown anthelmintic activity for paralyzing as well as death of Indian earthworm *pheritima posthuma* at 5mg concentration is of long duration of time, whereas the ethanolic extract showed paralysis and death at similar concentration in short time duration. The leaves of *Cajanus Cajan* Linn. Ethanolic extract has given potent anthelmintic activity as compared to standard drug, thus it is evident that leaves of this plant of daily use is useful for anthelmintic activity and it is concluded that further research is possible for finding active compound responsible for this activity.

### INTRODUCTION

Plants are erect shrub which is indigenous to south Asia, cultivated in India vernacularly called as kandipappu in Telugu and Tuvar in Hindi. Branches provided with silky hair, leaves are compound, pollinate, leaflet oblong-lanceolate, entire, densely silky beneath, flowers are yellow in terminal panicles or corymbs racemes, fruits pods, tipped with the persistent lower half of the style, seeds vary in color from yellow and red to brown or black. The leaves and seeds are used in medicine. The leaves of *Cajanus cajan* Linn. are useful in ulcerogenic and inflammatory conditions, they are also used as antidiabetic, diuretic and laxative [1]. Phytosterols such as  $\beta$ -sitosterol, stigmasterol and cholesterol isolated from leaves and leaves are also used in Ayurvedic medicine as poultice over the breast to induce lactation [2]. Through the plant and its extracts

have been used in the folk medicine extensively, but no scientific evidence for such activities is available in established scientific journals of repute [3].

Helminthiasis is among the most important animal diseases inflicting heavy production losses. The disease is highly prevalent particularly in third world countries due to poor management helminthiasis practices. A number of medicinal plants have been used to treat parasitic infections in man and animals [4]. The plants are known to provide a rich source of botanical anthelmintics.

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 [5]. Because of easy availability, earthworms have been used widely for the initial evaluation of anthelmintic compounds *in vitro* [6, 7]. The objective of the present research has to prove traditional anthelmintic use of the plant

## MATERIAL AND METHOD

### Collection of plant

The leaves of *Cajanus cajan* (*Fabaceae*) was collected near Neelbud, Bhopal, India and identified by the botanist Dr. Zea Ul Hasan, Department of botany, Saifia Science College Barkatulla University Bhopal (M.P.) and a voucher specimen of plant (No.226/Bot/Safia/2011) has been deposited in herbarium for further reference.

### Preparation of plant extract

The leaves of the plant were dried in shade, powdered and passed through a 40-mesh sieve. Dried powder was taken and subjected to successive extraction with petroleum ether, ethyl

acetate, ethanol and water in soxhlet apparatus. The extracts were concentrated to dry residue by vacuum distillation (temperature 40-60 °C) and dried completely in desiccators and weighed. The yield of the ethanol extract is 32%. The extracts were subjected to phytochemical and pharmacological screening.

### Phytochemical analysis

On preliminary phytochemical study on leaves of *Cajanus cajan* Petroleum ether extract show positive test for fats & fatty acids while ethyl acetate extract show carbohydrate and fatty acids positive and all other tests are negative. Other extracts given positive test for the presence of flavonoids, glycosides, traces of alkaloids, and saponins as shown in table 1.

**Table 1.** : 3 Phytochemical screening of *Cajanus cajan* Linn.

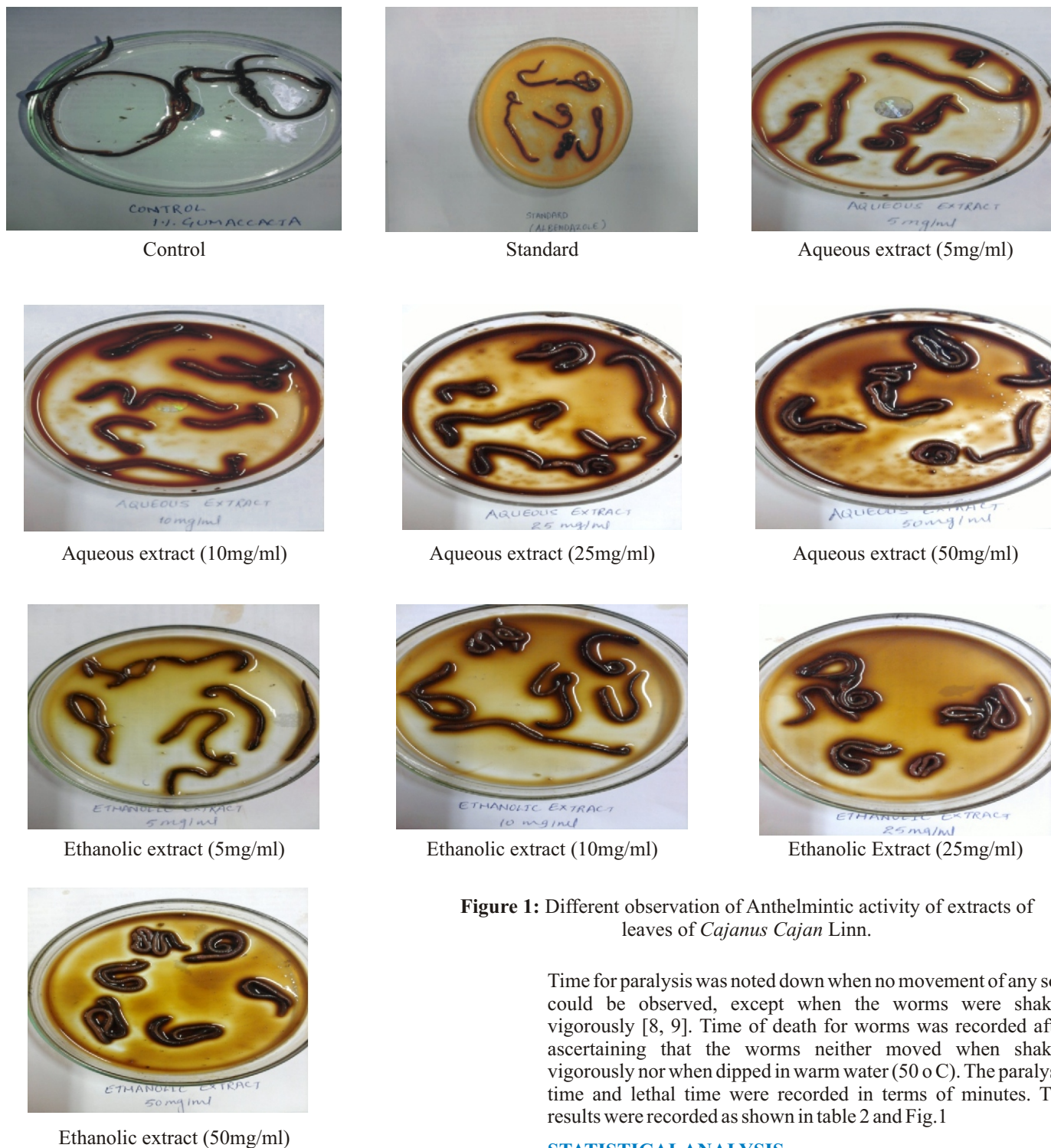
S. No.	Chemical Test	Ethanolic extract	Aqueous extract
1.	Alkaloids	-	-
2.	Glycosides	+	++
3.	Saponins	++	-
4.	Flavonoids	+++	+
5.	Tannins	++	-
6.	Carbohydrates	+	-
7.	Reducing sugars	++	+
8.	Proteins	+	-
9.	Resins	++	-
10.	Terpenoids	++	-

+++ = Conspicuously present, ++ = moderately present, + = present, - = absent

**Table 2.** : Anthelmintic Activity of *Cajanus cajan* Linn. Extract.

Treatment	Time taken for Paralysis (min)	Time taken for death (min)
Albendazole 20 mg/ml	32 ± 0.88	40 ± 0.88
Aqueous extract		
5mg/ml	55 ± 1.73	82.3 ± 1.45
10mg/ml	42.3 ± 1.45	65 ± 1.15
25mg/ml	34.3 ± 2.33	46.6 ± 0.88
50mg/ml	25.33 ± 0.88	36.3 ± 0.88
Ethanolic extract		
5mg/ml	33.3 ± 0.88	63.33 ± 1.73
10mg/ml	25.3 ± 0.88	54 ± 0.57
25mg/ml	18.33 ± 0.88	45 ± 1.73
50mg/ml	10 ± 0.57	30 ± 1.15

±SD value, n=6



**Figure 1:** Different observation of Anthelmintic activity of extracts of leaves of *Cajanus cajan* Linn.

Time for paralysis was noted down when no movement of any sort could be observed, except when the worms were shaken vigorously [8, 9]. Time of death for worms was recorded after ascertaining that the worms neither moved when shaken vigorously nor when dipped in warm water (50 o C). The paralysis time and lethal time were recorded in terms of minutes. The results were recorded as shown in table 2 and Fig.1

#### STATISTICAL ANALYSIS

Each value represents mean  $\pm$  SEM (N=6)

#### RESULT

Preliminary phytochemical studies on ethanolic as well as aqueous extract of *Cajanus cajan* revealed the presence of flavanoid, glycosides, steroids, carbohydrates, tannins and proteins. Some of these phytoconstituents may be responsible to show a potent anthelmintic activity.

The data reveals that the aqueous extract shown anthelmintic activity for paralyzing as well as death of Indian earthworm *pheritima posthuma* at 5mg concentration is of long duration of

#### Anthelmintic Activity

The anthelmintic activity was performed on the adult Indian earthworm *Pheritima posthuma*. Albendazole, the standard drug, was diluted with normal saline to obtain 5, 10, 25 and 50 mg/ml concentrations and was poured into Petri dishes. Methanol extract of the plant was diluted with normal saline to obtain 25, 50 and 100 mg/ml concentrations. Normal saline (0.9% NaCl) alone served as the negative control. All these dilutions were poured into the Petri dishes accordingly. Ten petri dishes of equal size were taken & numbered. Six earthworms (n=6) of similar sizes (about 8 cm) were placed in each petri dish at room temperature.

time, whereas the ethanolic extract showed paralysis and death at similar concentration in short time duration. The other test concentrations of both the extracts showed marked increase of anthelmintic activity. The anthelmintic effect of aqueous extract at 50 mg/ml concentration is comparable with that of the effect produced by the standard drug albendazole. The ethanolic extract showed the effect beyond 25mg/ml concentration that is at par with the standard Albendazole.

## DISCUSSION

The present study reveals that the ethanolic extract was more effective than the aqueous extract, even though both the extracts were endowed with anthelmintic property. The activity reveals concentration dependent nature of the different extracts. The activity of the extracts was found to be inversely proportional to the time taken for paralysis / death of the worms. The data revealed that the methanol extract showed anthelmintic activity at a concentration of 100 mg/ml, whereas the aqueous extract also showed paralysis and death at similar concentrations. The other test concentrations of both the extracts showed marked degree of anthelmintic activity. The anthelmintic effect of extracts is comparable with that of the effect produced by the standard drug albendazole. Parasitic helminths affect animals and man, causing considerable hardship and stunted growth. Hundreds of millions if not billions of human infections by helminthes exist worldwide and increased world travel and immigration from the developing countries. However tremendous advances has been made during the previous decade and substantial number of synthetic precursors have been derived to cope up the damage caused by parasite, but unfortunately no effective medicine has been developed so far. Moreover the problems associated with the use of such drugs like some serious side effects and development of resistance drives the severity of infection to the next level. These factors paved the way for herbal remedies as alternative anthelmintics. Evaluation of activities of medicinal plants claimed for possessing the anthelmintic property is getting the attention these days. Screening and proper evaluation of the claimed medicinal plants could offer possible alternatives that may be both sustainable and environmentally acceptable. The results of this study have shown promising anthelmintic activity suggesting the possible use of *Cajanus cajan* extracts in intestinal nematode control.

## CONCLUSION

Ethanolic extract of the leaves of *Cajanus Cajan* had given potent anthelmintic activity as compared to standard drug, thus it is evident that leaves of this plant of daily use is useful for anthelmintic activity. Further, in future it is necessary to identify and isolate the other active phytoconstituents responsible for the anthelmintic activity and study its pharmacological actions.

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