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ANTHELMINTIC ACTIVITY FROM STEM BARK OF *CAESALPINIA BONDUC* (L) ROXB

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Abstract:

Caesalpiniabonduc (L.) Roxb. is a scrambling woody liana belongs to the family Caesalpinoidae of Leguminosae In Ayurveda system of medicine, leaves and seeds are the potential drug for treating tuberculosis, cancer, eye sores, haemorrhages, leprosy, inflammations, asthma, toothache, fever and to expel parasitic worms. The petroleum ether, chloroform and ethanol extracts of stem bark were screened for anthelmintic activity using *Pheretimaposthuma*. The ethanol extract at the concentration of 100 mg/ml showed significant effect in time of paralysis at 29.67±0.88 min and death time at 60.00±0.58 min whereas, the time of paralysis and death time of standard drug Piperazine citrate was 38.67±0.88 min and death at 59.00±1.73 min. respectively. At the concentration of 100 mg/ml of each petroleum ether and chloroform extracts showed moderate activity in time of paralysis and death time. The ethanol extract confirmed anthelmintic activity in dose depend manner and the investigation supports the ethno- medical claim of *Caesalpiniabonduc*.

Key Words: *Caesalpiniabonduc*, *Pheretimaposthuma*, Stem Bark, Ethanol Extract & Anthelmintic

Introduction:

Helminthes infection causes chronic illness in human beings and cattle. Majority of cattle suffers from worm infections. Most of the Anthelmintics are used to expel parasitic worms (helminthes) from the body either by stunning or killing. But, chemotherapeutic practice, parasites developed to resistance against Anthelmintics. Furthermore, it has been reported that anthelmintic substances having significant toxicity on human health. Ttaditionally, many medicinal plants have been used to cure parasitic infections in man and animals (Chartier et al., 2001).

Caesalpiniabonduc (L.) Roxb. is a scrambling woody liana belongs to the family Caesalpinoidae of Leguminosae In Ayurveda system of medicine, leaves and seeds are the potential drug for treating tuberculosis, cancer, eyesores, haemorrhages, leprosy, inflammations, asthma, toothache, fever and to expel parasitic worms (Nadkarni, 1954). Pharmacologically, therapeutic effect of seeds are screened for huge medicinal properties (Arif et al., 2009, Sharma et al., 1997, Gupta et al., 2004, Archana et al., 2005, Kannuret al., 2006, Gaur et al., 2008, Shruti Shukla et al., 2009). This study focussed to evaluate the antihelmintic property of stem bark extracts of*C.bonduc*against *Pheretimaposthuma*to support its medicinal claims.

Material and Methods:

Plant Material and Extraction:

The stem bark of *C. bonduc* were collected from Bhadra Wild Life Sanctuary, adjacent to Kuvempu University, Karnataka. The materials were shade dried and soxhlet extracted sequentially using petroleum ether, chloroform and ethanol respectively. The extracts were concentrated using rotary flash evaporator (Buchi, Flawil, Switzerland) and preserved in air tight container until experiments.

Test Organism for Anthelmintic Activity:

Indian adult earthworms (*Pheretimaposthuma)* collected from the Indian Institute of Horticultural Research, Bangalore, was used as model for Anthelmintic activity due to its anatomical and physiological resemblance with the intestinal roundworm parasites of human beings (Thorn et al., 1977). The earthworms were maintained under normal vermicomposting medium with adequate supply of nourishment and water, for about three weeks. Before the initiation of experiment the earthworms were washed with normal saline. Adult earthworms of approximately 4 cm in length and 0.2 - 0.3 cm in width were used for the experiment.

Anthelmintic Activity:

The stem bark extracts from petroleum ether, chloroform and ethanol extracts of *C. bonduc* at the concentration of 50 and 100 mg were evaluated as per the method reported (Dash, 2002). Five groups with three earthworms in each groups. Group I earthworms were released in 20 ml normal saline in a clean petri plate. Group II earthworms were released in normal saline containing standard drug Piperazine citrate (50 mg/ml) in 20 ml of normal saline. group III earthworms were released in 50 and 100 mg/ml of petroleum ether extract in 20 ml of normal saline. Group IV earthworms were released in 50 and 100 mg/ml of chloroform extract in 20 ml of normal saline. Similarly, V earthworms were released in 50 and 100 mg/ml of ethanol extract in 20 ml of normal saline respectively.

Earthworms were observed for the time taken for paralysis and the time taken for death was monitored and documented in minutes. Paralysis time was analyzed based on the behavior of the earthworm with no revival body state in normal saline medium. Death was concluded based on total loss of motility with faded body color.

Statistical Analysis:

The data of Anthelmintic activity was expressed as mean ± S.E.M of three earthworms in each group. The difference in values at $p \leq 0.01$ was considered as statistically significant using ezANOVA (version 0.98) software.

Results:

The yield of petroleum ether, chloroform and ethanol extract for 1 kg of powdered stem bark of material was 26 g, 31 g and 36 g respectively. The preliminary phytochemical constituents present in bark extracts showed positive tests for the presence of flavonoids, glycosides, terpenoids, sterols and tannins.

Anthelmintic Activity:

Earthworms belonging to control group showed paralysis time at 138.33±1.76 min and death time at 179.67±2.03 min. The petroleum ether extract at the concentration of 50 and 100 mg/ml showed the time of paralysis (64.67±0.88; 59.00±0.58 and death (113.67±0.88; 103.33±1.20). The chloroform extract at the concentration of 50 and 100 mg/ml showed the time of paralysis (51.33±0.33; 44.67±0.88 and death (86.33±0.88; 75.67±1.20). Similarly, the ethanol extract at the concentration of 50 and 100 mg/ml showed the time of paralysis and death at (40.33±0.88; 29.67±0.88) and 65.00±1.73; 60.00±0.58) min respectively (Table 1).

Table 1: Anthelmintic activity from stem bark of *Caesalpiniabonduc*(L) Roxb

Group (Table 1)	Sample	Concentration	Time taken for paralysis (min)	Time taken for death (min)
I	Control	-	138.33±1.76	179.67±2.03
II	Standard Piperazine Citrate	50 mg/ml	38.67±0.88**	59.00±1.73**
III	Petroleum Ether Extract	50 mg/ml	64.67±0.88**	113.67±0.88**
		100 mg/ml	59.00±0.58**	103.33±1.20**
IV	Chloroform Extract	50 mg/ml	51.33±0.33**	86.33±0.88**
		100 mg/ml	44.67±0.88**	75.67±1.20**
V	Ethanol Extract	50 mg/ml	40.33±0.88**	65.00±1.73**
		100 mg/ml	29.67±0.88**	60.00±0.58**

Values are the mean ± S.E.M. of three earthworms. Symbols represent statistical significance.
* P < 0.05, ** P < 0.01, ns: not significant as compared to control group.

On the other hand, standard drug Piperazine citrate at the concentration of 50 mg/ml showed the time of paralysis and death at 38.67±0.88 and 59.00±1.73 min. This investigation revealed that petroleum ether, chloroform and ethanol extract of *C. bonduc* showed significant Anthelmintic activity against *Pheretimaposthuma in dose* depended manner when compared to control and very similar to the standard drug. The results of this investigation revealed that the extract were significantly effective in paralyzing and killing earthworm (*Pheretimaposthuma*). Fractionation and characterization of the active compounds from crude extract is under investigation.

Conclusion:

The plant *C. bonduc*(L) Roxbwas used traditionally to treat intestinal worm Infections. This study claims the ethno-medicalproperty for anthelmintic activity.Further there is need for thorough phytoconstituent, clinical trial and molecular mechanism of action.

Conflict of Interest:

The authors declare that there is no conflict of interests in this paper.

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