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Anthelmintic Activity of Stem Bark of *Bauhinia purpurea* Linn

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ABSTRACT

The objective of present work was to evaluate the anthelmintic activity of petroleum ether and aqueous extract of stem bark of *Bauhinia purpurea*L. using Indian earthworms *Pheretima posthuma* as test worm. Various concentrations of petroleum ether extracts were tested in the bioassay, which involved determination of paralysis time and death time of the worm. Piperazine citrate (30mg/ml) was used as a reference standard. The result of present study indicates that the petroleum ether extract significantly demonstrated paralysis, and also death of worms.

Keywords: *Bauhinia purpurea*; anthelmintic activity; Piperazine citrate.

INTRODUCTION

The well-known and well established genus *Bauhinia* comprises of trees and shrubs that grow in warm climate. It is rare in southern most districts, 5-7m tall tree in deciduous forests which is often planted in gardens along roadside for its large purple beat flowers. The leaves are 10–20 cm long and broad, rounded, alternate and bilobed at the base and apex. The flowers are conspicuous, pink, and fragrant, with five petals. The fruit is a pod 30 cm long, containing 12 to 16 seeds and have long seeds as pea. Flowers and fruits appear in the month of December. Synonyms/Common names of plant *Bauhinia purpurea*-Purple Orchid tree, Mandaram, etc. [1, 2].*B. purpurea* is native to South China (which includes Hong Kong) and South-eastern Asia and it is found throughout India, ascending to an altitude of 1300m in Himalaya [3].The different species of *Bauhinia* viz., *B. reticulata*, *B. rufescens* and *B. variegata* have been traditionally used to treat roundworm infections, conjunctivitis, anthrax, ulcerations, dysentery, blood-poisoning, leprosy, lung and skin diseases in Africa; while in India, extracts of the bark of *B. variegata* is used for treatment of cancer. Leaves are used as a plate for food and fodder during lean period [4], bark used as fibre, in dyeing and tannin extraction and its decoction is used as anthelmintic and in diarrhoea. The decoction of root is used for expelling gases, flatulence and gripping pain from the stomach and bowels. The decoction of flower works as a maturant for boils and abscesses. Root bark of *Bauhinia purpurea*L. contains flavones glycoside [5]. The present study was designed to investigate and evaluate the pharmacological basis for the use of *B.purpurea* in the folk medicine to expel the worms.

MATERIALS AND METHODS

The stem bark of *Bauhinia purpurea*L. were collected from local area of Manipal, Karnataka, India during August 2011 and were authenticated by Dr.Chandrashekar KS, Department of Pharmacognosy, Manipal College of Pharmaceutical Sciences, Manipal University, Manipal.

Preparation of extracts [6,7]

Petroleum ether extract was obtained as follows. The stem bark of *Bauhinia purpurea*L. were dried in hot air oven at 50-60° C for 5-6 days and then grinded to a fine powder in a grinder. The powdered plant material (2.5 kg) was

subjected to maceration using petroleum ether for 4 days, then filtered with muslin cloth and evaporated to dryness. Extract was kept in desiccator.

The test samples were prepared at concentration i.e. 50, 60 70, 80, 90 and 100 mg/ml in normal saline containing 1% gum acacia. Aqueous extract was obtained using following method. The stem bark of *Bauhinia purpurea* L. were dried in hot air oven at 50-60° C for 5-6 days and then grinded to a fine powder in a grinder. The powdered plant material (250g) was subjected to maceration using distilled water for 4 days, then filtered with muslin cloth and evaporated to dryness. Extract was kept in desiccator. The test samples were prepared at concentration i.e. 10, 30, 50, 70, 90 and 100 mg/ml in normal saline containing 1% gum acacia.

Worm collection and authentication

The anthelmintic activity was evaluated on adult Indian earthworm *Pheretima posthuma* (Annelida). It resembles anatomically and physiologically with the intestinal round worm parasite of human being [8, 9, 10]. Indian earthworms were obtained from vermiculture area and were identified at Manipal College of Pharmaceutical Sciences, Manipal, Karnataka by Dr. K S Chandrashekar.

Anthelmintic Assay

The Anthelmintic activity was carried out as per the method of Mathew *et al.*, [11] and Dash *et al.*, [12, 13] was followed for the screening. Five groups of approximately equal size Indian earthworms consisting of six earthworms in each group were released in 10 ml of desired formulation. Each group was treated with one of the following: Vehicle (1% gum acacia in normal saline). Piperazine citrate (30 mg/ml), methanolic extract (50, 60, 70, 80, 90, 100 mg/ml) and aqueous extract (10, 30, 50, 70 90, 100 mg/ml) in normal saline containing 1% gum acacia. Observations were made for the paralysis time (PT) and subsequently for death time (DT). The time of paralysis was noted when no movement of any sort could be observed except when the worms were shaken vigorously. Time for death was recorded after ascertaining that worms neither moved when shaken vigorously nor when dipped in warm water (50° C)[1].

Statistical Analysis

The data are expressed as Mean \pm SEM and analysed by using one way analysis of variance (ANOVA), followed by post hoc Sheffe's test using SPSS computer software version 10. The values were considered significant when $p < 0.05$.

RESULTS AND DISCUSSION

Preliminary phytochemical screening of petroleum ether extract of stem bark of *Bauhinia purpurea* L. revealed the presence of phytosterols and triterpenoids. The petroleum ether extract of stem bark of *Bauhinia purpurea* L. exhibits anthelmintic activity maximum at dose 60mg/ml in petroleum ether extract (15 min is paralysis time and 26 min is death time) as compared to standard piperazine citrate (30mg/ml) (7.6 min is paralysis time and 30 min is death time). Also aqueous extract of stem bark of *Bauhinia purpurea* L. was showing good anthelmintic activity and maximum was at dose 100mg/ml.

Table 1: Anthelmintic activity of Petroleum ether extract of *Bauhinia purpurea* L.

Treatment	Concentration (mg/ml)	Time taken for Paralysis (P) and Death (D) of worms (<i>P. posthuma</i>), (in min.)	
Vehicle	-	-	-
Piperazine Citrate	30	7.6 \pm 0.88	30 \pm 0.57
Petroleum ether Extract	50	21.6 \pm 0.88*	32.6 \pm 0.88*
	60	15 \pm 0.57*	30 \pm 1*
	70	14 \pm 0.66*	29.1 \pm 0.22*
Aqueous extract	50	>3hrs	>3hrs
	60	145 \pm 2.8	150 \pm 2.8
	70	59 \pm 0.57	62 \pm 0.57
	90	39.3 \pm 1.20*	40.3 \pm 1.20*
	100	34 \pm 0.57*	36 \pm 0.57*

All values are expressed as mean \pm SEM (n= 3), values are statistically significant at $p < 0.05$ * when compared with standard group.

Piperazine citrate by increasing chloride ion conductance of worm muscle membrane produces hyper polarization and reduced excitability that leads to muscle relaxation and flaccid paralysis[14]. The petroleum ether extract of the plant not only demonstrated paralysis, but also caused death in shorter time as compared to reference drug

piperazine citrate. In short the use of *Bauhinia purpurea* L. stem bark as an anthelmintic have been confirmed and further studies are suggested to isolate the active principles responsible for the activity.

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