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ANTHELMINTIC ACTIVITY OF METHANOLIC LEAF EXTRACT OF *HOLOPTOLEA INTEGRIFOLIA* ROXB

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ABSTRACT

Holoptelea integrifolia is one of the medicinally important plant belonging to the family Ulmaceae, commonly known as Indian Elm, Kanju. It is a large deciduous tree, commonly found throughout the greater part of India. The objective of the present study was to evaluate and compare the Anthelmintic activity of methanolic extract of leaves of *Holoptelea integrifolia* Roxb. Albendazole was used as a standard drug to compare the test results. Indian Adult earth worms (*Pheretima posthuma*) were used for the study. The results were interpreted as time taken for paralysis and death of the earth worms. The study concluded that the methanolic leaf extract of *Holoptelea integrifolia* showed significant Anthelmintic activity.

Keywords: *Holoptelea integrifolia*, Bignoniaceae, Anthelmintic activity.

INTRODUCTION

Parasitic nematodes cause significant problems to the health and life of many plants and animal, and also of humans. Gastro intestinal parasites create a serious threat to the production of livestock in developing nations [1]. Despite the fact of development of anthelmintic resistance in parasites of high economic significance, chemotherapy is still the most widely used option for the control of helminthes. Helminthes parasite infections are global problems with severe social and economic repercussions in the third world countries [2]. The diseases affect the health status of a large fraction of human population as well as animals. Some type of dangerous helminthes infections like filariasis has only a few therapeutic modalities at present [3].

Holoptelea integrifolia Roxb belongs to the family Ulmaceae commonly known as *Ulmus integrifolia*. It is a large spreading glabrous tree, commonly found throughout the greater part of India up to an altitude of 660mts [4,5]. In traditional system of medicine, bark and leaves are used as bitter, astringent, acrid, thermogenic, anti-inflammatory, digestive, carminative, laxative, anthelmintic, depurative, repulsive, urinary astringent and in rheumatism [6,7].

MATERIALS AND METHODS

Plant material

The fresh leaves of *Holoptelea integrifolia* Roxb were collected from Sri Venkateshwara University,

Tirupati AP, India in June 2012 [8]. The plant was identified and authenticated (*Holoptelea integrifolia* Roxb. Voucher No: TRRCP (1447/PO/9/11/CPCSEA) by Dr. K .Madhavachetty, Assistant Professor, Department of Botany, Sri Venkateshwara University, Tirupati, AP, India. The leaves were cleaned, shade dried and milled into coarse powder by a mechanical pulverizer.

Preparation of plant extract

The powdered material (1.5kgs) was subjected to continuous hot percolation method using Soxhlet extraction apparatus for 24hrs. Then the extract was filtered and the filtrate was concentrated at 30°C under reduced pressure in a rotary evaporator. Finally the extract was dried in a desicator. From the dried extract, accurately 5mg/ml, 10mg/ml, 15mg/ml, 20mg/ml, 25mg/ml, 30mg/ml suspensions of methanolic extract of *Holoptelea integrifolia* Roxb in 1% gum acacia solution (1% gum acacia solution in normal saline) was prepared.

Animals

Pheretima posthuma (Adult Indian earth worms) of about 5-7 cms long were used for the present study.

Standard Drug used

Albendazole suspension (micronized albendazole suspension in the concentration of 10mg/ml) was used as the standard to compare the test results.

ANTHELMINTIC ACTIVITY

Pheretima posthuma (Indian adult earth worms) of nearly equal size (6cms \pm 1) were selected randomly for the present study [9-11]. The worms were acclimatized to the laboratory conditions before experimentation. The earth worms were divided into four groups of six earth worms in each. Albendazole suspension in the concentration of 10mg/ml served as a standard and poured into petri dishes. The test extract were prepared in the concentrations of 5mg/ml, 10mg/ml, 15mg/ml, 20mg/ml, 25mg/ml,

30mg/ml. Normal saline served as control. Six earth worms nearly equal size 6cms \pm 1 were taken for each concentration and placed in petri dishes at room temperature [12]. The time taken for complete paralysis and death were recorded. The mean paralysis time and mean lethal time for each sample was calculated. The time taken for the worms to be become motionless was noted as paralysis time and to ascertain death, each worm was frequently applied with external stimuli which stimulates or induce movements in the earth worm, if alive [13].

Table 1. Anthelmintic activity of methanolic extract of leaves *Holoptelea integrifolia*

Treatment	Concentration used (mg/ml)	Time taken for paralysis (min) X \pm S.D	Time taken for death (min) X \pm S.D
Control	---	---	---
Standard (Albendazole)	10mg/ml	17 \pm 1.571*	39 \pm 1.932*
Methanolic extract of <i>Holoptelea integrifolia</i>	5mg/ml	63.83 \pm 3.842*	81 \pm 2.921*
	10mg/ml	54.00 \pm 2.633**	73.50 \pm 2.717**
	15mg/ml	42.67 \pm 0.8433**	50.00 \pm 0.8563**
	20mg/ml	39.67 \pm 1.520***	44.17 \pm 0.4773***
	25mg/ml	39.50 \pm 1.628*	35.17 \pm 1.327*
	30mg/ml	19.83 \pm 0.4773***	24.33 \pm 0.33***

All values are Mean \pm SEM analyzed by one way ANOVA followed by Dunnett's test.

n= 5, *p<0.05, **p<0.01, ***p<0.001

RESULTS AND DISCUSSION

The earlier studies on preliminary phytochemical investigations of *Holoptelea integrifolia* leaves revealed the presence of chemical constituents such as Hexacosanol, Octacosanol, β - sitosterol and α -amyrin [14]. The leaf extract displayed a significant Anthelmintic activity (p<0.001) in a dose dependent manner as shown in Table 1. The predominant effect of Albendazole on the worm is to cause flaccid paralysis that result in expulsion of the worm by peristalsis. Albendazole by increasing chloride ion conductance of worm muscle membrane produces hyperpolarization ad reduced excitability that leads to muscle relaxation and flaccid paralysis. The methanolic leaf extract of *Holoptelea integrifolia* demonstrated paralysis as well as death of the worms at a time comparable to Albendazole especially at higher

concentration of 30mg/ml. The Anatomy and Physiology of *Pheretima posthuma* is similar to that Helminthes [15]. Therefore earth worms were used in this study. It has been demonstrated that all Anthelmintics are toxic to earth worms, and a substance toxic to earth worm is worthy for investigation as an Anthelmintic [16]. Further studies are needed to establish the mode of activity. The Anthelmintic activity can be ascertained by testing the drug on other species of helminthes which is our future plan of research work.

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