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Anthelmintic activity of *Neolamarckia cadamba* barks

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Abstract

Present study reports anthelmintic activity of various extracts of the bark of *Neolamarckia cadamba* (Roxb.) Bosser (Family: Rubiaceae) against Indian earthworms *Pheritima posthuma*. The results revealed that all the tested extracts of *N. cadamba* bark possess anthelmintic activity in a dose dependant manner. The activities were comparable with the reference drug Piperazine citrate. Among the tested extracts, the chloroform extract and pet-ether extract were found to possess promising anthelmintic activity in comparison to other extracts. The present study therefore justifies its use in the folklore remedies as an anthelmintic drug of natural origin.

Keywords: *Neolamarckia cadamba*; Anthelmintic; *Pheritima posthuma*; Piperazine citrate.

1. Introduction

Neolamarckia cadamba (Roxb.) Bosser (Family: Rubiaceae) is a large, deciduous tree, occasionally buttressed, up to 37.5m in height and 2.4m in girths, with a clear bole of 9m and horizontal branches, found all over India and also cultivated. The tree is frequently found in moist, warm type of deciduous evergreen forests. The stem bark is reported to possess tonic, astringents, febrifugal and anti-diuretic properties and is given in cough^{1, 2}. In the Konkan, the fresh juice of the bark is applied for healing of infants when the fontanelle sinks. In inflammation of the eyes the bark juice, with equal quantities of lime juice, opium and alum, is applied round the orbit³. The Sabara tribes of Orissa state use the decoction of fresh barks for treating helminthiasis in children. The present study reports the anthelmintic activity of the roots of *N. cadamba*.

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2. Materials and methods

2.1. Plant Material

The plant material was collected from the herbal garden of Regional Plant Research Centre, Bhubaneswar in July 2007 and identified by the taxonomists of the research center.

After authentication, fresh bark material was collected in bulk, washed, shade dried and pulverized in a mechanical grinder to obtain coarse powder.

2.2. Preparation of Extract

The powdered root (500 g) was extracted successively with 2 lit each of petroleum ether (40-60^o C), chloroform, methanol and water for 48 h in a soxhlet extractor. Following extraction, the liquid extracts were concentrated under vacuum to yield dry extracts.

3. Anthelmintic Activity

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 beings⁴⁻⁶. The method of Nirmal et al. was followed for the study⁷. Six groups of approximately equal size Indian earthworms consisting six earthworms in each group were released into 50 ml of desired formulation. Each group was treated with one of the following: Vehicle (1% gum acacia in normal saline), Piperazine citrate (15 mg/ml) or extracts (10, 15, 20 mg/ml). Observations were made for the time taken to paralysis and/or death of individual worms. Paralysis was said to occur when the worms do not revive even in normal saline. Death was concluded when the worms loose their motility followed with fading away of their body colour. The results are shown in Table I.

4. Results and discussion

Various extracts of *Neolamarckia cadamba* barks possess anthelmintic activity in a dose dependant manner which has been shown in table-1. Potency of the test samples was found to be inversely proportional to the time taken for paralysis/death of the worms. The activities were compared with the reference drug Piperazine citrate. Among the tested extracts, the chloroform extract and pet-ether extract were found to possess potent anthelmintic activity while methanol extract showed moderate activity. The present study therefore provides scientific base for its use in the folklore remedies as an anthelmintic drug of natural origin. Hence there is a need of further study to rationalize the active chemical entity. Isolation and characterization of the active constituents from the plant extracts are currently under progress in our institution.

Table I: Anthelmintic Activity of Various Extracts of *Neolamarckia cadamba* Bark

Treatment	Concentration used (mg/ml)	Time taken for paralysis (min)	Time taken for death (min)
Vehicle	-	-	-
Piperazine citrate	15	23±0.399	-
Pet-Ether extract	10	21.833±1.922	41.33±1.856
	15	18.83±0.792	36.33±1.476
	20	14.33±1.116	30.83±0.600
Chloroform extract	10	11.66±0.760	35.833±1.447
	15	9.5±0.763	33.166±1.55
	20	7.166±0.945	22.833±1.887
Methanol extract	10	33.83±1.249	53.33±1.33
	15	26.833±1.195	47.833±2.892
	20	18.33±0.8433	44.16±1.778
Aqueous extract	10	57.166±1.078	-
	15	40.16±1.4	58.16±1.138
	20	34.166±1.47	45.166±1.424

Values are expressed as mean ± S.E.M. (n = 6), Control worms were alive up to 24 h of the experiment.

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