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Evaluation of anthelmintic potential of ethanolic extract of *Murraya koenigii* leaves

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Abstract

Objective: The ethanolic extract of leaves of *Murraya koenigii* was investigated for anthelmintic activity using earthworms *Pheretima posthuma*.

Methods: Various concentrations of plant extract were tested in the bioassay. Albendazole (20 mg/ml) was used as reference standard drug whereas distilled water as control. Determination of paralysis time and death time of the worms were recorded.

Results: Extract exhibited significant anthelmintic activity at highest concentration of 500 mg/ml. The results of the study shows that ethanolic extract of leaves of *M. koenigii* showed significant anthelmintic activity at a dose of 500 mg/ml when compared to standard drug albendazole at 20mg/ml concentration.

Conclusion: Ethanolic extract possesses vermicidal activity and found to be effective as an anthelmintic.

Keywords: Anthelmintic activity*, Murraya koenigii, Pheretima posthuma,* Ethanolic extract.

Helminthic infections continue to be the major health hazard to the people, especially those living in tropical developing countries. Although these infections do not cause significant morbidity and mortality when compared with many other parasitic infections, they do cause substantial, but often less measurable effects. For example, infections with gastrointestinal helminths often lead to malabsorbtion, diarrhoea, anaemia and other states of poor health, particularly in infants and school-age children. Though there are several synthetic anthelmintics available at the present time against these parasites, the fact remains that a large proportion of the world's population still does not have access to, or cannot afford to pay for modern medicines, particularly in remote rural areas in poor countries. Besides, the continued usage of current anthelmintic drugs is also posing a major problem of drug resistance in several parasite species. There is thus an urgent need for newer and inexpensive drugs that are able to act for longer periods before resistance set in. In this context, traditional medicines, based largely on chronic, debilitating nature; they probably cause more morbidity and greater economic and social deprivation among humans and animals than any single group of parasites. Chemical control of helminthes coupled with improved management has been the important worm control strategy throughout the world [1, 2].

The curry tree (*Murraya koenigii* or *Bergera koenigii*) is a tropical to sub-tropical tree in the family Rutaceae (the rue family, which includes rue, citrus, and satinwood), which is native to India and Sri Lanka [3].

Its leaves are used in many dishes in India, Sri Lanka and neighbouring countries. Often used in curries, the leaves are generally called by the name 'curry leaves', although they are also literally 'sweet neem leaves' in most Indian languages (as opposed to ordinary neem leaves which are very bitter and in the family Meliaceae, not Rutaceae)[4, 5].

The present study was aimed to investigate the anthelmintic potential of ethanolic extract of leaves of *M. koenigii* [6]

Fresh leaves of *M. koenigii* were collected from botanical garden of Modern Institute of Pharmaceutical Sciences, Indore. The plant material was authenticated by department of pharmacognosy, MIPS, Indore. The leaves of *M. koenigii* chopped weighed and air-dried until 20% of moisture content was left.

Albendazole suspension [Zentel, GSK Pharmaceuticals Ltd. Bangalore], Ethanol [changshuyangyuan chemical china], were used during the experimental protocol. All the chemicals used were of laboratory and analytical grade. *Pheretima posthuma* (Annelida) were collected from the water logged areas of soil in Indore.

Leaves of *M. koenigii* were collected and shade dried. The dried leaves were then converted to coarse powder with the help of pestle mortar. The powdered drug was then extracted by maceration process. The maceration was performed at room temperature and ethanol was used as solvent for extraction. 100 gm of coarse powdered drug was macerated with 300 ml of ethanol for 24 h with occasional shaking in a conical flask. After 24 h the drugs was filtered and extract so obtained was concentrated by heating the extract on water bath till it becomes semi solid extract. The extract was placed

in closed container in cool and dry place to prevent any microbial growth [7].

The anthelmintic activity was performed according to the standard method. *Pheretima posthuma* was placed in petridish containing two different concentrations (250 & 500 mg/ml) of ethanolic extract of leaves of *M. koenigii*. Each petridish was placed with 2 worms and observed for paralysis or death. Mean time for paralysis was noted when no movement of any sort could be observed, except when the worm was shaken vigorously, the time death of worm (min) was recorded after ascertaining that worms neither moved when shaken nor when given external stimuli. The test results were compared with reference compound albendazole (20 mg/ml) treated samples [8-10].

The data of anthelmintic evaluations were expressed as mean ± S.E.M of six earthworms in each group. The statistical analysis was carried out using one-way ANOVA followed by Tukey's t-test. The difference in values at $p< 0.01$ was considered as statistically significant.

In the present investigation, the ethanolic extract of leaves parts of the plants *M. koenigii* were evaluated for its anthelmintic potential. It is evident from the experimental data that, the ethanolic extracts of *M. koenigii* showed significant ($P<0.01$) anthelmintic activity at 500 mg/ml when compared with the standard drug, albendazole at 20 mg/ml concentration. Study results revealed that ethanolic extract of *M. koenigii* 250mg showed the significant paralysis at 08.04±1.12 min and death at 9.39±1.32 min and extract of *M. koenigii* 500 mg/ml showed the paralysis at 2.05±0.46 and death at 3.32±0 when compared with standard albendazole drug 20 mg/ml showed the paralysis at 2.03 ± 0.52 and death at 2.40 ± 0.36 (Table 1).

The ethanolic leaves extract of *M. koenigii* has showed significant anthelmintic activity at all the tested doses when compared to standard drug as albendazol. Highest activity exhibited by the higher conc. (500 mg/ml) which assures the ethno-medicinal claim.

Parasitic worms (helminths) of the gastrointestinal (GI) tract are pathogens of major global importance. Over a billion people, mainly in developing countries, are estimated to be infected with soil-transmitted helminths, whilst helminth infection is also a serious problem in livestock production worldwide, causing significant economic losses and threatening food security. Control of helminths relies almost exclusively on a limited number of synthetic anthelmintic drugs. Besides, the continued usage of current anthelmintic drugs is also posing a major problem of drug resistance in several parasite species. Hence, we can think about this herb as alternate source of anthelmintic drugs and also can generate new active lead for suitable anthelmintic drug.

Table 1: Anthelmintic activity of *Murraya koenigii*

S. No.	Drug/extracts and concentration	Paralysis time (min)	Death time (min)
1.	Control (distilled water)	-	-
2.	Albendazole 20 mg/ml	2.03±0.52*	2.40±0.36*
3.	*Murraya koenigii* 250 mg/ml	08.04±1.12*	9.39±1.32*
4.	*Murraya koenigii* 500 mg/ml	2.05±0.46*	3.32±0*

All values represent mean ± S.E.M; n=6 in each group. * $p < 0.01$

Comparisons made between standard versus treated groups, $p<0.01$ was considered significant

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