

## Comparative evaluation and anthelmintic potential of roots and leaves extracts of *Lantana camara* linn

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### Abstract

**Objective:** Anthelmintic activity of ethanolic extract of *Lantana camara* Linn roots and leaves in comparison with albendazole was evaluated through *in vitro* studies by the worm motility inhibition assay.

**Methods:** In the present investigation, we have made a sincere attempt to evaluate the anthelmintic property of ethanolic extract of *L. camara* using *Pheretima posthuma* as an experimental helminthes model. Albendazole was used as the standard reference. Ethanolic extract of leaves and roots were tested at concentration of 250 mg/ml and 500 mg/ml respectively to determine their effect as the time taken to paralysis and time to induce death in the worms.

**Results:** The results of the study show that significant anthelmintic effects ( $p < 0.001$ ) were observed on leaves extract (500 mg/ml) of *L. camara* when compared with albendazole at 20 mg/ml concentration. Roots extract also showed anthelmintic activity but having lesser potential as compared to leaves extract of *L. camara* at 500 mg/ml concentration.

**Conclusion:** This investigation revealed that leaves extract was more effective in its anthelmintic action against *Pheretima posthuma* when compared to roots extract. Leaves of *L. camara* Linn can be potential sources for novel anthelmintics.

**Keywords:** Anthelmintic activity, *Lantana camara* Linn, *Pheretima posthuma*, Ethanolic extract

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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 [1]. Control of helminths relies almost exclusively on a limited number of synthetic anthelmintic drugs [2]. The limitations of this reliance on chemotherapy are the threat of parasites developing resistance to drug treatment (already widespread in some livestock production systems) [3], the cost of drugs for small-scale farmers in developing countries and for some helminths, lack of efficacy of currently available drugs. Therefore, novel and complementary helminth control options are urgently needed [4, 5].

*Lantana camara* Linn is a flowering ornamental plant belonging to family Verbenaceae. *L. camara* is a well known medicinal plant in the traditional medicinal system and recent scientific studies have emphasized the possible use of *L. camara* in modern medicine [6, 7].

Phytochemical composition of the *L. camara* has been extensively studied in last few decades. Different parts of *L. camara* are reported to possess essential oils, phenolic compounds, flavonoids, carbohydrates, proteins, alkaloids, glycosides, iridoid glycosides, phenyl ethanol,

oligosaccharides, quinine, saponins, steroids, triterpens, sesquiterpenoids and tannin as major phytochemical groups [8-9]. The aim of the present present study was to comparatively evaluate the anthelmintic activity of ethanolic extract of *L. camara* roots and leaves *in vivo*.

Leaves and roots of *L. camara* were collected from botanical garden of Modern Institute of Pharmaceutical Sciences, Indore. The plant was authenticated by the department of Pharmacognosy, MIPS, Indore. The leaves and roots of *L. camara* were chopped, weighed and air-dried until 20% of moisture content was left. Indian earthworm *Pheretima posthuma* (Annelida) were collected from the water logged areas of soil in Indore.

Albendazole suspension [Zentel, GSK Pharmaceuticals Ltd. Bangalore], ethanol [changshu yangyuan chemical china], were used during the experimental protocol. All the chemicals used were of laboratory and analytical grade.

Roots and leaves of *L. camara* were collected and shade dried. The dried leaves and roots were then converted to a coarse powder with the help of pestle mortar. The powdered material of *L. camara* roots and leaves (200 gm) were kept for maceration with 1000 ml of ethanol for 12 h separately. Both the extract was double filtered by using a muslin cloth and Whatman no.1 filter paper and concentrated by evaporation on a water bath. Both the extract was dried on a water bath to get a concentrated product. The extracts were placed in a

closed container in cool and dry place to prevent any microbial growth [10].

The anthelmintic activity was performed according to the standard method on adult Indian earth worm *Pheretima posthuma* as it has anatomical and physiological resemblance with the intestinal round worm parasites of human beings. Five experimental groups were prepared, first one containing albendazole (20 mg/ml) as standard, second and third group containing two different concentrations (250 & 500 mg/ml) of ethanolic extract of leaves of *L. camara* and fourth and fifth group containing two different concentrations (250 & 500 mg/ml) of ethanolic extract of roots of *L. camara* respectively. All the dilutions were made using distilled water. *Pheretima posthuma* was placed in petridish containing test drugs and standard drug albendazole. Each petridish was placed with two 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 [11-15].

The data of anthelmintic evaluations were expressed as mean  $\pm$  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.

It is evident from the experimental data that, the ethanolic extract of *L. camara* leaves at 500mg/ml showed highest anthelmintic activity (paralysis time  $1.02 \pm 0.46$ , death time  $1.32 \pm 0.14$ ) at tested doses when compared with the albendazole at 20 mg/ml concentration (paralysis time  $2.03 \pm 0.52$ , death time  $2.40 \pm 0.36$ ). Leaves extract at 250 mg/ml concentration (paralysis time  $5.04 \pm 1.12$ , death time  $7.39 \pm 1.32$ ) also showed significant anthelmintic activity but lesser as compared to 500 mg/ml concentration of leaves extract. Root extracts at both concentration 500mg/ml and 250mg/ml does not showed any significant anthelmintic activity when compared to standard drug and leaves extract. It reveals that ethanolic extract leaves of *L. camara* 500mg/ml showed significant anthelmintic activity [Table 1].

From the results it is clear that the *L. camara* leaves extracts has showed significant ( $p < 0.001$ ) anthelmintic activity, when compared to standard drug as albendazole and also in comparison to roots extract of *L. camara*.

Highest activity exhibited by *L. camara* leaves extracts at 500 mg/ml concentration, which assures the ethnomedicinal claim. Roots extract of *L. camara* did not showed any significant anthelmintic activity when compared to standard drug albendazole and also in comparison to leaves extract of *L. camara*.

Hence, we can think about *L. camara* leaves as alternate source of anthelmintic drugs and also can generate new active lead for suitable anthelmintic drug.

**Table 1: Anthelmintic activity of *Lantana camara* against *Pheretima posthuma***

S. No.	Drug/extracts and concentration	Paralysis time (min)	Death time (min)
1.	Control (normal saline)	34.00 $\pm$ 2.65	78.00 $\pm$ 8.02
2.	Albendazole 20mg/ml	2.03 $\pm$ 0.52*	2.40 $\pm$ 0.36*
3.	Ethanolic extract of leaves of <i>L. camara</i> (500 mg/ml)	1.02 $\pm$ 0.46*	1.32 $\pm$ 0.14*
4.	Ethanolic extract of leaves of <i>L. camara</i> (250 mg/ml)	5.04 $\pm$ 1.12*	7.39 $\pm$ 1.32*
5.	Ethanolic extract of roots of <i>L. camara</i> (500 mg/ml)	13.07 $\pm$ 1.54	15.03 $\pm$ 2.10
6.	Ethanolic extract of roots of <i>L. camara</i> (250 mg/ml)	19.03 $\pm$ 2.22	20.05 $\pm$ 1.22

All values represent mean  $\pm$  S.E.M; n=6 in each group. \*  $p < 0.001$

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

#### References

- Keiser J, Utzinger J. Efficacy of current drugs against soil-transmitted helminth infections: Systematic review and meta-analysis. JAMA 2008; 299:1937-1948.
- Charlier J, Van Der Voort M, Kenyon F, Skuce P, Vercruyse J. Chasing helminths and their economic impact on farmed ruminants. Trends Parasitol 2014; 30: 361-367.
- Fitzpatrick JL. Global food security: The impact of veterinary parasites and parasitologists. Vet Parasitol 2013; 195: 233-248.
- Sutherland IA, Leathwick DM. Anthelmintic resistance in nematode parasites of cattle: a global issue? Trends Parasitol 2011; 27:176-181.
- Sargison ND. Pharmaceutical treatments of gastrointestinal nematode infections of sheep-Future of anthelmintic drugs. Vet Parasitol 2012; 189: 79-84
- Venkatachalam T, Kumar VK, Selvi PK, et al. Physicochemical and preliminary phytochemical studies on the *Lantana camara* (L.) fruits. Int J Pharm Pharm Sci 2011; 3: 52-54.

7. Kensa VM. Studies on phytochemical screening and antibacterial activities of *Lantana camara* Linn. Plant Sciences Feed 2011;1: 74-79
8. Kalita S *et al.* Phytochemical composition and in vitro hemolytic activity of *Lantana camara* L. (Verbenaceae) leaves. Pharmacologyonline 2011; 1: 59-67.
9. Bhakta D, Ganjewala D. Effect of leaf positions on total phenolics, flavonoids and proantho-cyanidins content and antioxidant activities in *Lantana camara* (L). J Scien Res 2009; 1: 363-369
10. Shivkumar YM, Kumar VL. Anthelmintic activity of latex of *Calotropis procera*. Pharma Biol 2003; 41: 263-265.
11. Kaushik RK, Katiyar JC, Sen AB. Studies on the mode of action of anthelmintics with *Ascardia galli* as a test parasite. Indian J Med Res 1974; 64: 1367-1375.
12. Yadav AK, Temjenmongla. Anthelmintic activity of *Gynura angulosa* against *Trichinella spiralis* infections in mice. Pharmacologyonline 2006; 2: 299-306
13. Lal J, Chandra S, Raviprakash V, Sabir M. In vitro anthelmintic action of some indigenous medicinal plants on *Ascardia galli* worms. Indian J Physiol Pharmacol 1976; 20: 64-68.
14. Mali RG, Mahajan S, Patil KS. Anthelmintic activity of root bark of *Capparis spinosa*. Indian J Nat Prod 2005; 21: 50-51.
15. Mali RG, Wadekar RR. *In vitro* anthelmintic activity of *Baliospermum montanum* Muell. Arg roots. Indian J Pharm Sci 2008; 70: 131-133.

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