

Comparative *In vitro* Anthelmintic Activity of *Mentha piperita* and *Lantana camara* from Western India

A. S. Girme, R. D. Bhalke, P. B. Ghogare, V. D. Tambe,
R. S. Jadhav and S. A. Nirmal

Department of Pharmacognosy, Pravara Rural College of Pharmacy, Loni-413 736, India

ABSTRACT: Methanol extracts from the leaves, stems and roots of *Mentha piperita* and *Lantana camara* were investigated for their anthelmintic activity against *Pheritima posthuma*. Each extract was studied in the bioassay at 20 mg/ml, which involved determination of time of paralysis and time of death of the worms. Both the extracts of both plants exhibited considerable anthelmintic activities, and the order of sensitivity of the extracts to the worms was stems > roots > leaves for the *M. piperita* and stems > leaves > roots for the *L. camara*. The methanol extracts of stems of both *M. piperita* and *L. camara* were found to be the most active. Albendazole (20 mg/ml) and distilled water were included in the assay as standard reference drug and control, respectively.

Key words: *Mentha piperita*, *Lantana camara*, *Pheritima posthuma*, *In vitro* anthelmintic activity.

INTRODUCTION

Mentha piperita is a popular herb tonic worldwide. It is generally used as a flavouring agent. It has been a popular home remedy for digestive ailments for two centuries in India. It is a perennial, glabrous, strong scented herb from the family Menispermaceae. The volatile oil obtained from this plant, known as mint or peppermint oil, is used as antiseptic, stimulant, carminative and for allaying nausea and vomiting and also has got commercial value.¹ The major components of this oil are menthofuran,²⁻³ menthol, menthyl acetate, neomenthol, menthone and isomenthone.⁴ The plant has been used for anti-nociceptive, anti-inflammatory,⁵ antimicrobial and antioxidant activities.⁶

The flavonoids namely eriocitrin, narirutin, hesperidin, luteolin-7-O-rutinoside, isorhoifolin, diosmin, rosmarinic acid, and 5, 7-dihydroxycromone-7-O-rutinoside isolated from the plant showed antiallergic effects.² Menthone is also a major constituent of the plant.⁷

Lantana camara (Syn; *Lantana aculeata*) is a characteristic plant of the Verbenaceae family which is a large scrambling evergreen shrub. The plant is said to have carminative, antispasmodic and antirheumatic uses in traditional medicines. The nematocidal compounds lantanoside, lantanone, linaroside, camarinic acid have been isolated from this plant.⁸ Camaryolic acid, methylcamaralate, camangeloyl acid has beta-sitosterol, 3-O-beta-D-glucopyranoside, octadecanoic acid, docosanoic acid, palmitic acid, camaric acid and lantanolic acid have also been reported.⁹ The plant has antibacterial and antifungal¹⁰ as well as strong antioxidant activities.¹¹

Correspondence to: A. S. Girme
Email: aboligirme@yahoo.co.in

As a part of our continuing studies with plants having anthelmintic activities we investigated these plants and we present here in the comparative *in vitro* anthelmintic activity of *M. piperita* and *L. camara*.

MATERIALS AND METHODS

Plant materials. Stems, leaves and roots of *Mentha piperita* and *Lantana camara* were collected from Ahmednagar district, Maharashtra (India) and in October 2005 authenticated by Dr. Salunke and Dr. Pingale at the Department of Botany, P.V.P. College, Loni, India.

Preparation of extracts. Dried and coarsely powdered stem, leaf and root parts (500 gm, each) of *M. piperita* and *L. camara*, were separately subjected to extraction in Soxhlet extractor using methanol. The extracts of various parts were concentrated by vacuum distillation and then dried in open air.¹²

Animals. Indian adult earthworms (*Pheretima posthuma*) collected from moist soil of the Horticulture Department of the P.V.P. College, Loni and washed with normal saline to remove all the faecal matter, were used for the anthelmintic study. The earthworms of 3-5 cm in length and 0.1-0.2 cm in width were used for all the experimental protocol due to its anatomical and physiological resemblance with the intestinal roundworm parasites human beings.^{13, 14}

Drugs and chemicals. The following drugs and chemicals were used. Drugs: Albendazole (BANDY, Mankind Pharma Ltd., New Delhi), Chemicals: Methanol A.R (PCL, Pune), DMF (PCL, Pune), Saline water (Claris Lifesciences Ltd., Ahmedabad).

Anthelmintic activity. All the extracts of *M. piperita* and *L. camara* were dissolved in minimum amount of DMF and the volume was adjusted to 10 ml with saline water. All drugs and extract solutions were freshly prepared before starting the experiment.

In each case, six earthworms were released into 10 ml of desired formulations as follows; vehicles (5% DMF in normal saline), Albendazole (20 mg/ml), or total methanolic extracts of leaf, stem or

root of *M. piperita* and *L. camara* (20 mg/ml, each) in normal saline containing 5% DMF.

Observations were made for the time taken to paralysis and death of individual worm. Paralysis was said to occur when the worms were not able to move even in normal saline. Death was concluded when the worms lost their motility followed with fading away of their body colors as our previous method.¹⁵⁻¹⁷

RESULTS AND DISCUSSION

It is evident from the experimental data that, the crude methanolic extracts of various parts of the *M. piperita* and *L. camara* showed significant anthelmintic activity at 20 mg/ml. Results were comparable with the standard drugs, Albendazole, at same concentration. Table 1 reveals that total

Table 1. *In vitro* anthelmintic activity of various extractives of *M. piperita* and *L. camara* at 20 mg/ml.

Treatment	Time taken for the paralysis (min)	Time taken for the death (min)
MeL	4.57 ± 0.286	6.20 ± 0.220
MeS	1.46 ± 0.206	1.60 ± 0.298
MeR	4.20 ± 0.346	4.31 ± 0.256
LaL	3.12 ± 0.098	5.56 ± 0.164
LaS	2.03 ± 0.332	2.55 ± 0.304
LaR	3.31 ± 0.280	3.48 ± 0.186
Albendazole (5% DMF)	3.28 ± 0.200	3.40 ± 0.338
Control (in normal saline)	-	-

Results are expressed as Mean ± SEM from eight observations; Control worms were alive up to 24 hrs of observation. Crude methanolic extracts of leaves, stems and root parts of *M. piperita* and *L. camara* used for the study were designated as MeL, MeS, MeR, LaL, LaS, LaR, respectively.

extract of stem of *M. piperita* and *L. camara* showed the best anthelmintic activity. These parts required the least time for causing paralysis and death of the earthworms followed by leaves and root parts. As shown in Table 1 stems of *M. piperita* and *L. camara* displayed intrinsic anthelmintic properties with 20 mg/ml giving a shortest time of paralysis and death for the *M. piperita* than the *L. camara*.

The function of the anthelmintic drugs like Albendazole is to cause paralysis of worms so that they are expelled in the faeces of man and animals. The extracts not only demonstrated this property, they also caused death of the worms, especially at 20

mg/ml as compared with the Albendazole. In conclusion, these plants have been confirmed to display anthelmintic activities.

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