

ANTHELMINTIC ACTIVITY OF *OCIMUM SANCTUM* AND  
*CITRUS AURANTIFOLIA* OILS

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**Summary**

In world helminthes infections are the most widespread infections in humans. The morbidity due to parasitic diseases has been increased in population. The gastrointestinal helminthes becomes resistant to currently available anthelmintic drugs. Anthelmintic substances having considerable toxicity to human beings are present in foods derived from livestock, posing a serious threat to human health due to this there is a need for new chemical substances from natural sources for helminth control. In present study volatile oil isolated from *Ocimum sanctum* Linn and *Citrus aurantifolia* swingle were evaluated for anthelmintic activity on Indian adult earthworms, *Pheretima posthuma* due to its anatomical and physiological resemblance with the intestinal roundworm parasites of human beings. In concentration of 0.05 ml/ml *Ocimum sanctum* and *Citrus aurantifolia* oil showed potent anthelmintic activity as compare to standard drug albendazole 10 mg/ml.

**Key words:** *Ocimum sanctum*, Anthelmintic, *Citrus aurantifolia*, *Pheretima posthuma*

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## Introduction

In world helminthes infections are the most widespread infections in humans. The morbidity due to parasitic diseases increased in population. The gastro-intestinal helminthes becomes resistant to currently available anthelmintic drugs therefore there big problem in treatment of helminthes diseases. Anthelmintic substances having considerable toxicity to human beings are present in foods derived from livestock, posing a serious threat to human health. A new lead for helminth control is greatly needed and has promoted studies of traditionally used anthelmintic plants, which are generally considered to be very important sources of bioactive substances<sup>1-4</sup>.

*Ocimum sanctum* Linn. (Labiatae), commonly known as holy basil, is an herbaceous plant found throughout the south Asian region. The plant grows wild in India, but is also widely cultivated in homes and temple gardens. Apart from religious significance, it has a long history of medicinal use and is mentioned in *Charak Samhita*, the ancient textbook of Ayurveda. Other texts mention the use of basil leaves for a variety of conditions such as catarrhal bronchitis, bronchial asthma, dysentery, dyspepsia, skin diseases, chronic fever, haemorrhage and helminthiasis, and topically for ring worms<sup>5,6</sup>. *Citrus aurantifolia* swingle (Family:-Rutaceae) is commonly known as familiar food and medicine. The fruits are sour, bitter, astringent, thermogenic, laxative, appetizer, stomachic, digestive, anthelmintic and anti-scorbutic and are useful in vitiated conditions of pitta and kapha. used in cough, bronchitis, nausea, colic, helminthiasis, scabies and anemia<sup>5,6</sup>. The aim of the present research was to study chemical composition and anthelmintic property of the volatile oil from leaves of *Eucalyptus globules*.

## Methods

### *Plant material*

The plants were collected from Baramati region Dist- Pune and authenticated by Prof. R. B. Deshmukh Head Dept. of Botany, Shardabai Pawar Mahila Mahavidyalaya, Shardanagar.

### *Isolation of essential oil*

The essential oil was isolated from the fresh leaves of *Ocimum sanctum*, *Citrus aurantifolia* by hydrodistillation in a Clevenger-type apparatus, yielding essential oil 0.73 and 0.58 % w/w respectively.

***Evaluation of Anthelmintic activity***

Indian adult earthworms (*Pheretima posthuma*) of 3-5 cm in length and 0.1-0.2cm in width are used for anthelmintic activity because it's anatomical and physiological resemblance with the intestinal roundworm parasites of human beings<sup>7, 8</sup>. The earthworms were divided in to four groups containing five earthworms in each group. In group I and II treated with Oil of *Ocimum sanctum* and *Citrus aurantifolia* respectively at concentration 0.05 ml/ml. Group III treated with albendazole (10mg/ml) and group IV treated with distilled water. The observation of time taken to paralyze and death was concluded. All readings are expressed as mean and SEM of three animals in each group<sup>9</sup>.

***Thin layer chromatography***

Thin layer chromatography was performed using Silica gel G as stationary phase, Toluene-ethylacetate (97:3) as mobile phase and Vanillin-sulphuric acid as spraying reagent<sup>10</sup>.

**Results**

The result of present study reveals that earth worm treated with oil of *Ocimum sanctum* and *Citrus aurantifolia* respectively at concentration 0.05 ml/ml. showed significant anthelmintic activity as compare to standard drug albendazole 10 mg/ml as shown in table 1. *Citrus aurantifolia* oil showed potent anthelmintic activity (1.90 ±0.3655) as time of paralysis and time of death is (2.24±0.0929) as compare to Albendazole.

Table1. Anthelmintic activity *Ocimum sanctum* and *Citrus aurantifolia*

Groups	Treatment	Dose	Time of paralysis Mean ±SEM	Timeof death(min) Mean ±SEM
I	<i>O. sanctum</i> oil	0.05 ml/ml	1.56 ± 02.862	7.26 ± 0.2262
II	<i>C. aurantifolia</i> oil	0.05 ml/ml	1.90 ± 0.3655	2.24 ± 0.0929
III	Albendazole	10 mg/ml	7.61 ± 1.85	8.0224 ± 2.136
IV	Distilled water	10 ml	No paralysis and death of earth worm observed till 24 hrs	

Chromatographic evaluation of *Ocimum sanctum* oil showed 0.42, 0.63, 0.71, 0.76, 0.77 and 0.82 R<sub>f</sub> value and confirmed citral, Geranyl acetate, Menthyl acetate, myristicin, myristicin and anethol respectively as a phytoconstituents.

While *Citrus aurantifolia* oil observed 0.37, 0.60, 0.63, 0.71, 0.73, 0.75 and 0.81 as  $R_f$  and these value indicate presence of piperitone, Geranyl acetate, Geranyl acetate, Menthyl acetate, Myristicin and Anethol respectively as a phytoconstituents as shown in figure 1 and 2.

Figure1. TLC of *Ocimum sanctum* oil



Figure 2. TLC of *Citrus aurantifolia* oil



### Discussion

An Indian adult earthworm (*Pheretima posthuma*) has anatomical and physiological resemblance with the intestinal roundworm parasites of human beings<sup>8, 9</sup>. Result indicates that albendazole causes time for paralysis and death for *Pheretima posthuma* ( $5.82 \pm 0.466$ ) and ( $6.54 \pm 0.429$ ) respectively. While *Citrus aurantifolia* oil showed ( $1.90 \pm 0.3655$ ) as time of paralysis and time of death is ( $2.24 \pm 0.0929$ ); *Ocimum sanctum* oil caused paralysis ( $1.56 \pm 0.2862$ ) and and death ( $7.26 \pm 0.2262$ ) of earth worm respectively. Present investigation concluded that *Citrus aurantifolia* and *Ocimum sanctum* oil have anthelmintic potential.

### Acknowledgement

The authors are thankful to the Management S.V.P.M's College of Pharmacy, Malegaon (Bk), Baramati for providing necessary facilities and also to the Prof. R. B. Deshmukh Head Dept. of Botany, Shardabai Pawar Mahila Mahavidyalaya, Shardanagar for the authentication of the plants

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