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Larvicidal Activity Of Essential Oil Obtained From Different Species Of Genus *Ocimum* Against Mosquito Vector

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ABSTRACT:

Prevalence of mosquito borne diseases is one of the world's most health hazardous problems like malaria, filariasis, etc. Present study deals with larvicidal (Larvae: *Aedes aegypti*) activity of two different species of tulsi i.e. *Ocimum sanctum* Linn. and *Ocimum tenuiflorum* Linn. (Labiatae). Tulsi contains mainly volatile oil which is composed of different types of terpenes in the form of apiole, anethole, eugenol, etc. Terpenes proved to have antibacterial activity, fungicidal activity mosquito repellent activity, etc. Both the species of tulsi showed significant results in larvicidal activity.

Key words: Tulsi, *Ocimum sanctum*, *Ocimum tenuiflorum* and Larvicidal activity.

INTRODUCTION:

Human beings and some animals are affected by many of the vector- borne diseases and mosquito is the principal vector. (El Hag et al., 1999). *Anopheles*, *Culex* and *Aedes* are the genera of several mosquito species which are vectors for the pathogens of various diseases like malaria, filariasis, japanese encephalitis, dengue fever, dengue haemorrhagic fever and yellow fever (Hubalek and Haluzka, 1999). Mosquito vector *Aedes aegypti* is responsible for dengue fever and dengue hemorrhagic fever. It is reported to infect more than hundred million people every year in more than 110 countries in the tropics (Halstead, 2000). There are several approaches to control of the mosquito- Borne diseases one of them is by killing, preventing mosquitoes to bite human beings (by using mosquito repellants) and other is by killing mosquitoes at larval stage in a large scale at breeding centers of vectors. Several synthetic pesticides are available in the market such as malathion, DDT and pyre-throides but they are known to cause the problems like environmental pollution, residual effects and resistance by their prolong use.

BACKGROUND AND OBJECTIVE:

Recently the interest has increased for developing plant based insecticides instead of chemical insecticides. Mosquito borne diseases is one of the world's most health hazardous problems like malaria, filariasis, etc. One of the approaches to prevent mosquito borne diseases is by killing mosquito at larval stage. this study deals with the assessment of larvicidal activity of essential oil from the leaves of *Ocimum sanctum* Linn. (Labiatae) (OSEO) and *Ocimum tenuiflorum* Linn. (Labiatae) (OTEO) against medically important mosquito vector, *Aedes aegypti*.

MATERIAL AND METHOD:

Both *Ocimum sanctum* and *Ocimum tenuiflorum*, in the flowering stage were collected from the medicinal garden of Sigma Institute of Pharmacy, Bakrol, Baroda and washed with water.

1. Extraction of the essential oils:

Samples of fresh aerial parts of both species were subjected to hydro distillation for 2 hours in a Clevenger apparatus. The isolated oils were subsequently dried over anhydrous sodium sulfate and stored under refrigeration until analyzed and tested. The oil yields (w/w on fresh weight basis) for *Ocimum sanctum*, was 0.9% while the oil yields for *Ocimum tenuiflorum* was 0.1% respectively.

2. Larvicidal Activity:

Larvicidal activity was performed according to reported method by Tiwari et al., 2007. Different concentrations (75 to 500 μ g/mL) of essential oils from both species were prepared in H₂O: DMSO (98.5:1.5). 25 instar III larvae of *A. aegypti* were delivered to each beaker. After 24 hours, at room temperature, the number of dead larvae was counted and the LC₅₀ was calculated. The results were compared against blank H₂O: DMSO (98.5:1.5). Study was carried out in triplicates.

RESULT:

Among the essential oil obtained from two different species of *Ocimum*, essential oil obtained from both the species proved to have significant larvicidal activity against *Aedes aegypti* instar III mosquito larvae. Essential oils obtained from *Ocimum sanctum* i.e (OSEO) and *Ocimum tenuiflorum* i.e (OTEO) showed LC₅₀ at 322.61 ppm and 291.29 ppm respectively. The percent larvicidal activity has been given in Table No. 1, while LC₅₀ has been given in Table No. 2. The present study demonstrated that the active terpenes present in the essential oil of two different species of tulsi may be very useful in preventing the mosquito borne diseases such as malaria, dengue, etc.

Table No. 1. Percent Larvicidal Activity (Total no. of larvae taken = 25)

% Larvicidal Activity		
Concentration (μ g/mL)	<i>Ocimum sanctum</i> oil (OSEO)	<i>Ocimum tenuiflorum</i> oil (OTEO)
75	4	8
125	16	20
250	36	36
500	60	64

Table No. 2. Lethal Concentration 50 (LC₅₀) in μ g/mL

LC ₅₀ in µg/mL	
OSEO	OSEO
322.61	291.29

Interpretation & conclusion: From the results it can be concluded that the larvae of the *Aedes aegypti* are susceptible to the essential oil composition. Such findings would be useful in developing the new agents against mosquito borne diseases. This can be achieved by killing the mosquitoes at larval stage based on bioactive compounds from indigenous plant sources instead of chemical larvicides.

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