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A STUDY ON MOSQUITO LARVICIDAL ACTIVITY OF ESSENTIAL OIL OF FOUR SPECIES OF *Ocimum* AGAINST *Aedes albopictus*. SKUSE.

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ABSTRACT

Conventional insecticides have raised many social and economic problems due to their non specific and broad spectrum of toxicity, high persistence, resistance etc. among alternative controls, plant products are first choice due to their co-evolution with insects. In the present work, the mosquito larvicidal activities of four species of *Ocimum* such as *Ocimum gratissimum* var. *suavis*, *O.basilicum* var. *purpurascens*, *O. tenuiflorum* var. *hirsuta and O.americanum* against *Aedes albopictus* Skuse were studied. Among the different species of *Ocimum*, the essential oil of *O. americanum* exhibited the most significant larvicidal effect against *Aedes albopictus*.

INTRODUCTION

Mosquitoes serve as vector of several diseases causing serious health problems to human beings. Although eradication of these was considered possible by use of chemical insecticides, development of insecticide resistance initiated a search for alternative control measures (Alice and Sufeetha, 2001). In this search, herbal products form the prime choice due to their co-evolution with insects. India is very rich in flora, providing ample opportunity to study their insect control potential.

Biologically active plant extracts are therefore studied for their efficacy to kill larvae of different mosquitoes ((Alice and Sufeetha, 2001, Ehlag, *et al.* 2001, Goldhirish *et Al.* 2000, Prasad *et al.* 2001, Venkatachalam and Jabanesan, 2001). Supavarn *et al. (*1974), reported that out of 36 samples studied, 5 of them killed all the larvae of *Aedes aegypti* within 7 days at a concentration of 1000 ppm. The oil of *Ocimum basilicum* has also been reported to have insecticidal and larvicidal effects (Chavan *et al* 1986a, Chavan *et al* 1986b, Deshpanday and Tipnis, 1971). The present study was carried out to determine the larvicidal activity of oils from different species of *Ocimum* such as *Ocimum gratissimum* var. *suavis*, *O.basilicum* var. *purpurascens*, *O. tenuiflorum* var. *hirsuta* and *O. americanum* against laboratory colonized fourth instar larvae of *Aedes albopictus* Skuse, which is the most menacing vector of yellow fever and dengue fever.

MATERIAL AND METHODS

The essential oils of different species of *Ocimum* used in the present study were extracted by hydro distillation in a Clevenger type apparatus (Clevenger, 1928)) at 100^0 C for 4 hrs. The aromatic essential oils were collected and dried over anhydrous Sodium sulphate. The oil was transferred into a small amber colored bottle and stored at 4-6^0C.

The larvae of *A. albopictus*, used in this study were reared in the laboratory by adding yeast granules and dog biscuits at a temperature of 26 ± 2^0C and a relative humidity of 75 ± 5%. The fourth instar larvae were used to study the larvicidal activity of different plant oils.

All bioassay were performed according to the standard method (W.H.O, 1982). The oils extracted using Clevenger Apparatus were used to prepare the stock solution of 10 mg/ml in acetone. The stock solution was diluted to 10 ml with filtered tap water to obtain the test solution of 10, 8, 6.6, 5.7, 5, 3.3, 2.5, and 2 µg /ml. two controls were maintained at a time, one consisted of acetone and the other tap water only. The fourth instar larvae (10 each) were tested at 8 different test solutions as well as control. The bioassay was repeated with three different batches of mosquito larvae. The larval mortality was recorded after 24 hrs. Toxic activity of every oil was reported as L_C 50, which is concentration of oil that killed 50% of larvae in 24 hrs.

RESULTS

The results of larvicidal activity of different plant oils against fourth instar larvae of *A.albopictus* are presented in table 1. The maximum activity was observed in the case of *O.americanum*. the most effective treatment of *O. americanum* oil which caused 100% mortality was at a concentration of 6.6 µg/ml. oils from *O.gratissimum* var.*suavis*, *O.basilicum* var. *purpurescens*, *O. tenuiflorum* var *hirsute* and *O.americanum* shared L_C50 values 20, 10, 6.6 and 3.3 µg/ml respectively.No mortality was noticed when 2 controls–tap water and acetone were used(Table-1).

Table 1. Larvicidal activity of different plant oils against fourth instar larvae of *Aedes albopictus*

Sl.No.	Name of the plant	Percentage of mortality (µg/ml)										Controls	L_C 50 Value
		40	20	10	8	6.6	5.7	5	3.3	2.5	2		
1	***Ocimum gratissimum* var. *suavis***	10	6	1	0	0	0	0	0	0	0	0	20
2	***O.basilicum* var. *purpurascens***	10	8	5	3	1	0	0	0	0	0	0	10
3	***O.tenuiflorum* var. *hirsuta***	10	10	9	8	5	3	1	0	0	0	0	6.63
4	***O.americanum***	10	10	10	10	10	8	6	5	2	0	0	3.3

DISCUSSION

The present study indicates the efficacy of plant oils of different species of *Ocimum* as larvicidal agents and their possible use in biological control of *A.albopictus*, an important vector for several parasitic diseases. The plant oils especially *O.americanum* showed extreme larvicidal activity against larvae of *Aedes albopictus*. The high rate of mortality may be due to the action of essential oils on the chromosomes of mosquito larvae causing many clastogenic and nonclastogenic abnormalities. Combined with conventional herbal larvicides these oils may provide an extremely effective vector control measure at a rather low cost. Results of this work indicate that these essential oils have an important place in integrated pest management programmes.

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