

LARVICIDAL EFFECT OF MARINE PLANT EXTRACTS ON MOSQUITO *CULEX TRITAENIORHYNCHUS**

ABSTRACT

Petroleum-ether extracts of 3 mangrove plants and 2 seaweeds were studied against the mosquito larvae *Culex tritaeniorhynchus*. Among the five samples tested, the seaweeds *Caulerpa scalpelliformis*, *Dictyota* species and the mangrove plant *Bruguiera cylindrica* were found effective with the LC_{50} of 46, 74 and 56 ppm respectively.

MOSQUITOES cause dreadful human diseases. In recent years, biologically active plant extracts have been studied in mosquito control programmes by the use of synthetic pesticides. The present study deals with the larvicidal efficacy of some marine plants against the mosquito *Culex tritaeniorhynchus*, a vector of Japanese encephalitis.

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Materials and methods

Leaves of mangrove plants were collected from Pitchavaram mangrove area (11°26'N; 79°48'E) and seaweeds from Trichendur, east coast of Tamil Nadu. The materials were thoroughly washed, shade-dried and powdered. The 40 mesh powder of the plant materials were extracted in soxhlet apparatus (Saxena and Yadav, 1983). The extracts were concentrated in rotary vacuum evaporator at 40-45°C and made a standard stock solution of 1% (W/V) with acetone. Test solutions of different concentrations viz. 10, 20, 40, 60, 80, 100 ppm were prepared in unchlorinated, filtered tap water. Tween-80 was used as an emulsifier at the concentration of 0.002% to the final

test solutions. Equal volume of acetone and emulsifier in tap water were also prepared as control solution.

The mosquito *Culex tritaeniorhynchus* was colonised and the larvae of early fourth instar were used for the test. The larval susceptibility tests were carried out with twenty five larvae, released in 500 ml beakers containing 250 ml of the test solutions (WHO, 1975). Four replicates were run at a time and the experiments were conducted at $25 \pm 20^\circ\text{C}$. Mortality counts were made at 24 hours of treatment. Results were plotted on the logarithmic-probability paper and LC_{50} was calculated (WHO, 1975).

Results and discussion

Table 1 shows the mortality caused by the plant extracts of different concentrations. Among the 5 plant extracts tested, *Caulerpa scalpelliformis*, *Dictyota* sp. and *Bruguiera cylindrica* were effective with the LC_{50} of 46, 74 and 56 ppm respectively. Extracts of *Acanthus ilicifolius* and *Salicornia brachiata* caused only 37% and 46% of mortality at 100 ppm of treatment.

Many authors have studied the larvicidal action of terrestrial plant extracts only against different mosquito larvae (Kalyanasundaram and Babu, 1982; Saxena and Yadav, 1982; 1983; Saxena and Sumithra, 1985; Kumar and Dutta, 1987) and they have shown a need for very high concentrations of the plant extracts for achieving significant mortality of mosquito

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TABLE 1. Effect of petroleum-ether extracts of marine plants on *Culex tritaeniorhynchus*

| Plant extract | Percentage mortality | | | | | | Control | Lc ⁵⁰ (ppm) |
|---------------------------------|----------------------|----|----|-------------|----|-----|---------|---------------------------|
| | 10 | 20 | 40 | 60 (ppm) | 80 | 100 | | |
| Seaweeds | | | | | | | | |
| <i>Caulerpa scalpelliformis</i> | 9 | 15 | 41 | 67 | 85 | 96 | 0 | 46 |
| <i>Dictyota</i> sp. | 0 | 0 | 8 | 36 | 59 | 77 | 0 | 74 |
| Mangroves | | | | | | | | |
| <i>Acanthus ilicifolius</i> .. | 0 | 0 | 6 | 17 | 28 | 37 | 0 | — |
| <i>Bruguiera cylindrica</i> .. | 4 | 14 | 38 | 51 | 72 | 92 | 0 | 56 |
| <i>Salicornia brachiata</i> .. | 0 | 13 | 20 | 29 | 41 | 46 | 0 | — |

larvae. To our knowledge no report is available regarding the insecticidal property of the marine plants against the mosquito *Culex tritaeniorhynchus* and the present work reveals the efficacy of *Caulerpa scalpelliformis* as

larvicidal agent with the minimum effective concentration of 46 ppm suggesting its possible use in the control of *Culex tritaeniorhynchus*, an important vector of the fast spreading encephalitis disease.

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