

## Larvicidal Activity of Fractionated Clerodendrum *Inerme* Leaves Extract



### Chemistry

**KEYWORDS :** Clerodendrum *inerme*, Culex, Aedes, Anopheles

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### ABSTRACT

**Objective:** the larvicidal activity is studied and compared for different fractions of extracts of *C. inerme* plant leaves in solvents like petroleum ether chloroform and methanol. The targeted larvae's were 3rd and 4th instars larvae of *Aedes*, *Culex* and *Anopheles*.

**Methods:** In present investigation, extracts of *C. inerme* were prepared by refluxing plant leaves using petroleum ether, chloroform and methanol sequentially and were tested for larvicidal activity.

**Results and conclusion:** It has been observed that petroleum ether extract is more effective than chloroform and methanol for mosquito larvae's of *Culex* and *Aedes*. In conclusion the petroleum ether extract can be used as herbal insecticide to inhibit mosquito breeding sources.

### Introduction:

Today mosquito borne diseases are one of the major diseases in the world. Hence safe and ecofriendly agent from biological origin are a better option against them. *Clerodendrum inerme* is one of the biological agents which can be used. *C. inerme* occurs predominantly in the mangrove forests of coastal India. Exposed to the wide range of fluctuations in salinity, they have an advantage over other species that lack strategies to deal with salt in the soil thus are excellent competitor in saline environment<sup>(1,2)</sup>. All the plants of the Glory Bower are used against rheumatism, fever, hypertension, cough, skin rashes, muscular pain, dysentery and its Roots are used for venereal diseases.<sup>(3,4,5,6)</sup> Also the plant products are less hazardous and bio-degradable than the synthetic insecticides or pesticides<sup>(7,8,9,10)</sup>. They offer a rich storehouse of chemicals of diverse biological activities.<sup>(11)</sup> An attempt is made to emphasize and create awareness of the great potential of the plant in India for its application as herbal pesticides to kill mosquito larvae.

### Material and Methods:

*C. inerme* leaves were collected from coastal regions of Mahim, Mumbai. The leaves were washed to remove the mud and dust particles and sun dried till they easily can be crushed. The extraction was carried out by reflux method. The leaves were fractionated firstly by Petroleum ether till colorless solution at 40 -50 °C and then with Chloroform and methanol respectively. The solvent was removed and the residue was tested for larvicidal activity in series of concentration. The larvae were collected from Vikroli, Mumbai, creek area.

### Bioassay:

Bioassay was conducted in glass beakers with 100 ml of test solution with four replicates according to the guidelines of WHO (2005)<sup>(12)</sup>. 10 Third instar larvae of *Culex*, *Aedes* and *Anopheles* were collected from the field and introduced in each test solution and in an appropriate control solution. The results were observed at 24h, 48h and 72h.

### Result and Discussion:

The differentially fractionated extract of *C. inerme* leaves (Petroleum ether, Chloroform and Methanol) were subjected to 24h, 48h and 72h bioassay using third instar of mosquito larvae (*Culex*, *Aedes* and *Anopheles*) at six different concentration (50, 100, 150, 300, 600 and 1200 ppm) of test solutions. Among these various extracts Petroleum ether extract showed highest larvicidal activity with LC<sub>50</sub> 91.38 ppm against *Culex*, for 24 hr and

LC<sub>50</sub> 72.58 ppm for 48hr. *Aedes* showed LC<sub>50</sub> 434.96 ppm for 72 hrs and with LC<sub>50</sub> 829.06 ppm against *Anopheles* larvae for 72 hrs. The Chloroform extract was active against *Culex*

mosquito larvae with LC<sub>50</sub> 81.43 ppm for 24hr and LC<sub>50</sub> 55.51 ppm for 48hr where as methanol extract was non active against all types of larvae. Also it was observed that larval development period extended. Larvae of treated group took 3-4 days to develop from third instar to fourth instar where as it took 2-3 days in the control group. This phenomenon of prolongation of larval development period suggests that the extract interfered in the development of mosquito larvae and further led to the death of larvae. Several researches have been done on other medicinal plants which showed that the plant extract increases the developmental stage of mosquitoes leading to prolongation of larval and pupal development period.<sup>(13,14,15)</sup>

### Conclusion:

The present experimental result showed that the fractionated Petroleum ether extract possess effective larvicidal properties against *Culex* larvae. Also its high dosage is effective against *Aedes* and *Anopheles* species of mosquito larvae. Whereas Chloroform extract is effective only against *Culex* species of mosquito larvae and Methanol is found to be non-effective to all species of mosquito larvae. Hence *C. inerme* can be used as a botanical insecticide for treating the mosquito larvae as it is a commonly available plant and easily affordable.

**Table 1: Lethal concentration of organic solvent extracts of *C. inerme* against third instar larvae of mosquito species.**

Species	Extract	Duration	Concentration	LC <sub>50</sub>
Culex	Petroleum Ether	24	300ppm	91.38 ppm
		48	150-300ppm	72.56 ppm
Culex	Chloroform	24	300ppm	81.43 ppm
		48	150-300ppm	55.50 ppm
Ades	Petroleum Ether	72	1200ppm	434.96 ppm
Anopheles	Petroleum Ether	72	>1200ppm	829.05 ppm

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