International Journal of Advanced Science and Research
ISSN: 2455-4227, Impact Factor: RJIF 5.12
www.newresearchjournal.com/science
Volume 1; Issue 4; April 2016; Page No. 18-20

A study on larvicidal assay on *Duranta Repens* Linn. and *Vitex Negundo* Linn. against *Culex Quinquefasciatus* say

Hemavathy J, Anitha T

M.Sc. Botany Nirmala College For Women,Red Fields, Coimbatore.

Abstract
Mosquitoes are one of the most medically significant vectors and they transmit parasites and pathogens, which continue to have devastating impact on human beings. Culex quinquefasciatus is an important vector of Brancraftian filariasis in tropical and subtropical regions. The current study on Larvicidal assay of *Duranta repens* linn. And *Vitex negundo* linn. Against *culex quinquefasciatus* say. Focuses on preparing mosquito repellents against *Culex quinquefasciatus* say. By soaking the dried leaf powders in equal proportion of the two species in different solvents, their efficacy in using against mosquito have been analysed. Among the three solvents used, distilled water and methanol showed higher mortality percentage.

Keywords: Duranta Repens, Vitex Negundo, Culex Quinquefasciatus

Introduction
Mosquitoes are one of the most medically significant vectors that transmit parasites and pathogens, which continue to have devastating impact on human beings. Mosquitoes are found in all types of environments associated with lentic aquatic habitats for breeding such as sewage water, stagnant water, septic tanks, natural and artificial containers such as pools, gutters, coconut shells, tree holes, bamboo stumps, leaf axils, water tanks and so on. They not only cause nuisance by their bites but also transmit deadly diseases like malaria, filariasis, yellow fever, dengue and Japanese encephalitis, contribute significantly to poverty and social debility in tropical countries. *Culex quinquefasciatus* acts as a vector for filariasis in India. Occur in all climatic zones ranging from forest to semi desert zones.
The major tool in mosquito control operation is the application of synthetic insecticides such as organochlorine and organophosphate compounds. Use of many of the former synthetic insecticides in mosquito control programme has been limited due to lack of novel insecticides, high cost of synthetic insecticides, concern for environmental sustainability, harmful effect on human health and other non-target populations. Human beings have used plant parts, products and secondary metabolites of plant origin in pest control since early historical times. A large number of plant derived substances possess physiological and behavioral activities against insect pests and may provide new sources of natural pesticides. Natural products have shown that it is possible to produce a great range of biological activities, including toxicity, repellent action and anti-feedant.
The principle objective of the present study was to find out the best suitable solvent and to screen the larvicidal activity of *Duranta repens* and *Vitex negundo.*

Materials and Methods
Collection of plant material
The plant species *Duranta repens* and *Vitex negundo* are shrub. The fresh leaves were collected from Coimbatore district of Tamilnadu, during December 2015.

Duranta repens

Vitex negundo

Preparation of Plant Extracts

The leaves (2 kg each) were air dried in shade for 15–30 days. The dried leaves were then powdered with the help of pulverizer. The extracts were prepared by using three different solvents viz, ethanol, methanol and distilled water. Equal proportion (1:1) of powdered dried leaves were taken and dissolved in the solvents. Then they were placed in laboratory conditions for 48 hours. Using Whatmann filter paper the crude extract was filtered twice. The filtered extracts were placed in refrigerator at 4° C for 24 hours. A known volume of 100ml extract was prepared using the same solvent. From that different concentrations of the extract were prepared using distilled water.

Collection of Mosquito Larvae

The mosquito larvae were collected from stagnant water, Coimbatore. The larvae were collected in a container and transferred to the laboratory immediately. The identification of mosquito larvae (*Culex quinquefasciatus*) was done by Rev. Dr. Sr. Mary Fabiola, Entomologist, Department of Zoology, Nirmala College for women Coimbatore. Third instar larvae alone were collected for the larvicidal bioassay. Feed is supplied to the mosquito larvae for its growth.

Larvicidal assay

For larvicidal activity, third instar larvae of the respective mosquito species were used for the present investigation. Larvicidal activity of each extract derived from the leaves of *Duranta repens* and *Vitex negundo* against *Culex quinquefasciatus* was carried out. Initially, the mosquito larvae were exposed to a broad range of test concentrations to determine the activity range of each extract. To the concentration of 10ml, 15ml, 20ml and 25ml, 20 larva for each concentration was added. The test was carried at a temperature of 25 ± 2°C and relative humidity of 75 ± 5%. The numbers of dead larvae were counted after 24 hours of exposure and percentage mortality was calculated using Abbott's formula.

$$\text{Percentage mortality} = \frac{\text{Number of dead larvae / pupae}}{\text{Total number of larvae}} \times 100$$

Results and Discussion

Among the three solvent extracts, distilled water and methanol showed high percentage of mortality than ethanolic extract. Out of 20 larvae, at 10% concentration of the extract of distilled water, methanol and ethanol; the larvae found to be dead was 17, 16 and 13.At 15% concentration of distilled water and methanol the 20 larvae introduced were found dead. And at 15% concentration of ethanol extract 15 larva were found dead. In the 20% concentration of distilled water and methanol extract the total number of larvae found dead was 20; while in ethanolic extract of 20% it was 18. In 25% concentration of distilled water, methanol and ethanolic extract the total number of dead larva was found as 20.

At 10% concentration of distilled water, methanol and ethanol the mortality was 85, 80 and 65%. In 15% of distilled water, methanol and ethanol the mortality was 100, 100 and 75%. The usage of 20 and 25% of distilled water and methanol extracts resulted 100% mortality, while the usage of 20% ethanol resulted in 90% mortality and 25% resulted in 100% mortality. All the extracts exhibited 100% mortality at 25% concentration. Methanol and distilled water extract showed the maximum activity even at low concentration. Hence the study proves that the extracts of *Duranta repens* and *Vitex negundo* are suitable ingredient for mosquito repellents.

Nikkon *et al.*, studied the larvicidal effects of stem and fruits of *Duranta repens* against the mosquito *Culex quinquefasciatus*. The highest larval mortality was found in ethanol extract of fruits (LC50 = 8.51 ppm 12 h) of *Duranta repens*. When comparing my study with this, the ethanolic extract of *Duranta repens* and *Vitex negundo* (1:1) has showed 100% mortality. Nayak and Rajani, studied the larvicidal activity of *Vitex negundo* leaf extract against *Culex quinquefasciatus* mosquito larvae. The methanolic extract of *Vitex negundo* was found effective and 100% result was observed in this treatment. As above work mentioned, this study also showed 100% mortality at 15, 20 and 25% concentration of methanolic extract of *Duranta repens* and *Vitex negundo* (1:1).

Adebote *et al.*, studied the larvicidal efficacy of solvent-extracted stem bark of *Bobgunnia madagascariensis* (Desv.) Kirkbr and Wiersema (Caesalpiniaceae) against *Culex quinquefasciatus* Mosquito. 30mgL-1, the water extract produced 28(37.33%) mortality. When comparing this report to the present study 15, 20 and 25% concentration of distilled water extract of *Duranta repens* and *Vitex negundo* (1:1) showed 100% mortality.

Summary

Culex quinquefasciatus acts as a vector for filariasis which is the famous public health hazard caused socioeconomic problems in many of the tropical countries including India. The extract obtained from *Duranta repens* and *Vitex negundo* was used for larvicidal assay.20 third instar larva of *Culex quinquefasciatus* were added to the serial concentrations.Using Abbott's formula, total number of dead larva were calculated. Usage of three solvents viz, distilled water, methanol and ethanol showed the 100% mortality.

Where 15, 20 and 25% of distilled water and methanol showed 100% mortality rate of *Culex quinquefasciatus*. The study also suggests distilled water extract can be used for further analysis since it is a universal solvent and easily affordable.The biological activity of the plant extract might be due to a variety of compounds in the plants including phenolics, terpenoids and alkaloids. These compounds may jointly or independently contribute to cause repellent activity against *Culex quinquefasciatus.*

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