Larvicidal activity of leaf extract of *Ficus elastica*, Roxb.; (Rubber Fig) on *Culex sps*.

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ABSTRACT

Today's research mainly focused on medicinal plants because of the presence of bioactive compounds and their medicinal properties. These Phytochemicals has great antibacterial activity leading to the larvicidal activities. The study focuses on larvicidal activity of plant extract against *Culex* sps. The plant extract used in this experiment is *Ficus elastica*, Roxb.; The phytochemical screening of methanol leaf extract is analysed by standard methods and shown various phytochemical constituents such as saponins, phenols, alkaloids, protein, tannins, flavonoids, carbohydrates and terpenoids etc. Larvicidal bioassay done and number of mortality of larvae was observed, including in the control (0%) during the two days. The plant is easily available and has high content of Phytochemicals. Due to the presence of high amount of active principles *Ficus elastica*, Roxb.; show highest range of mortality after two days.

Key words: Phytochemical, larvicidal bioassay, *Ficus elastica.*

INTRODUCTION

Plants that possess therapeutic properties or exert beneficial pharmacological effect on human body are generally designated as medicinal plants. Medicinal plants naturally synthesize and accumulate some secondary metabolites like alkaloids, sterols, terpenoids, and flavonoids (Motaleb *et al.*, 2011) Current research trends use variety of plant extracts as alternative larvicides because they contain various phytochemicals. Phytochemicals are the chemicals that present naturally in plants. Now a day these phytochemical become more popular due to their countless medicinal use. Phytochemical play a vital role against number of diseases such asthma, arthritis, cancer etc. Unlike pharmaceutical chemicals these phytochemicals do not have any side effects. Since the phytochemicals cure diseases without causing any harm to human beings. These can also be considered as "man friendly medicines" (Sahira banu and Cathrine, 2015).

Mosquitoes are small flies that constitute the family Culicidae. Mosquitoes act as a vector for most of the life threatening diseases like malaria, yellow fever, dengue fever, chikungunya fever; filariasis etc., WHO has declared the mosquitoes as "public enemy number one". Mosquito borne diseases are prevalent in more than 100 countries across the world, infecting over 700,000,000 people every year globally and 40,000,000 of the Indian population (Anupam Ghosh *et al*., 2012). Like all flies mosquitoes go through four stages in their life cycle, egg, larva, and adult. Most species, adult females lay their eggs in stagnant water. Each species select the situation of the water into which it lay eggs and does so according to its own ecological adaptations.

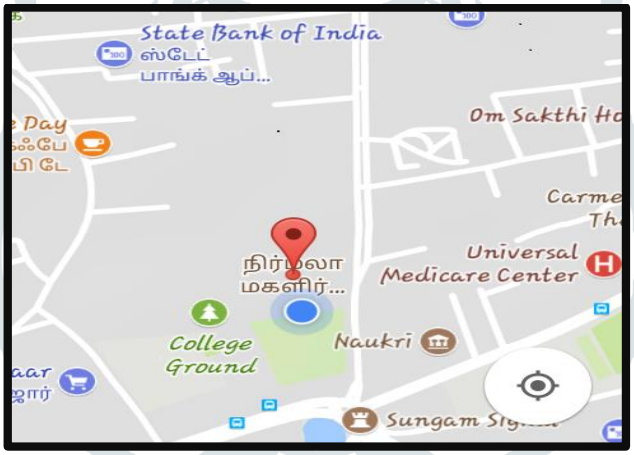
Mosquitoes control strategies have depended primarily on the use chemical insecticides however, the unfriendly effect of most of the past advocated synthetic chemical insecticides leads the insect pest managers of the world. Also long term stability of many of these chemical insecticides and their tendency to bioaccumulation in non targeted organism have fostered many environmental and human health concerns such as threats faced due to the development of resistance to chemical insecticide by the mosquitoes, resulting rebounding vectorial capacity (Arivoli *et al.*, 2015).The present study is focus on to find out larvicidal activity of *Ficus elastica*, Roxb., leaf extracts

MATERIALS AND METHODS

STUDY AREA: (Plate-1)

Tamilnadu is one of the 28 states in India. Its capital is Chennai (Formerly known as Madras) the largest city. Tamilnadu lies in the southern most part of the Indian peninsula and is bordered by the union territory of Puducherry and the states of Kerala, Karnataka and Andhra Pradesh. Coimbatore is the city in Tamil Nadu, South India. It is the capital city Kongunadu region and is often been referred to as the Manchester of south India. Sungam is a place in Coimbatore from where the plant *Ficus elastica*.Roxb.ex Horne collected.

Location Map



Selected samples

***Culex sps.*, mosquitoe larvae (Plate-2)**

Class :Insecta

Order :Diptera

Family :Culicidae

Genus :***C. sps.* L.;**

Culex sps.L.; is commonly reffered to as the house mosquito. It is a vector for diseases including Japanese encephalitis, Wile nilevirus, St. Louis Encephalitis etc., and also great human nuisance due to biting. Stagnant water mosquitoes tend to lay egg in clumps, called rafts, of 50 to 300 on the surface of standing water at the edges of lakes and ponds and among the vegetation in swamps and marshes. *Culex sps.* develop mainly in habitats containing highly polluted water rich in organic matter that the larvae can use the nourishment. The

duration of larval stages varies in male and female mosquitoes. The larval stages lasted between 6 and 8 days and pupal stages about 40 hrs. (Sajal Bhatacharya, *et al*., 2016).

Plate-2: Mosquito larvae

Ficus elastica, Roxb.; (Plate-3)

Systematic position

Division	:	Angiosperms
Class	:	Dicotyledons
Order	:	Rosales
Family	:	Moraceae
Kingdom	:	Plantae
Genus	:	*Ficus*
Species	:	***F.elastica*, Roxb**.;

Often seen as an interior container plant, Rubber Tree has large, 5 to 12-inch-long, thick, glossy evergreen leaves, multiple trunks, and a spreading, irregular canopy. Able to reach 100 feet in height in its native habitat in the jungle but most often seen at about 25 to 40 feet in the landscape, Rubber tree is useful as a screen, shade, and a specimen tree. Its coarse texture makes a strong statement in the landscape. Rubber tree will grow quickly in sun or partial shade on almost any well-drained soil. The soil should be allowed to become fairly dry between watering, especially in containers. Rubber tree makes a nice house plant if it is not over-watered. Shade; trained as a standard; indoors; screen; specimen; container or planter; espalier; shining color variable in different cultivars.

Plate-3: ***Ficus elastica***

PREPARATION OF PLANT EXTRACTS:

The leaves were dried for 7-14 days in the shade at the environmental temperatures (27-37℃ day time). These dried parts were powdered using pulverizer. 15 grams of each pulverized part were placed in separate flasks; 100 ml of distilled water was added and mixed vigouresouly. The mixture was kept in shaker system for 48 hours with occasional shaking.

PRELIMINARY PHYTOCHEMICAL ANALYSIS, (Raaman, 2006)

The phytochemical screening of methanol extract of analysed by standard methods and shown various phytochemical constituents such as saponins, phenols, alkaloids, protein, tannins, flavonoids, carbohydrates and terpenoids.

LARVICIDAL BIOASSAY:

Mosquitoes were collected from plant pots with stagnant water which contain kivi fruit parts. It is found that, with fruit parts of kivi fruit and stagnant water contain numerous numbers of larvae within two days. Then enough number of larvae was collected using collecting bottles. 10 larvae of one to fourth in stars were placed in petridish containing 100 ml treatment solution. Each concentration (1ml, 2ml, 3ml, and 4ml) of plant extract is adding to the petridishes containing 100 ml treatment solution with ten larvae in each petridish. Then petridish containing the larvae were kept in the growth room maintained at room temperature. The effects of extracts were monitored by counting the number of dead larvae each day up to three days. Number of mortality of larvae was observed, including in the control (0%) during the three days.

RESULTS AND DISCUSSION

Vector control is facing a series threat due to the emergence of resistance in vector mosquitoes to conventional synthetic insecticides or development of newer insecticides. However due to the continuous increase in resistance of mosquitoes to familiar synthetic insecticides, better alternative means are sought. A considerable number of plant derivatives have been screened effective against mosquitoes (Hima, *et al.*, 2014).

The research was carried out to investigate the larvicidal activity of methanolic extract of *Ficus elastica*, Roxb., larvicidal activity of plants and successive isolation of their botanical compounds depend upon the type of solvent used in the extraction procedure. For better extraction methanol is used in the investigation. After two days *Ficus elastica*, Roxb.; shows high percentage of mortality against mosquito larvae. In 1 ml it shows 46.66% mortality after two days and three days. It shows 56.66%, 96.66%, 100% mortality rate in 2ml, 3ml, and 4ml concentration respectively (Table-3).

Qualitative phytochemical analysis of methanol extracts of *Ficus elastica*, Roxb.; shows the presence of carbohydrates, proteins, amino acids, steroids, glycosides, flavonoids, alkaloids, tannins, saponins and terpenoids. Carbohydrates, steroids, tannins are present higher amount in the extract. Proteins, flavonoids, alkaloids, saponins, terpenoids are moderately present. Amino acids and glycosides are present in lesser amount. The large amount of phytochemicals present in *Ficus elastica*, Roxb.; cause the high rate of larvicidal activity (Table-2).

Table 1: Qualitative analysis of phytochemicals present in the methanolic leaf extracts.

Phytochemicals	*Ficus elastica*
Carbohydrates	+++
Proteins	++
Aminoacids	+
Steroids	+++
Glycosides	+
Flavonoids	++
Alkaloids	++
Tannins	+++
Saponins	++
Terpenoids	++

(+++ indicates strongly present, ++ indicates moderately present, + indicates less presence, - indicates absent)

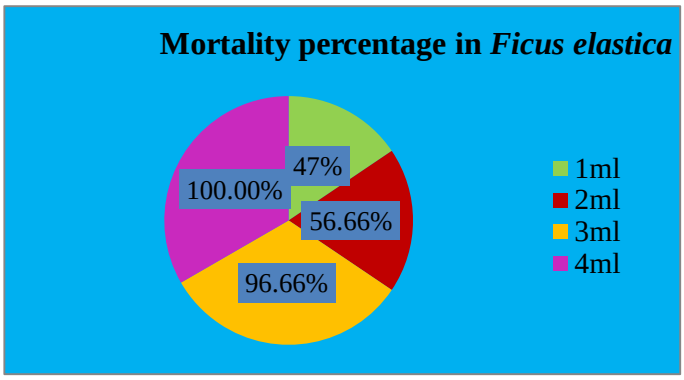
Table 2: Larvicidal activity of plant extract after 2 days

Sample	Concentration			
	1ml	2ml	3ml	4ml
Ficus elastica	4.66±1.15	5.66±0.57	8.33±1.15	8.33±0.57

(Mean ± standard deviation)

Table -3: Percentage of mortality

Sample	Concentration	Percentage of mortality after 2 days
Ficus elastica	1ml	46.66%
	2ml	56.66%
	3ml	96.67%
	4ml	**100%**



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