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Effect of Ethanolic and Chloroform Extracts of *Lantana Camara* Flowers on the Second Instar Stage of *Anopheles* Mosquito Larvae

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Abstract - **In addition to environmental degradation and financial issues due to their high cost, the use of synthetic pesticides, particularly insecticides, has led to ecological issues such pest tolerance to chemicals, a return of pests, and harm to human and animal health. Natural goods are a safer and more environmentally friendly option that has minimal or no mammalian toxicity. Wide-ranging testing is being done on numerous plant items for their potential as repellents. Plant products have insecticidal properties because they include secondary metabolites. Given its potential for commercial use, the plant merits further examination. Given their effectiveness against them and ease of biodegradability, several botanicals are increasingly emerging as a feasible component in parasite management techniques. In the current investigation, the plant Lantana camara's larvicidal activity has been selected and investigated and given its potential for commercial use, the plant merits further examination.**
Keywords: **Anopheles Mosquito, Insecticides, Instar Stages, Lantana Camara**

I. INTRODUCTION

One of the most dangerous issues to people's health is the prevalence of diseases spread by mosquitoes. Several mosquito species from the genera Anopheles, Culex, and Aedes are carriers of the viruses that cause a number of diseases, including yellow fever, chickungunya, dengue, dengue hemorrhagic fever, filariasis, japanese encephalitis, and malaria. Many strategies have been devised to reduce the threat of mosquitoes. One such method of disease prevention involves eradicating mosquito larvae. Synthetic pesticides are the foundation of the present strategy to control mosquitoes.

Despite their effectiveness, they have led to a number of issues, including pesticide resistance [1], pollution, and hazardous side effects for humans [2]. This has made it necessary to do research and develop an indigenous, environmentally friendly, and biodegradable strategy for controlling vectors. Before the development of synthetic organic insecticides, many herbal compounds were utilized as natural insecticides. [3] the effects of plant compounds against mosquitoes. It was discovered that oils and plant extracts with leaves, flowers, and roots have mosquito larvicidal activity [4], [5].Using *Lantana camara* Linn (Verbanaceae), a sizable scrambling evergreen shrub also known as wild sage and *Lantana* weed, mosquito larvicidal activity was examined in this work. The plant is known as "Arisimalar" and "Unnichedi" in Tamil. According to [6], the plant contains antibacterial, antifungal, antioxidant, and insecticidal properties [7]. According to research [8]., coconut oil infused with *Lantana camara* Linn flower extract offers defense against Aedes mosquitoes. In the current study, early third and fourth instar larvae of *Aedes aegypti* and *Culex quinquefasciatus* were exposed to Lantana camara extracts to determine their larvicidal effects.

Wide sage and lantana weed are other names for Lantana camera Linn (Verbanaceae). It is a large, sprawling, evergreen shrub that can reach a height of 3 metres and has a potent aroma. It is a perennial shrub that can grow up to 2000 metres above sea level in tropical, subtropical, and temperate regions of the world. Throughout the world, all parts of this plant have been traditionally used to treat a variety of illnesses. This plant's roots were used to treat malaria, rheumatism, and skin rashes, while the leaves were used as an antibiotic and antihypertensive [9]. Lantana camara extract from the leaves had larvicidal properties, while extract from the plant's flowers had adult mosquito repellant properties [10].

The larvicidal efficacy of certain plants against [11]. First instar larvae of *Culex fatigans* were examined, and the effectiveness of the therapy was assessed by its capacity to result in 100% mortality of larvae before pupation and failure of pupae to emerge as adults. assessed the biological effects of sesamianonagrioides corn borer larvae on methanolic extracts of seeds and fruits. The larvicidal activity of a granular formulation of a Melia volkensii acetone extract against Aedes aegypti was reported[12]. According to Rajkumar and Jebansan's finding [12], the mosquito Culex quinquefasciatus is attracted to varied concentrations of a plant extract called Solanum aerianthum.

Neem trees are known to have a variety of compounds that have biological actions against insects, according to [13]. Neem oil and extracts have been shown to have insect-inhibiting properties [13]. Plants produce a variety of secondary metabolites to act as defensive mechanisms and are a rich source of bioactive organic compounds. Insect-repelling chemicals. These substances can behave as attractants, insecticides, antifeedants, oviposition inhibitors, repellents, growth inhibitors, juvenile hormone mimics, moulting inhibitors, and antimoulting hormones. They have an advantage over synthetic pesticides since they are less toxic, more easily biodegradable, and less likely to cause resistance. The overall number of secondary metabolites may surpass 4,000, even though only 10,000 have been chemically characterized. Screenings and the discovery of powerful chemicals could be utilized to successfully manage to control mosquitoes in future.

Lantana camara is widely used in folk medicine around the world and is recognized as both a notorious weed and a desirable decorative garden plant. Small ruminants are poisonous to some taxa of the highly varied Lantana camara, and the toxicity has been linked to the kind and proportion of particular triterpenes enters metabolites. But Lantana camara also yields a number of metabolites, some of which have been demonstrated to have important biological actions. In order to assess the possibilities for utilizing the huge amount of Lantana biomass that is now available, all of these factors are taken into account in this research [14]. One of the top ten most dangerous weeds in the world is lantana camara.

It has an alleleopathic effect on nearby flora and is poisonous to animals. It has been established that the Lantana plant has pathological and biochemical impacts on cattle, sheep, and guinea pigs [15]. Although gram-negative bacteria were similarly inhibited by the methanol extract of Lantana camara, the chloroform and methanol extracts of Lantana camara were found to be more selective towards gram-positive bacteria. It was discovered that the water extract was inert [15].To destroy mosquito larvae, aquatic plants like stone warts release larvicidal poisons. Both fresh and brackish water include the two major genera of stone warts, *Chara* and *Nitella*. These plants are simple to nurture and transplant and the control is long-lasting and inexpensive.

However, they are unable to grow in heavily polluted areas, and photoperiod, nutrition, and temperature all have an impact on their development. In its aqueous habitat, the carnivorous bladderwort *Utricularia vulgaris* can consume mosquito larvae, and the seeds of plants in the mustard family generate mucilage that traps the insects. A variety of plant extracts are being tested as larvicidal to reduce the number of mosquito larvae.

There hasn't been any research done on the stem of the roadside weed Lantana camara specifically because so many botanical plants, trees, roots, etc. were used as mosquito repellents. Therefore, the current study was conducted to examine the significance of the ethanol extract of *Lantana camara* stem and to further explore the potential of the extract as a biological weapon against mosquito larvae.

From the foregoing accounts there is a need for the study on the herbicidal activity of *Lantana camera* flowers extracts on the larval stages of Mosquito. Hence the present investigation has been undertaken into the formulation of mosquito repellents.

II. MATERIALS AND METHODS

A. Collection of Mosquito Larvae

Aquatic organisms include mosquito larvae. They can survive as larvae in a variety of environments, such as swamps, marshes, free holes, septic ditches, rack pools, etc. These breeding locations all have the feature of having stagnant pools without much wind, wave, or water flow. Large aluminum pans were used to collect the tap water, and a few dried leaves were added to it. This set-up was left unattended in a quiet, open area where mosquitoes may breed. Larvae (Fig. 1) congregate on the water's surface to breathe in the oxygen. Using a long-handled tea strainer, the larvae were removed from the water's surface with the least amount of disturbance to the larval population and without dispersing it. The larvae needed for the experiment were periodically removed from the culture tray in the Guru Nanak College Department of Zoology lab.

Anopheles larvae of the II instars were recognized in the lab.

Fig. 1 Collection of Anopheles larvae

B. Larval Feeding

In order to clean off the dirt and larval excretions, collected mosquito larvae were rinsed with water before being transported into the lab. In the lab, larvae were kept in little tanks that were netted off and kept at room temperature (270C). Before beginning the experiment, the larvae were divided according on instar. In the current investigation, II instar Anopheles larvae (Fig. 2) were employed.

Fig. 2 Photomicrograph showing the II Instar larvae of *Anopheles* mosquito

C. Anopheles

The maxillary palpi, which are as long as the proboscis, the crescent-shaped scutellum, and the distinctive resting position all serve to identify Anopheles mosquitoes. Anopheles lays its eggs singly on the surface of freshwater in places like home wells, overhead tanks, etc. The most prevalent species' adults are mediocre flyers. The life cycle can last anywhere from 8 days and several weeks, depending on the temperature. The genus Anopheles of mosquitoes is responsible for transmitting malaria. Although there are fifty-eight species of *Anophelines* known to exist in India, only a small number of these species are thought to be responsible for disease transmission. The main malaria vectors in India are *An. culicifacies*, *An. stephensi, An. fluviatilis, An.minimus, An. annularris, An. philippinensis, An. sundaicus, and An. balabacensis. An. Varuna, An. aconitus, An. jeyporiensis* var. candidiensis, *An. maculates*, and *An. tessellates* are malaria vectors of little relevance [16].

D. Collection of the Plant Material

The *Lantana camara* plant's flower (Fig. 3) was harvested at the Nanmangalam Reserve Forest, located 25 kilometres from Chennai, Tamil Nadu, and India at latitude 950 and longitude 3590. Lantana camara flowers weighing 400 grammes were harvested and shade dried (Fig. 4). The dried flowers' weight was measured after drying. The Lantana camara flowers were then ground using a mortar and pestle (Fig. 5). Further ethanol and chloroform extractions were performed on the fine powder.

Fig. 3 *Lantana camara* flowers on the plant

Fig. 4 Shade drying of *Lantana camara* flowers

E. Extraction Procedure

According to [17]., fresh plant flowers were collected, shade-dried for a month, and the dried powders (Fig. 4, 5) were extracted with 85% ethanol and Chloroform separately by cold percolation method. This yielded an extract with an approximate 20% yield (2.5 gms of extract from 15 gms of dried plant material).

1. Phytochemical Screening: Standard protocols were used in chemical assays to identify the contents in the ethanol and chloroform extract of the powdered samples. These procedures were reported by [18].

2. Test for Tannins: In a test tube, samples of ethanol and chloroform extract (equivalent to 1 g of plant material) were heated before being filtered. A few drops of 0.1% ferric chloride were added, and the coloration was checked for blue-black or brownish green hues.

3. Test for Saponin: 20 ml of each solvent were added to 2 g of the powdered sample before it was heated, filtered, and cooled. For a stable, long-lasting froth, 10 ml of the filtrate was combined with 5 ml of each of the ethanol and chloroform and vigorously shaken. Three drops of olive oil were added to the froth, which was violently shaken before being checked for the development of an emulsion.

4. Teat for Flavonoids: In a test tube, samples of ethanol and chloroform extract (equivalent to 1 g of plant material) were heated before being filtered. A few drops of 0.1% ferric chloride were added, and the coloration was checked for blue-black or brownish green hues.

5. Test for Saponin: 20 ml of each solvent were added to 2 g of the powdered sample before it was heated, filtered, and cooled. For a stable, long-lasting froth, 10 ml of the filtrate was combined with 5 ml of each of the ethanol and chloroform and vigorously shaken. Three drops of olive oil were added to the froth, which was violently shaken before being checked for the development of an emulsion.

6. Teat for Flavonoids: Each separate extract of ethanol and chloroform (5 ml, or 1 g of plant material) was cooked for 3 minutes in a steam bath with 10 ml of ethyl acetate. After filtering the mixture, 1 ml of diluted ammonia solution was added to 4 ml of the filtrate. An apparent yellow coloration indicated a positive test for flavonoids.

Fig. 5 Grinding and sieving of *Lantana camara* flower powder

7. Test for Steriods: Each sample's 0.5 g of ethanol and chloroform extract was mixed with 2 ml of acetic anhydride and H2S04 before being added to the mixture. In other samples, it was noted that the colour changed from violet to blue or green, indicating the presence of steroids.

8. Test for Terpenoids (Salkowski test): Concentrated H2S04 (3 ml) was carefully added to form a layer after 5 ml of each extract had been thoroughly combined with 2 ml of chloroform. To demonstrate that terpenoids were present, a reddish brown coloration of the interface was created.

9. Test for Cardiac Glycosides (Keller-Killani test): Using 2 ml of glacial acetic acid and 1 drop of ferric chloride solution, 5 ml of each extract was treated. This had 1 cc of pure sulfuric acid underneath it. An interface brown ring denotes the cardenolide deoxysugar property. Below the brown ring, a violet ring may emerge, and in the thin acetic acid layer, a greenish ring may grow gradually.

F. Bioassay

Following the extraction process, the Lantana camara flower extract was ingested in a bowl. Separately, five bowls were consumed. 100 ml of water in each bowl, together with the appropriate amounts of the extract - 50 mg, 100 mg, 200 mg, 400 mg, and 800 mg. Ten (10) Anopheles mosquito larvae were put to each bowl, and the bowls were then covered with nets and kept at room temperature (27°C) in the lab. The death rate was simultaneously recorded together with the mortality of the larvae at intervals of 24 hours, 48 hours, 72 hours, and 96 hours. A Control was kept under comparable circumstances with distilled water and the extract but without treatment.

G. Statistical Treatment

The following statistical techniques were used to ensure valid and reliable analysis and interpretation of data.

$$\text{Percentage of Mortality} = \frac{\text{Number of dead larva}}{\text{Total number of larva}} \text{ X } 100$$

III. RESULTS OF THE STUDY

In the current investigation, an ethanol and chloroform flower extract from Lantana camara was employed. 90 mg was obtained from 500 mg of shade-dried flower, which was then extracted with 85% ethanol, yielding 20%. (2.5 gms). Anopheles mosquito larvae in their second instar were exposed to various doses of ethanol and a chloroform extract of the Lantana camara flower at various times, ranging from 50 mg to 800 mg per 100 ml (Fig. 6).

Fig. 6 Anti-larvicidal activity of Different concentrations of Ethanolic and Chloroform extract

According to Figs. 6 and 7, the mortality rate increased with increasing concentrations (50, 100, 200, 400, and 800 mg/100 ml) and exposure times (24, 48, 72, and 96 hrs) (Table I and Fig. 7), proving that "The mortality rate is directly proportional to the concentration of the extract used." However, it was interesting to note that in a preliminary study, the maximum mortality rate for Anopheles mosquito larvae in an ethanol extract of the Lantana camara flower was 800 mg/100 ml in 24 hours, while the maximum mortality rate for Anopheles larvae in a chloroform extract was 800 mg/100 ml in 96 hours. Thus, it was discovered that Anopheles larvae in the II-Instar stage were more vulnerable to the ethanol extract of the Lantana camara flower.

The lowest mortality was obtained in both chloroform and ethanol extract at 50 mg/100 ml at 24 hours, which is 0% (Table II and Fig. 8), while the maximum mortality was obtained in ethanol extract at 800 mg/100 ml at all times. Table III lists the phytochemicals found in several Lantana camara extracts (ethanol and chloroform). Both leaf extract samples included cardiac glycosides and terpenoids, however saponin was only found in the ethanol leaf extract.

TABLE I EFFECT OF *LANTANA CAMARA* ETHANOLIC EXTRACT (FLOWER) AGAINST II INSTARS *ANOPHELES* LARVAE

Sl. No.	*Anopheles* larvae in Distilled Water (Control)	Concentration of *Lantana Camara* Flower Extract (mg/100ml)	Time Interval and Mortality Rate in %			
			24 hrs	48 hrs	72 hrs	96 hrs
1	10	Control	0%	0%	0%	0%
2	10	50 mg	0%	0%	10%	10%
3	10	100 mg	30%	30%	40%	40%
4	10	200 mg	70%	70%	70%	70%
5	10	400 mg	90%	90%	90%	90%
6	10	800mg	100%	100%	100%	100%

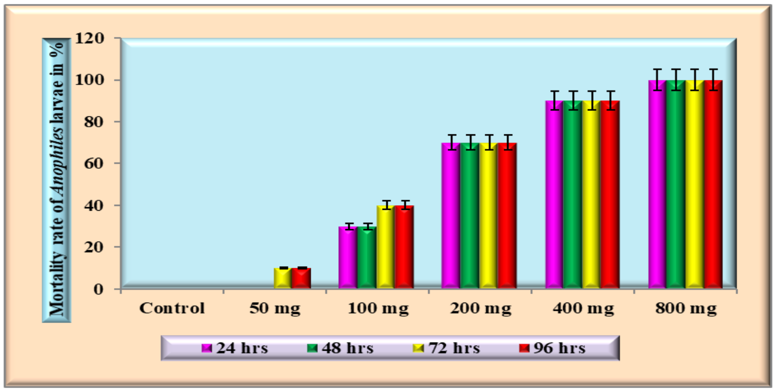

Fig. 7 Effect of *Lantana camara* flower ethanolic extract against II instar of *Anopheles* larvae

TABLE II EFFECT OF *LANTANA CAMARA* CHLOROFORM EXTRACT (FLOWER) AGAINST II INSTAR ANOPHELES LARVAE

Sl. No.	*Anopheles* Larvae in Distilled Water (Control)	Concentration of *Lantana camara* Flower Extract (mg/100ml)	Time Interval and Mortality Rate in %			
			24 hrs	48 hrs	72 hrs	96 hrs
1	10	Control	0%	0%	0%	0%
2	10	50 mg	0%	10%	20%	20%
3	10	100 mg	0%	10%	20%	20%
4	10	200 mg	0%	20%	30%	30%
5	10	400 mg	10%	20%	30%	40%
6	10	800mg	20%	50%	50%	70%

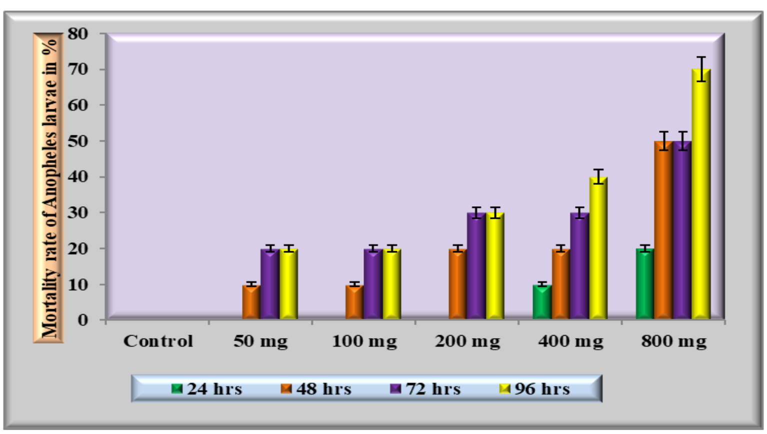

Fig. 8 Effect of *Lantana camara* flower Chloroform extract against II instar of Anopheles larvae

The least mortality was obtained in both chloroform and ethanol extract of 50 mg / 100 ml at 24 hrs time period which is 0% and highest was obtained in 800 mg /100ml concentration of ethanol extract in all periods. The phytochemicals present in various extract (ethanol and chloroform) of Lantana camara were represented in Table III. Cardiac glycosides and terpenoids were present in both extract samples of leaves, whereas saponin was present in ethanol leaf extract.

TABLE III QUALITATIVE PHYTOCHEMICAL ANALYSIS OF ETHANOL AND CHLOROFORM EXTRACTS OF *LANTANA CAMARA* FLOWERS

Phytochemical Test	Chloroform Extract	Ethanol Extract
Tannin	-	-
Saponin	-	+
Flavinoids	_	_
Steroids	_	_
Terpenoids	+	+
Cardiac Glycosides	+	+

IV. DISCUSSION OF THE STUDY

Since there are now millions of deaths each year from diseases spread by mosquitoes, there has been a significant increase in the mosquito problem, which has caused many nations to lose socioeconomic prosperity. Currently, environmental imbalance and insecticide resistance among vectors discourage the use of chemical mosquito control. As a result, new control strategies are required; many plant sources have medicinal and insecticidal qualities. Aside from lowering the cost, pesticides with a botanical origin do not harm the environment. The current review paper discusses the plant parts and solvents employed. Biopesticides made from plants have the potential to be effective in future programmes to control mosquitoes.

Numerous terrible diseases, including malaria, are conveyed by mosquitoes. Japanese encephalopathy, filariasis, and dengue In India, there are known to be 400 mosquito species spread throughout 19 genera and 40 sub genera. Only three of these genera - Anopheles, Culex, and Aedes - are connected to the numerous diseases spread by mosquitoes. The tropics and warm temperate zones are where *Culex quinquefasciatus* can be found in large numbers and is a major source of filariasis. In the country, there are now 26.42 million infected people and 20-40 million chronic cases [11]. A variety of pesticides have been used to control mosquito populations. The majority of them pose a hazard to the ecological balance due to their toxicity to non-target organisms, which has led to the development of insect resistance [11]. An environmentally beneficial technique of controlling insects is to use botanical derivatives in place of synthetic insecticides, notably for mosquito larvae [19]. Around the world, many plant species have been used to reduce mosquito populations [20],[21], [22], [23], [24]. The current study intends to assess the effects of five plant oils on the significant *Bancroftian filariasis* vector, *Culex quinquefasciatus*.

Lantana camara flower repellant power against Aedes mosquitoes was assessed. *Aedes alhopictus* and *Aedes aegypti* were 94.5% protected against lantana flower extracts in coconut oil. The average length of protection was 1.9 hours. One application of lantana flowers can offer greater than 50% protection against potential Aedes mosquito bites for up to 1.9 hours. Through three months following the application, there were no negative side effects on the human subjects [25].

The larvicidal effect of the volatile oils of Lantana camera leaves and flowers was studied in a lab setting at doses (0.0125%, 0.025%, 0.05%, 0.1% and 0.2%) against the development of Musca domestic larvae, revealing a mortality rate ranging from 80% to 100%. However, 10–20% of the developing pupae eventually became adults [26].

At a concentration of 0.5%, lantanilic acid, camaric acid, and oleanolic acid all demonstrated 98%, 95%, and 75% mortality against root knot nematode, respectively. At this dose, the common nematicide furadan demonstrated 100% mortality. [27],the mortality of *C. quinquefasciatus* and A. gambiae larvae exposed to plant extracts increased with exposure time and extract concentration. Larvae of *C. quinquefasciatus* and other mosquito species exposed to plant extracts from *Nerium indicum* and *Euphorbia royleana* were also reported to die [28], [29] and [30].

Studies have shown that, among other things, the plant portion from which they are extracted, the solvent of extraction, the provenance of the plant, and the photosensitivity of certain of the chemicals in the extract all affect the activity of phytochemical compounds on target species [3].These aspects, including how various mosquito species react at different stages of development to sublethal doses of specific L. alopecuroides extracts, especially the impact on growth and reproduction, need to be assessed.

Lantana camara extract. The phytochemical makeup of leaves and their ability to repel adult termite workers were investigated. The termite workers were found to be significantly killed by the 5% chloroform extract [31]. It is clear from the available research that various organisms respond differently to *Lantana camara* extracts. The lantana bug (Orthezia insignis Dougl.), By feeding on stems, leaves, blooms, and seeds, Lantana seed flies (Ophiomyia (Agromyza) lantanae Frog) and *Lantana lace* bugs (*Telconemiascrupulosa* Stal) limit the spread of the plant. It has been attempted to introduce foreign insects into India to manage lantana, but this has not been pursued because further research on the impact of the introduction on other plants is needed [32].

According to [32], extracts of *Azardiractaindica* and Ocimum sanctum were efficient against Culex fatigans larvae. The ability of *Culex quinquefasciatus* to lay eggs was significantly influenced by the *Solanum aerianthum*plant extract used in Rajkumar and Jabanesan's laboratory experiments in 2002. For stored grain insects, piper extracts have been used for both antifeedant and oviposition deterrent action [33], [34], [35].

In the current study, the ethanolic extract of Lantana camara flower was used to examine the death rate of Anopheles larvae in the II Instar stage at various dosages. In all doses, the ethanolic extract of the Lantana camara flower had a lethal effect on Anopheles mosquito larvae in the second instar stage, and the mortality rate increased continuously every 24 hours for four days. But it was interesting to notice that although Anopheles mosquito larvae exposed to chloroform extract had a maximum mortality rate of 70% in 96 hours, ethanolic extract of Lantana camara flowers had a maximum mortality rate of 100% in 24 hours. Thus, it was discovered that Anopheles larvae in the II-Instar stage were more vulnerable to the ethanol extract of the *Lantana camara* flower [33]. Which found that *Lantana camara* leaf extract had the highest potential for allopathy, followed by stem and root extract, have been interpreted as the result of phytotoxic substances that may be synthesized in the leaf and then transported to other organs. Additionally, it has been observed that Lantana camara ethanolic extract-based ointments can be employed in tropical therapies for acute lesions of dematophilosis. These treatments promote the healing of the illness in the affected animal without recurrence [26]. The present hypothesis is supported by another research by [23], which convincingly documented the mortality of *Anopheles gambiae* larvae exposed to *Lantana camara*.

Impressive mortality rates were seen in Anopheles mosquito larvae treated to an ethanolic extract of Lantana camara. Therefore, it can be concluded that an ethanolic extract of the Lantana camara flower, when used at high concentrations (800 mg/100 ml with a 24-hour exposure interval), exhibits larvicidal action, specifically against mosquitoes in their second instar. There are a number of enticing benefits to using a certain plant to control vectors. The plant products offer a rich reservoir of compounds with a variety of biological activities, are less dangerous, and are generally easier to biodegrade than synthetic insecticides. They are also more target-specific. The identification and characterization of novel plant chemicals for mosquito control programmes presents a wealth of research prospects.

Utilizing a variety of plant products with the inherent benefit of being natural and at the very least ‘a priori’ compatible with ecosystems and their biota can effectively manage vector populations. Undoubtedly, more research will result in superior formulations with increased activity that could someday replace traditional and disagreeable insecticides for mosquito control and become environmentally acceptable. We can infer that nature is home to a variety of medicinal plants that can be employed to combat vector-borne diseases. The depth of knowledge on this topic is currently required to use natural agents rather than chemicals to combat environmental contamination or insecticidal resistance. Governments at the federal, state, local, and international levels have spent billions of dollars to combat mosquitoes. For the city of Chennai, the Chennai Corporation alone spends almost 2 crores of rupees annually on mosquito control. Even if they offer comfort right away, chemical agents only have a short-term effect. Only environmentally safe mosquito control techniques can guarantee complete control. The biggest barriers to efficient environmental regulation are a lack of public knowledge, bad economic conditions, and insufficient financial resources. In this regard, we can manage mosquitoes and vector-borne diseases by setting up public awareness campaigns and improving their morale. The current investigation was done to investigate the larvicidal abilities of various plants, such as *Lantana camara*, against the larvae of the Anopheles mosquito during the II Instar stage.

In addition to environmental degradation and financial issues due to their high cost, the use of synthetic pesticides, particularly insecticides, has led to ecological issues such pest tolerance to chemicals, a return of pests, and harm to human and animal health. Natural goods are a safer and more environmentally friendly option that has minimal or no mammalian toxicity. Wide-ranging testing is being done on numerous plant items for their potential as repellents. Plant products have insecticidal properties because they include secondary metabolites. Given its potential for commercial use, the plant merits further examination. Given their effectiveness against them and ease of biodegradability, several botanicals are increasingly emerging as a feasible component in parasite management techniques. In the current investigation, the plant *Lantana camara's* larvicidal activity has been selected and investigated. Given its potential for commercial use, the plant merits further examination.

The ethanolic and chloroform extracts of the *Lantana camara* flower were applied to the larvae of the II Instar stage of the Anopheles mosquito. All concentrations (50, 100, 200, 400, and 800 mg/100 ml) of the ethanolic extract of the lantana camara flower had a deadly effect on Anopheles II Instar mosquito larvae, and the mortality rate increased steadily every 24 hours for four days. However, it was interesting to note that in the ethanolic extract of the Lantana camara flower, the mortality rate was highest (100%) in 800 mg/100 ml concentration in 24 hours, which led us to choose the concentrations above, whereas in the chloroform extract, the mortality rate was highest (70%) in 800 mg/100 ml concentration in 96 hours in Anopheles, mosquito larvae. The largest allelopathic potential was observed in the *Lantana camara* leaf extract, which was followed by the stem and root extract. This has been explained as the result of phytotoxic chemicals, which may be produced in the leaf and then transported to other organs. Additionally, it has been observed that ointments produced with ethanolic extracts of Lantana camara can be employed as tropical therapies on chronic crusty or acute dermatophilosis lesions, causing the condition to recover in the mine-infected animal treated without recurrence.

V. CONCLUSION

Continued use of chemical insecticides leads to environmental contamination and the progressive development of resistant mosquito larvae. The non-target natural mosquito predators that coexist with the mosquito larvae are poisonous to chemical insecticides. As an alternative, bio environmental strategies have been used to persistently control the development of mosquitoes using biological control agents such as larvar fishes. Due to the presence of hazardous substances in the water bodies, these fish had a difficult time surviving. Better alternative methods of control are required since mosquitoes have become dramatically more resistant to common pesticides in the absence of the necessary and effective molecules. The impact of botanicals is one such alternative. Many plant derivatives have been demonstrated to be effective against a variety of insect species. However, only few have been noted to have larvicidal effects on mosquitoes. The current study comes to a conclusion regarding the efficient insecticidal activity against Anopheles mosquito larvae in the II instars. Overall, it can be said that nature has a wide variety of medicinal plants that can be utilized to treat vector-borne illnesses.

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