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Larvicidal and biological activity of weed plants in Coimbatore against filarial vector, *Culex quinquefasciatus* (Say) (Insecta: Diptera: Culicidae)

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Abstract

The methanol leaf concentrates of *Parthenium hysterophorus* and *Duranta erecta* are exceptionally harmful even at low portions demonstrated to be helpful for larvicidal, pupicidal action against *Culex quinquefasciatus*. The extraction of *Parthenium hysterophoru* and *Duranta erecta* are portion reliant and the mortality of the hatchlings increments as the dosages of the example were expanded. Among every one of the instars, the fourth instar hatchlings were less powerless to the plant removes than first instar hatchlings. The mortality brought about by some brain and solid aggravation by the presence of assortment of dynamic mixtures, for example, cytotoxic diterperiods, lactones and flavonoids in the plants. It was seen that the expansion in centralization of concentrates expanded the possible movement of biocides against *Culex quinquefasciatus.* The decline in egg hatchability was viewed as portion subordinate. There was expansion in the larval-pupal length in our review.

Keywords: *Culex quinquefasciatus*, *Parthenium hysterophoru* and *Duranta erecta*.

Introduction

Mosquito send infections like dengue, filariasis represented worldwide mortality and grimness with expanded protection from normal insect poisons. Mosquitoes can communicate a greater number of infections than some other gathering of arthropods and influence a huge number of individuals all through the world. WHO has pronounced mosquitoes as "Public foe number

one". Mosquitoes borne sickness are predominant in excess of 100 nations across the world, disease north of 700,000,000 individuals consistently universally and 40, 000, 0000 of Indian population. Mosquitoes are the significant vector for transmission of perilous illness like jungle fever, Yellow fever, dengue fever, chikungunya fever, filiariasis, encephalitis, West Nile infection disease, and so on, in practically all tropical and subtropical nations and numerous different regions of the planet (Govindrajan *et al*., 2011; Ramar *et al*., 2013).

Culex quinquefasciatus is a medium, light earthy colored mosquito; the stomach sternites of females are pale scaled with a couple of dim scaled fixes medially. *Culex quinquefasciatus*, is a vector of lymphatic filiariasis which is broadly circulated tropical sickness and there are almost 1,100 million individuals living in regions endemic for lymphatic filiariasis and presented to their gamble of contamination; there are 102 million instances of filiariasis, either having patent micro filare animeia or constant filarial illness (Michael et al., 1996),*Wuchereria bancrofti* represents roughly 90% of all filiariasis cases on the planet, trailed by *Brugia malayi* and *Brugia timori.*

India contributes around 40% of the all out worldwide weight of filiariasis and counts for around half individuals in danger of disease. Ongoing appraisals have shown that in India, 22 states were viewed as endemic for filariasis and nine states (Andhra Pradesh, Bihar, Gujarat, Kerala, Maharashtra, Orissa, Tamil Nadu, Uttar Pradesh and West Bengal) added to around 95% of the absolute weight of filiariasis. Perhaps of the best elective methodology under the organic control program is to investigate the flower biodiversity and enter the field of involving more secure insect sprays of herbal beginning as a straightforward and economical technique for mosquito control. Further, dissimilar to traditional insect poisons which depend on a solitary dynamic fixing; plant determined insect sprays include herbal mixes of synthetic mixtures which act happily on both conduct and physiological cycles (Rawani *et al*., 2014).

In this way there is almost no opportunity of nuisances creating protection from such substances. Distinguishing bio-insect sprays are proficient, as a well as being reasonable and versatile to environmental condition is basic for preceded with successful vector control the board. Botanicals have broad insecticidal properties and will clearly function as another weapon in the armory of manufactured bug sprays and in future many goes about as appropriate elective item to battle against mosquito borne sicknesses. The broad utilization of manufactured natural insect sprays during the most recent couple of many years has brought about ecological dangers and furthermore in the formative of physiological opposition in most vector species.

This has required the requirement for innovative work of ecological protected, biodegradable, minimal expense native strategies for vector control which can be involved with least consideration by individual and networks in unambiguous circumstances (Singh et al., 2006). Because of the issue of contamination and vector opposition, safe plant items are being tried all over the planet as vermin control specialists (Ramaswamy and Mohan, 2014; Bagavan *et al*., 2010).

Plant based items has been resuscitated due to the improvement of obstruction, cross-opposition and conceivable harmfulness dangers related with engineered insect sprays, bioaccumulation and contamination. Photochemical got from gigantic variety of plant species are the significant hotspots for protected and biodegradable synthetics, which can be evaluated for mosquito repellent and insecticidal exercises (ICMR, 2003). Botanicals are fundamentally optional metabolites that act for the purpose of guard component of the plants to with stand the constant choice tension from herbivore hunter and other ecological elements.

A few gatherings of photochemical like alkaloids, steroids, terpenoids, rejuvenating balms and phenolics from various plants have been accounted for beforehand for their insecticidal exercises (Shaalam *et al*., 2005). Insecticidal

impacts of plant extraction differ not just as indicated by plant species, mosquito species, geological assortments and parts utilized, yet additionally because of extraction system adjusted and the extremity of the solvents utilized during extraction.

Phytochemicals play a significant part in mosquito control programs. The bioactive plant fixings can be gotten from the entire plant or from a particular part by extraction with various kinds of polar and non-polar solvents, for example, oil ether, benzene, chloroform, methanol, outright liquor and CH3)2CO and so on. A wide choice of plant from spices, bushes and huge trees was utilized for extraction of mosquito poisons. Photochemical were separated either from the entire group of little spices of from different parts like natural products, leaves, stems, barks and roots and so on, of huge plants or trees. In all situations where the most harmful substances were concentrated upon, found and extricated for mosquito control.

Mosquitocidal exercises of different home grown items from eatable yields, fancy plants, trees, bushes, spices, grasses and marine plants as per the extraction methodology created in various dissolvable frameworks and the idea of mosquitocidal exercises against various life phases of various vector species go about as a prepared reference for additional examinations. In nature, medicinal balms assume a significant part in the security of the plants as hostile to bacterials, antivirals, antifungals, bug sprays and furthermore against herbivores by lessening their hunger for such plants. Medicinal oils being perplexing combinations of unpredictable natural mixtures are for the most part delivered as optional metabolites in plants.

They are comprised by hydrocarbons (terpenes and sesquiterpenes) and oxygenated compounds (alcohols, esters, ethers, aldehydes, ketones, lactones and phenols). Other than harmful and repellent properties, natural balms have been displayed to pronouncedly affect the formative time frame, development, grown-up rise, fruitfulness, ripeness and egg bring forth of bugs (Shallam *et al*., 2005; Elango *et al*., 2010).Phytochemicals are botanicals which are normally happening insect sprays got from flower assets. Utilizations of phytochemicals in mosquito control were being used since 1920s (Shahi *et al*., 2010), however the disclosure of engineered bug sprays, for example, DDT in 1939 derailed use of phytochemicals in mosquito control program.

Subsequent to dealing with a few issues due of rash and over utilization of engineered insect sprays in nature, re-center around phytochemicals that are effectively biodegradable and affect non-target creatures was valued. Since, the quest for new bioactive mixtures from the plant realm and a work to decide its design and business creation has been started. At present photochemical make up to 1 percent of world's pesticide market (Isman, 1997).

Accordingly in the current review I have screened two Weed plants *Parthenium hysterophorus*, and *Duranta erecta* leaves separate on the larvicidal, pupicidal assay of *Culex quinquefasciatus*. The conceivable consequence of the current review would be valuable in advancing examination focusing on the advancement of new specialist for mosquito control in view of bioactive mixtures from native endemic restorative plant source.

Materials and Methods

2.1 Collection and preparation of plant extracts

Healthy leaves of *Parthenium hysterophorus*, and *Duranta erecta* were Collected from Sulur , Coimbatore District, Tamilnadu, India. The Plants were identified with the help of experts in the Department of Botany, Govt. Arts College, Udhagamandalam and standard books. The collected Plant materials were washed in tap water, cut into Small pieces and air dried. After the plants were completely dry, they have been ground into powder and then macerated in methanol solvents at room Temperature for 3 days and filtered. The combined Filtrate were concentrated to dryness by rotary Evaporation at 50^{o}C and kept in a freezer. In preparing Test

concentrations, each plant extract were volumetrically diluted in methanol.

2.2 Mosquito culture

Mosquito larvae/eggs of *Culex quinquefasciatus* have been collected in an around Sulur,Coimbatore. The mosquito Colonies were maintained at 27 + 2 0C, 75-85% Relative humidity index a 14:10 light/dark photo period Cycle (Murugan and Jeyabalan, 1999).

2.3 Larvicidal and Pupicidal assays

Larvae tested for the present study was obtained from our laboratory culture. Freshly hatched/moulted larvae were used for the bioassay tests. The required Quantity of different plant extract concentrations were mixed thoroughly with 200 ml of rearing water in 500ml plastic troughs. One hundred early fourth instars mosquito larvae were released into each trough. Larvae food consisted of 1g of finely ground dog biscuits per day per trough. Dried coconut midribs were place over water as the substratum for pupation. The plastic trough containing 200 ml of rearing water with methanol solvent served as the control. Dead larvae and pupae was removed and counted at 24 h intervals. Observations on larval and pupal mortality were recorded. The experiment was replicated five times. Percentage mortality observed in the control was subtracted from that observed in the treatments (Abbot, 1925). LC_{50} and LC_{90} values and their 95% confidence limits were estimated for larval mortality by fitting a probit regression model to the observed relationship between percentage mortality of larvae and logarithmic concentration of the substance. A separate probit model was fitted for each extract (Finnely, 1971). The larvae and pupal duration of treated and control individuals were compared and developmental rates were determined.

2.4 Statistical analysis

Statistical analysis The average larval mortality data were subjected to probit analysis for calculating LC_{50}, LC_{90} and other statistics at 95% fiducially limits of upper confidence limit and lower confidence limit, and chi-square values were calculated by using the software using Statistical Package of Social Sciences (SPSS) 13.0 for windows, significance level was set at $P<0.05$

Results

The plants were more powerful at high fixations; the harmful impact anyway expanded with expansion in the centralization of the concentrate. A moderate impact of plant separation was seen at lower fixation, yet it displayed higher action as the focus expanded. Information on the larvicidal movement of the crude methanolic leaf concentrate of *Duranta erecta* and *Parthenium hysterophorus* against *Culex quinquefasciatus* mosquitoes (Table 1) Concerning deadly fixations for mortality L_{C50} and LC_{90} unrefined concentrates of *Duranta erecta* seemed, by all accounts, to be best against larvae of *Cx. quinquefasciatus* (LC_{50}=47.91 mg/L) and (LC_{90} =85.63*(5) mg/L) at different concentrations of 15,30,45,75,60. The anti-agent movement of the unrefined concentrate of *Parthenium hysterophorus* showed critical anti-agents against *Cx. quinquefasciatus.* Table 2 showed that (LC_{50}=42.09 mg/L) and (LC_{90} =14.895*(5)mg/L) at different concentration of 15,30,45,75,60. After the treatment of the mosquito *Culex quinquefasciatus*, the treated mosquito's hatchlings were evaluated for their larval length. The two plants of methanol concentrate, *Duranta erecta* and *Parthenium hysterophorus*, were screened (Tables 3 and Table 4). Among the two plants, *Duranta erecta* was more effective than *Parthenium hysterophorus*.

Table1. LC_{50} and LC_{90} values of methanol leaf extracts of *Duranta erecta* against larvae of *C.quinquefasciatus*

Concentration %	24hrs mortality	95% confidence limit				χ 2 (df)
		LC_{50} (mg/L)	95% confidence limits (mg/L)		LC_{90} (mg/L)	
			Lower	Upper		
15	19.2±1.8	42.09	34.69	49.20	78.93	14.895*(5)
30	32.4 ±1.4					
45	44.3±2.2					
60	61.0±1.4					
75	76.4±1.8					
60	97.5±1.8					
Control	0.8 ±1.4					

*Significant at P<0.05 level

Table1. LC_{50} and LC_{90} values of methanol leaf extracts of *Duranta erecta* against larvae of *C.quinquefasciatus*

Concentration (mg/L)	24hrs mortality	95% confidence limit				χ 2 (df)
		LC_{50} (mg/L)	95% confidence limits (mg/L)		LC_{90} (mg/L)	
			Lower	Upper		
15	19.2±1.8	47.91	40.16	55.91	85.63	15.661*(5)
30	32.4 ±1.4					
45	44.3±2.2					
60	61.0±1.4					
75	76.4±1.8					
60	97.5±1.8					
Control	0.8 ±1.4					

*Significant at P<0.05 level

Table 3. Larval duration of *Culex quinquefasciatus* after the treatment of methanol extracts of *Duranta erecta*

S.NO	CONCENTRATION (%)	Total larval duration (days)			
		1ST INSTAR	2nd INSTAR	3rd INSTAR	4th INSTAR
1.	CONTROL	0.0^{d}	0.0^{d}	0.0^{d}	0.0^{d}
2.	1	6.6^{c}	7.1^{c}	7.8^{c}	8.2^{c}
3.	2	7.6^{b}	7.9^{b}	8.1^{b}	8.9^{b}
4.	4	8.1^{a}	8.2^{a}	9.0^{a}	9.9^{a}

Within a column means followed by the same letters are not significant different at 5% level by DMRT

Table 4. Larval duration of *Culex quinquefasciatus* after the treatment of methanol extracts of *Parthenium hysterophorus*.

S.NO	CONCENTRATION (%)	Total larval duration (days)			
		1ST INSTAR	2nd INSTAR	3rd INSTAR	4th INSTAR
1.	CONTROL	0.0[d]	0.0[d]	0.0[d]	0.0[d]
2.	1	6.6[c]	6.9[c]	7.2[c]	7.5[c]
3.	2	7.0[b]	7.3[b]	7.6[b]	7.9[b]
4.	4	7.7[a]	8.0[a]	8.7[a]	9.3[a]

Within a column means followed by the same letters are not significant different at 5% level by DMRT

Portion: reaction still up in the air for plants applied to *Culex quinquefasciatus* Expansion in the convergence of the concentrates and expansion in the formative span, which obviously uncovers the portion-reaction relationship. The term of larval instars and the all-out formative time were drawn out. The conceivable explanation could be a symphonious mimic; on the other hand, we don't know about the specific system to uncover this impact. Consequently, in our current review, the use of plant separates enormously impacted the formative length at each focus, which shows promising viability and postpones the development of *Culex quinquefasciatus*, which is a fantastic outcome for additional investigation of these plants.

Discussion

Plants could be an alternative source for mosquitocidal because they constitute a potential source of bioactive chemicals and are generally free from harmful effects. Phyto-extracts are emerging as potential mosquito control agents, with low-cost, easy-to-administer and risk-free properties. Herbal products have been used as natural insecticides before the discovery of synthetic organic insecticides and need to be evaluated for efficacy and safety (ICMR, 2003).

In recent years, many studies on plant extracts against mosquito larvae have been conducted around the world. In the present study experimental results of methanol solvent extracts of *Duranta erecta* and *Parthenium hysterophorus* were accessed and revealed to be more toxic to immature stages of *Culex quinquefasciatus.*

The early instars larvae were more susceptible than the later ones and the pupae, which was not much affected by all the solvents. This may be due to the non-feeding behaviour of pupae, whereas the bio-pesticide enters the insect system through oral feeding and affects the gut and other organs. These results are also comparable to earlier reports of Murugan *et al*., (2012) who have reported that the bio-larvicidal and pupicidal activity of *Acalypha alnifolia* against the I to IV instar larvae and pupae of *C. quinquefasciatus* mosquitoes with LC_{50} value of I instar was 5.388%, II instar was 6.233%, III instar was 6.884%, IV instar was 8.594% and pupae was 10.073%. Further, Prathibha *et al*., (2011) have reported the larvicidal efficacy of *Euodia ridleyi* against *C. quinquefasciatus*.

In the present study, a significant decrease in the percentage of larval pupation was found with all plant extracts tested. Moreover, the pupation was found to depend on the plant and the solvent used for extraction. The present study showed that plant extracts had also a toxicity effect on pupae. In addition, almost all the plant extracts induced a reduction in the percentage of emerging adults from pupae produced form treated larvae. AI Dakhil and Morsy (1999) are using the neem, *Azadirachta indica* extract against *Culex pipiens* larvae and Nathan *et al.* (2005b) using methanol extracts of leaves and seeds of *Melia azadar* acts against *Anopheles stephensi* larvae. The plant tested in the present study is known to be non-

toxic to vertebrates. Moreover, it has been clearly proved that crude or partially purified plant extracts are less expensive and highly efficient for the control of mosquitoes rather than the purified compounds or extracts (Cavalcanti *et al*., 2004; Jaenson *et al.,* 2006).

Our results showed high bioactivity of the different extracts form the plant which is widely common in India. Such results may offer an opportunity for developing alternatives to rather expensive and environmentally hazardous organic insecticides. Results of the mortality, biology, repellency and biting deterrence effects of the present plant extracts on *Culex quinquefasciatus* as discussed latter confirm their potential for control of the mosquito population. In the present study, the growth of *Culex quinquefasciatus* was remarkably affected by the plant extracts tested. It decreased as the concentration of the extract increased. Retardation in growth was induced by methanol extract tested. Such results are in agreement with earlier studies which were induced by methanol extract tested. Such results are in agreement with earlier studies using different plant extracts against different mosquito species (Jeyabalan *et al*., 2003; Shaalan *et al*., 2005; Nathan *et al*., 2006). Inhibition of growth was detected with the extracts since all larvae grew to become pupae and subsequently adults. Earlier report (Bagavan *et al*., 2008) reveals that the ethyl acetate extracts of *A. aspera* showed larvicidal activity against the early fourth instar larvae of *Aedes aegypti* and *Culex quinquefasciatus*. Either difference in susceptibility between mosquito species (Sukumar *et al*., 1991) or variations in the composition of the extracts due to extraction method may explain the observed differences.

The extracts of two plants were screened for their oviposition activity against *Culex quinquefasciatus*. The plants methanol extracts *Duranta erecta* showed 96% larvicidal effect, thereby methanolic extract proven to show maximum deterrent activity than control. Among all plant with the exception of *Parthenium hysterophorus* showed mortality of 80% larvicial effect at 60 % concentration. The result of the present studyis in agreement with the earlier findings on the ovipositional deterrent effect of different plants origin (Venkateswarlu *et al*.,1988). observed ovipositional deterrence of neem oil on *Spodoptera litura*. Ayyangar and Rao (1989) reported that the methanol and hexane of neem seed kernel extracts are not only larval repellents, but also ovipositional deterrent to the adult of *Spodoptera litura*. Raja *et al*. (2004) reported ovipositional deterrent activities of heaxane extract of *Aegle marmeles* and *Coleus aromaticus* and methanol extract of *Cyerus rotundus* and *Cyper aromaticus* at 5% concentration.

Pure essential oil and individual compounds viz., geijerene and pregeijerene isolated form *Chloroxylon swietenia* showed oviposition deterrent activity against *Spodoptera litura*. The results of oviposition activity in the present study indicate that mosquitoes were acutely sensitive to chemical stimuli, with significant amounts of oviposition deterrent occurring in response to different concentrations of extract. Mosquitoes are known to select (or) reject their specific hosts and oviposition sites by sensing chemical signals that are detected by sensory receptors on the antennae (Davis and Bowen, 1994). The findings of present study are quite comparable with previous reports of Govindarajan *et al*. (2008a) have also observed that the leaf extract of *Azadirachta indica* with different solvents, viz., benzene, chloroform, ethyl acetate and methanol, hadlarvicidal activity, ovicidal activity and oviposition attractancy against *A. stephensi*. In the present study, all concentrations of plant extracts used exhibited repellency activity against *Culex quinquefasciatus* females. The present study indicates that the methanol extraction of plants was more effective in exhibiting a repellency action against the mosquito tested compared to control.

Morphological effects, almost all extracts of plant tested against all the instar larvae of *Culex quinquefasciatus* induced some morphological abnormalities in pupae and adults (pupal–adult intermediates) and incomplete or half – emerged adults were observed. The malformed pupae and

adults were not able to develop normally and died. Similar observations were obtained with other plant extract against different mosquito species in earlier studies. Saxena *et al*. (1993) and Sch mutterrer(1995) observed that alkaloids isolated for *Annona squamosa* induced morphological abnormalities such as larval– pupal intermediate and half – emerged adults in *Anopheles stephensi*; (Shalaby *et al*.(1998), Sharma *et al*.,(2005) using peel oils of lemon, grapefruit and naval orange against *C. pipiens* observed adults with paralyzed legs which were not able to survive. Similarly, Abhaussain (1999) using *Calotro pisprocera* extracts against *C. pipiens* an A. multicolor observed morphological abnormalities in immature and adult stages of *Culex pipiens* when larvae were treated with the neem, *Azadirachta indica* extracts.

In our observation almost all extracts against the larvae of *Culex quinquefasciatus*, induced some morphological abnormalities in pupae and adults. The malformed pupae were not able to develop normally and then died. Also, the present results showed that the percent and degree of malformation were concentrations dependent. In general it could be conclude that the plant extracts used in the present study act as larvicidal and possess growth and emergence inhibiting against the mosquito vector *Culex quinquefasciatus*. Furthermore, results of the present study may contribute to a reduction in the application of synthetic insecticides, which in turn increases the opportunity for natural control of various medically important pests by botanical pesticides. Further studies on the tested plants including mode of action, synergism with the biocides under field conditions are needed.

References

1. Abbott, W.S. (1925) A method of computing the effectiveness of insecticides. J. Eco. Ento.18: 265– 267.
2. Abdel Wahaba, H., and Mansoura, A.H. (2005) A review of botanical phytochemicals with mosquitocidal potential. Environ Int., 3: 1149 –1166.
3. Al-Dakhil, M.A. and Morsy, T.A. (1999) The larvicidal activities of the peel oils of three citrus fruits against C. pipiens. J. Egypt. Soc.Parasitol., 29 (2): 347 – 352.
4. Bagavan, A., Rahuman, A.A., Kamaraj, C. andGeetha, K. (2008) Larvicidal activity of saponin from *Achyranthes aspera* against *Aedes aegypti* and *Culex quinquefasciatus* (Diptera: Culicidae). Parasitol. Res.,103(1): 223-229.
5. Carlos F Marina, *Armando Ulloa, Arnoldo Orozco- Bonilla, Miguel Munoz* and *Trevor Williams*, (2014) Diversity of mosquitoes and the aquatic insects associated with their oviposition sites along the Pacific coast of Mexico. Parasit. Vectors, 7: 14– 17.
6. Cavalcanti, E.S., Morais, S.M., Lima, M.A. and Santana, E.W. (2004) Larvicidal activity of essentials oils from Brazilian plants against *A. aegypti*. Mem. Inst. Oswaldo Cruz., 99(5): 541 –544.
7. Caron, (1996) In Insect Repellents: Principles, Methods and Uses repellents, DEET and Piperidine compound A13-37220, against *Anopheles funestus* and *Anopheles arabiensis* in western Kenya. Journal of the American Mosquito Control Association, 12: 172 – 176.
8. Davis, E.E. and Bowen, M.F. (1994) Sensory physiological basis for attraction in mosquitoes. J. American Mos. Cont. Ass., 10: 316 – 325.
9. Deepalakshmi and Jeyabalan (2017) Studies on mosquitocidal and biological activity of weed plants in Coimbatore against filarial vector, *Culex quinquefasciatus* (Say) (Insecta: Diptera: Culicidae, International Journal of Advanced Research in Biological Sciences., 4(3):137-151
10. Duncan, D.B. (1955) Multiple range and multiple ‘F’ Tests. Biometrics. 11: 1 – 42.
11. Elango, G., Rahuman, A.A., Kamaraj, C., Zahir, A.A.and Bagavan, A. (2010a) Studies on effects of indigenous plant extracts on filarial vector Culex effects of thymoquinone . Res. Commun. Mol.Pathol. Pharmacol., 110 : 239–25.

12. Finnely, D.J. (1971) Probit Analysis, 3rd ed. Cambridge: Cambridge university press. p. 333.
13. Govindarajan, M., Mathivanan, T., Elumalai, K., Krishnappa, K. and Anandan, A. (2011) Ovicidal and repellent activities of botanical extracts against *Culex quinquefasciatus*, *Aedes aegypti* and *Anopheles stephensi* (Diptera: Culicidae). Asian. Pac. J. Trop. Biomed.1(1): 43 – 48.
14. ICMR. (2003) Prospect of using herbal products in the control of mosquito vector. Indian Council of Medical Research Bulletin, 33(1):10.
15. Isman, M.B. (1997) "Pesticide based on plant essential oils". Pesticide outlook, pp. 8 – 72.
16. Jeyabalan, D., Arul, N. and Thangamathi, P. (2003) Studies on effects of Pelargonium citrosa leaf extracts on malarial vector, *A. stephensi* Liston. Bioresour. Technol., 89 (2): 185 – 189.
17. Levetin, E. and McMahon, T.K. (2003) Plants and society, 3rd edn. Mc Graw-Hill, Dubuque, Iowa.Journal of Organic Chemistry, 19: 493 – 498.
18. Murugan, K. And Jeyabalan, D. (1999) Mosquitocidal Effect of certain plant extracts on *Anopheles Stephensi*, Curr. Science, 76(5): 631 – 633.
19. Murugan, K. And Jeyabalan, D. (1999) Mosquitocidal Effect of certain plant extracts on *Anopheles Stephens*i, Curr. Science, 76(5): 631 – 63.
20. Michael, E., Bundy, D.A.P. and Grenfel, B.T. (1996) Re-assessing the global prevalence and distribution of lymphatic filariasis. Parasitology, 122 : 409 –415.
21. Prathibha, K.P., Raghavendra, B.S. and Vijayan, V.A. (2011) Evaluation of larvicidal effect of Euodiaridleyi, Hoch, leaf extract against three mosquito species at Mysore. Int. J. Biol. Sci. Eng., 02(01): 106 – 10.
22. Ramar, M., Paulraj, G.M. and Ignacimuthu, S. (2013) Toxicity effect of *Croton sparciflorus linn*. (Euphorbiaceae) leaf extracts against *Culex quinquefasciatus* Say. Afr. J. Vec. Biol.,1001 –1004.
23. Rawani, A., Ghosh, A. and Chandra, G. (2014) Mosquito larvicidal activities of *Solanum nigrum* L. leaf extract against *Culex quinquefasciatus* Say. Parasitol. Res., 107: 1235 – 1240.
24. Sharma, R.N., Gupta, A.S., Patwardhan, S.A., Hebbalker, D.S., Tare, V. and Bhonde, S.B. (1992) Bioactivity of lamiaceae plants against insects.Indian. J. Exp. Biol., 30: 244 – 246.
25. Ramaswamy, M. and Mohan, D. R. (2014) Evaluation of the larvicidal activity of the leaf extract of a weed plant, *Ageratina adenophora*, against two important species of mosquitoes, *Aedes aegypti* and *Culex quinquefasciatus*. Afr. J. Biol., 8(6), 731–738.
26. Raja, N., Jayakumar, M., Elumalai, K., Jeyasankar, A., Muthu, C. and Ignacimuthu, S. (2004) Oviposition deterrent and ovicidal activity of solvent extracts of 50 plants against armyworm Spodoptera litura, Fab. (Lepidoptera: Noctuidae). Malaysian J. Appl. Biol., 33(2): 73 – 81.
27. Sharma, R.N., Gupta, A.S., Patwardhan, S.A., Hebbal ker, D.S., Tare, V. And Bhonde, S.B. (1992 Bioactivity of lamiaceae plants against insects. Indian. J. Exp. Biol., 30: 244 – 246.
28. Shahi. M., Hanafi Bojd, A.A., Iranshahi. M., Vatandoost, H. and Hanafi Bojd, M.Y. (2010) Larvicidal efficacy of latex and extract of *Calotropis procera* (Gentianales: Asclepiadaceae) against *Culex quinquefasciatus* and *Anopheles Stephensi* (Diptera: Culicidae) J. Vector. Borne. Dis., 47:185 – 188.
29. Shaalam, E.A.S., Canyonb, D., Younesc, M.W.F., Abdel Wahaba, H., and Mansoura, A.H. (2005) A review of botanical phytochemicals with mosquitocidal potential. Environ Int., 3: 1149 – 1166.
30. Sukumar, K., Perich, M.J. and Boobar, L.R. (1991) Botanical derivatives in mosquito control: a review. J. Am. Mosq. Control. Assoc.,7(2): 210 –237.
31. Saxena, R.C., Harshan, V., Saxena, A., Sukumaran, P., Sharma, M.C. and Lakshamana, K.M. (1993) Larvicidal and

chemosterillant activity of *Annona squamosa* alkaloids against *An. stephensi*. J. Am. Mosq. Control. Assoc., 9(1): 84 – 87.
32. Schmutterer, H. (1990) Properties and potential of natural pesticides from the neem tree, Ann. Review Entomol., 35: 165 – 271.
33. Schmutterer, H. (1995) The Neem Tree *Azadirachta indica* (A. Jass) and Other Meliaceous Plants: Sources of Unique Natural Products for Integrated Pest Management, Medicine, Industry and other Purposes, VCH, Weinheim, Germany, pp. 696.
34. Shalaby, A. A., Allam, K. A. M., Mostafa, A. A. andFahmy, S.M.E. (1998) Insecticidal properties of citrus oils against *C. pipiens* and *M. domestica*. J. Egypt. Soc. Parasitol., 28(2): 595 – 606.
35. Venkateswarlu, P., Raghavaiah, G. and Nagalingam, B. (1988) Effect of neem oil on certain behavioral aspects of *Spodoptera litura* Fabriciusin urdbean. Ind. J. Pulses Res., 1: 118 – 123.
36. WHO (1996) Report of the WHO informal Consultation on the evaluation and testing of Insecticides. WHO, Geneva, pp 9, 32-36, 50-52.

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