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A SIGNIFICANT EFFECT OF TURPENTINE OIL AGAINST THE LARVAE OF *AEDES ALOPICTUS* SKUSE

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ABSTRACT

The present study assessed the role of larvicidal efficacy in different solvents of turpentine oil against the larvae of *Aedes albopictus Skuse (Figure-01),* the vector of *Chickenguniya* and Dengue. Twenty five third instar larvae of *Aedes albopictus Skuse* were exposed to 10ppm, 50ppm and100ppm solutions of turpentine oil with alcohol and ether. These were assayed in entomological laboratory. The larval mortality was observed after 8, 16 and 24 hrs alternatively. It was calculated and corrected by Abbott's formula and the number of larval mortality was observed in controls. Values were observed with different concentrations.

Figures : 03 References : 20 Tables : 03

KEY WORDS : Abbott' s Formula, Alcohol, Auto-disposable syringe, Ether, Turpentine oil.

Introduction

Mosquitoes are the large group of transmitting serious human life threatening diseases, causing millions of deaths every year, disability and burden on the society. The intensive uses of insecticides cause development of resistance resulting in rebounding vectorial capacity and other parasitic diseases. To prevent the proliferation of mosquito borne diseases and improve quality of environmental and public health, mosquito control is essential. In recent years, use of many synthetic insecticides in mosquito control programme has been limited and most of them are non-biodegradable. Plant products may be the alternative sources of mosquito control.

Globally, conventional insecticides (larvicide) are used from very long time continuously. Due to the continuous use, resistance has been developed in larvae of Culex against Phenthion. Plants are very rich source of phytoecdysteroids. Earlier researchers found out the alternative substitute of these insecticides while working on the aspect of vector borne disease control. Earlier scientists have recorded the effectiveness of phytoproducts against adult and larvae of mosquitoes and other insects.

Eminent workers[18] studied the extract of Chinaberry leaf feeding difference and growth retardant for larvae of the corn earworm and fall armyworm. On the insecticidal properties of indigenous plant products [9,] while disruption in oviposition behavior of malaria, filaria and dengue vectors by plant extracts pronounced [12, 20]. Another pioneer worker[17] revealed the repellent and feeding

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Fig. 1 : Sitting postures of *Aedes albopictus*

effects of turmeric oil, sweet flag oil neem oil, and the neem based insecticides against the lesser grain borer (Coleoptera: Tanabrionidae). Toxicity of neem oil against leaf- minor, *Liriomyza trifolli* Burgress on cucumber *plant has been studied* [3]. Earlier workers[16] postulated the Azadirachtin a limnoid antifeedant from *Melia azadirachtin* phytochemistry. Experiments have been made on the repellency of *Lantana camara* (Verbenaceae) flower against Aedes mosquitoes[10] and evaluation of commercial insect repellent on human skin against *Aedes aegypti* (Diptera:Culicidae) postulated[8]. Repellency of essential oil to mosquitoes (Diptera: Culicidae) enumerated[7], larvicidal and repellent action of *Dalbergia sissoo oil (Roxb)* (*F.Laguminasae*) studied [2]. Important task has been done[6] on the evaluation of neem products as insecticides on the grain yield of rice. Latest study has been made on the significant reduction in density of dengue and chikunguniya diseases vectors *Aedes* by phytoprduct *Azadirachtin* [5]. The regulation of natural products as crop protection agents was studied [19].

Materials and Methods

The experiments have been performed from April 2014 to March 2015. The oil of turpentine bought from the market. Thereafter the solution has been made with alcohol and ether in different concentrations as 10ppm, 50ppm and 100ppm. Auto disposable syringe of 0.1ml, 0.5ml and 1.00ml were used for maintaining purity and then kept in the refrigerator as stock to maintain its original potency.

The larvae were collected from clean stagnant water, coolers, domestic containers, Cement tanks, discarded plastic tubs and buckets water from different colonies of Jhansi city like Avas Vikas, Suryapuram, Mayur Vihar Colony, K.K. Puri colony and Rajghat colony. The larvae were brought to the Entomological laboratory of Additional Director Medical Health and Family welfare Jhansi Division, Jhansi (U.P.) INDIA. In this study 04 Jars were used for each experiment. One liter of water filled in each Jar. Solutions of turpentine were prepared with the help of auto-disposable syringes of 0.1ml, 0.5ml and 1.00ml. Twenty five larvae of mosquito were poured in control solution upto same time mentioned below (Figure- 0 2). Twenty five larvae were poured in each solution of 10ppm, 50ppm and100ppm upto 8, 16 and 24 hrs in each solution of alcohol and ether and then the observed mortality rate has been calculated and corrected by Abbott's[1] formula:

$$\frac{\text{\% Test motility—\% control mortality}}{100 \text{ — \% control mortality}} \times 100$$

Result and Discussion

Table 1 shows the mortalities of larvae in different alcoholic solutions. The experiment has been made with the larvae of *Aedes albopictus* Skuse. 25 larvae were poured in control solution showed no mortality while the solution of turpentine with methanol showed 4-8% mortality with 10ppm, 25% mortality with 50ppm and 68% mortality with 100ppm solution.

Table 2 shows the mortalities of larvae in different ether solutions. In the same way experiment were made with the solution of ether and oil of turpentine. 25 *Aedes albopictus* Skuse larvae were poured in control solution showed no mortality while the solution of turpentine with ether showed 36-40% mortality with 10ppm, 60-72% mortality with 50ppm and 88-100% mortality with 100ppm solution (Figure -02.)

The result of larval mortality were good and accurate results in 100ppm of ether solution that was same as that of the previous studied[2] while it resembles to our study. Larvicidal activity of Saponin from *Acheyranthes aspera* against *Aedes, Culex* postulated[4] are same as our study.

Screening of new larvicides from plants were showed good mortality rate presented[2-4,11,12]

TABLE- 3 : Show the treated larvae with solution of turpentine with a methanol and ether

Concentration of solution	OUR STUDY with methanol		Our study with ether	
	Lower confidence	Upper confidence	Lower confidence	Upper Confidence Limit Tp. + Ether
10 ppm	4	8	20	32
50 ppm	40	48	60	68
100 ppm	68	80	88	100

Fig. 3 : Dead larvae of *Ades albopictus*

and it resembles to our study. Another prominent worker[13] revealed the larvicidal efficacy of *Ficus bengalensis* leaf extract against *Culex quienquefasciatus, Aedes aegypti* and *Anophelese stephensi* as same to our study. Earlier emirate scientist postulated of chinberry leaf feeding difference and growth retardation for larvae of the corn earworm is same as that of our study.

Larvicidal efficacy of *C. fistula* Linn leaf extract against *Culex tritaeniorhynchus* Giles and *Anophelese subpictus* (Dipters Culicidae) recorded [14] and also flower extract against *Culex tritaeniorhynchus* Giles, *Aedes albopictus* Skuse and *Anopheles subpictus.* (Diptera: Culicidae) pronounced[15] which is same as that of our study.

Plants are very rich source of phytosteroides studied[18]. It has been shown that phytochemicals inhibit the growth development and reduction of several insects. Authors observed that the longevity of development in different larval stages increased for very long time in low concentration; while in high concentration showed quick mortality as studied[5].

The result of our study showed very good mortality in solution of 100ppm of ether and it is same as that of earlier workers[2-5]. Longevity is observed in the developing time of different larval stages and also paralyses the body of the larvae of *Aedes albopictus* Skuse mosquito genera in very low concentration as well as in high concentration it showed quick mortality. Our opinion is that the oil is very close to use for poor population.

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