World Journal of Pharmaceutical research

Volume 3, Issue 2, 1961-1967. Review Article ISSN 2277 – 7105

REPELLENT EFFICACY AGAINST MOSQUITOES USING NATURAL BIOPESTICIDE

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Article Received on
30 November 2013
Revised on 02 January 2014,
Accepted on 06 February 2014

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ABSTRACT

Biopesticide repellents have been used in current situation for generations in traditional practices as a personal protection measure against mosquitoes. Natural repellents development is in valuable resources through ethnobotanical studies. The natural insecticide is eco-friendly, cheaper, easily available and more resistant from mosquitoes. Recently, commercial repellents are plant based which is popularity among customers. The effects of prepared biopesticide were evaluated on two different parameters such as evaporation and repellency. The application of biopesticide on mosquitoes such as Azadirachta indica, Vitex negundo and Partheneum histerophorus in the proportion of 2:2:1 is 95% repellency against mosquito, Aedes aegypti. The present developed product that offer high repellency not only customer safety but also harmless to environment.

Key words: Aedes aegypti, biopesticide, ecofriendly, ethnobotanical, repellent.

INTRODUCTION

Mosquitoes are important to control in present days, because with rising number of mosquitoes borne various diseases. The yellow fever mosquitoes, Aedes aegypti is spread the dangerous diseases such as dengue fever, yellow fever viruses, chikunguya, and other diseases. These are an alarming increasing in the range of mosquitoes due to waste water, sewage water, industrializing and polluted water. Various products used for mosquito control

have varying degree of effectiveness especially chemicals which are hazardous to the environment ecosystem and human being. These chemical products are costly. Many researchers are worked on mosquito repellents by chemical or natural products (1, 2, 3, 4, 5, 6, 7).

There result of mosquito repellents based on the chemicals has remarkable safety profile, but they are toxic against the skin, nervous system, eye irritation, and worse problems, through usual including brain swelling in children, anaphylactic shock, low blood pressure (4, 5). All of the mosquito coils provide a high degree of reduction in numbers of host- seeking mosquitoes (8, 9, 10).

The botanical plant have tested in various research experiments for the use of pest or insect control as a biopesticide. Also, the green plants represents a reservoir of effective and provide valuable natural source of pesticide (Balandrin et al., 1985; Hostettmann and Wolfender, 1997). The biopesticide have been evaluated in field trials and recommended for control (Vaishampayan and Bhandari, 1981; Meshram et al., 1990, 1993; Milner et al., 1992; Klein, 1995).

Botanical pesticides exert a range of behavioral and physiological effects on the colonization, development, growth survival and multiplication of insects (Anonymous, 2008). Neem, Azadirachta indica extract (biopesticide) is an effective insecticide against the insect pests (Schmutter, 1985; Baidoo et al., 2006). The Azadirachta indica, Vitex negundo and Partheneum histerophorus are the medicinal plants and plays insecticidal role. Azadirachta indica and Partheneum histerophorus plant extracts are also efficient against the scarab beetles. These both biopesticides are higher efficiency occurred. Azadirachta indica and Partheneum histerophorus plays an important role in insecticides (Patil and Theurkar, 2012).

The present study was carried out to evaluate repellency of mosquito derived from biopesticides. An attempt has been made to develop a natural based mosquito repellent application which is more effective, cheap and non- hazardous to the environment pleasant and health friendly using different binders.

MATERIALS AND METHODS

Three plants are selected for the biopesticide preparation and collected. The plant extracts was prepared by using Azadirachta indica, Vitex negundo and Partheneum histerophorus.

The experiment of efficiency of biopesticidal on Aedes aegypti adults was carried out in the laboratory. Four different solutions of biopesticide are prepared as follows-

Solution 1: Azadirachta indica, Vitex negundo and Partheneum histerophorus fresh leaves taken as equal proportion that is 1: 1: 1 grind and mixed in ethanol.

Solution 2: Azadirachta indica, Vitex negundo and Partheneum histerophorus fresh leaves were collected, grind in mortal- pestle and mixed in ethanol. All these plant materials were taken in 2:2:1 proportion but dissolved in ethanol and fermented for overnight.

Solution 3: Azadirachta indica, Vitex negundo and Partheneum histerophorus fresh leaves were collected and grind in mortal- pestle. After grinding this biopesticide, it dissolved in ethanol with 1: 2: 2 proportions, fermented overnight and filtered solution used for test.

Solution 4: Azadirachta indica, Vitex negundo and Partheneum histerophorus fresh leaves were collected, grind and dissolved in ethanol in 2: 1: 2 proportions, fermented overnight, and filtered for the test.

Figure 1 Electrical vaporizer container of biopesticide Repellent solution

These four solutions were diluted in ethanol because the prepared solutions were tested by electrical vaporizer (Figure 1). Each biopesticide solution was taken in an electrical vaporizer and tested for 24 hours. The vapours of biopesticide different solution were effects on mosquitoes and observed the result. The experimental as well as control group was conducted at room temperature.

RESULT AND DISCUSSION

The present study aimed to formulate a natural; herbal mosquito repellent based which are natural resources against the Aedes aegypti. The repellency of four different solutions of Azadirachta indica, Vitex negundo and Partheneum histerophorus on mosquito, Aedes

aegypti was showed about 55%, 95%, 30% and 20% respectively (Figure 2). All four solutions were showed repellent effect on mosquitoes especially solution 2 showed maximum repellent activity of about 95%. The proportion of Azadirachta indica, Vitex negundo and Partheneum histerophorus were showed efficient effect on mosquitoes after one hour. The 2:2:1 proportion get very aggressive repellent activity and it measured in an only after few minutes. In the present study, solution 2 showed 95% effective on mosquitoes while solution 1 had 55%, solution 3 had 30% and solution 4 had 20% repellent activity against the mosquitoes, Aedes aegypti. Also, that application of Azadirachta indica, Vitex negundo and Partheneum histerophorus leaves biopesticide had repellent activity on houseflies.

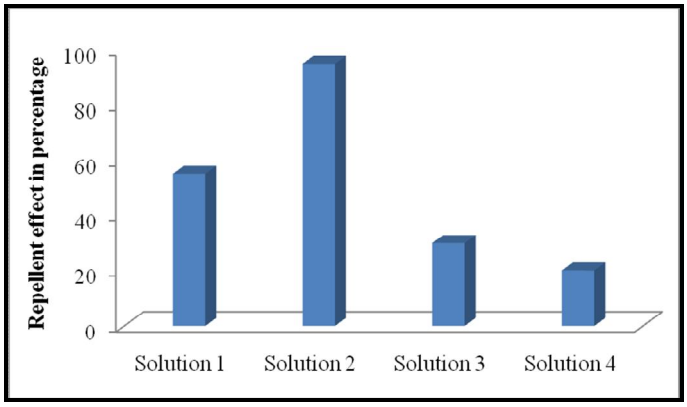

Figure 2 Repellent effects of biopesticide solutions on mosquitoes.

All there three plants showed insecticide or biopesticide activity. These plants are medicinal plants used as various field an insecticide property. The Azadirachta indica dried leaves are used in stored grains to repelled insects in rice. These plants are easily available use for biopesticide anytime. It was very common practices to control mosquitoes which are dangerous to the human being. The pongamia seeds powder, pongamia leaves and low dung with cow urine were effective repellent of mosquito (Aboli and Kulkarni, 2010).

Mosquitoes have developed resistance to Malaria from chemical pesticides and this is alarming situation from infection of mosquitoes. This is the basic need to use the natural pesticide or biopesticide to control the insect or pests. Various plants were used for agricultural and domestic pest control in China and other countries reported by Secoy and Smith (1983) and Yang and Tang (1988). The local and tribal people are used as various plant resources like Kanapa for pest control and its effectiveness (Kulkarni and Kumbhojkar, 1996, 2003).

The substances of mosquito repellent are unattractive to mosquitoes. Secondary ingredients are available in cream, lotions, and oils but are often sold as aerosol product; also smoke, oil tars, and mud have been used to repel mosquitoes.

The present study is used to formulate new and more efficient forms of mosquito repellents. It is necessary to carry out chemical composition of prepared biopesticide due to fermentation process. There are many opportunities for researchers to develop new technologies from these practices. Further research work has been continuing for toxicity of larval activity for control the population of mosquitoes and its diseases.

CONCLUSION

Currently, the use of synthetic chemicals to control insect raises several concern related to environment and human health. An alternative to the natural products are posses a good efficacy results and non- hazardous to environment. This report is preliminary work done using plant extractives of biopesticide against the repellency of mosquitoes. The present study describes application of biopesticide on mosquitoes for the high output insecticide and screening of plant extract. The tested biopesticide are harmless to the human being, environmental ecosystem, and beneficial to all. There is no any pollutant to occur pollution to use their repellent in the ecosystem.

ACKNOWLEDGEMENT

The authors are thankful to the Chairmen, the Secretary K.T.S.P. Mandal's, Principal of Hutatma Rajguru Mahavidyalaya, Rajgurunagar and Head of the Department of Zoology. The author is also than authorities of Pune University, Pune for providing necessary laboratory and facilities to complete this research work.

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