

Evaluation of Mosquito Repellent Activity of Marigold Petals Extract

Aarti Nandwana¹, Shivani Khoware², Pushpanjali Chourasiya³, Deepti Andheriya Modi¹, Shikha Nagle¹, Akhilesh Bilaiya⁴, Ishan Dubey^{5*}

¹Swami Vivekanand College of Pharmacy, Indore

²Dr. APJ Abdul Kalam University, School of pharmacy, Indore

³BM College of pharmaceutical science and research, Indore

⁴Sri Aurobindo Institute of Pharmacy, Indore

⁵Lakshmi Naraine College of Pharmacy, Indore

*Email ID Corresponding Author: Dr. Ishan Dubey, ishandby@yahoo.com

Abstract

Diseases like yellow fever, dengue fever, malaria, epidemic poly arthritis etc. caused by mosquito. Every year about 700 million people get a mosquito-borne illness resulting in over 725,000 deaths according to the WHO.¹ Many treatments available for malaria and other mosquito transmitted disease for prevent them. Various topical or other applicable mosquito repellent to repel, the mosquito targeted area to bit and infected to health, it's prepared by synthetically and naturally.² Various synthetic repellents contain to more chemicals especially DEET they effect to skin disorder like-irritation and smell to toxic and more harmful risk for children.³ In this work, naturally mosquito repellent was prepared by using marigold plant. Activity of flower extract was evaluated for mosquito repellency. The present study reports the studies directed towards the safe and efficient herbal mosquito repellent activity of ether extract of flower petals of marigold.

Keywords: Pyrethrin, Mosquito repellent, Incense sticks, Mari gold.

Introduction

In India various more disease caused by mosquito especially dengue, malaria and yellow fever. One of the most widely used synthetic compound DEET-N,N-diethyl-m-toluamide which is considered as "gold standard" repellent but it possess several reaction in people and unpleasant order and sensation on skin unpleasant. Natural product has been found to be safe to human health. Marigold plants contain tannins, quinines, simple phenols, saponins, carotenoids, essential oil, phenolic acids, alkaloids and polypeptides.⁴

Pyrethrins and pyrethrum are the most frequently used home and garden insecticides in the India. They are often used in indoor sprays, pet shampoos, and aerosol bombs to kill flying and jumping insects. Pyrethrins are a common cause of insecticide poisonings.⁵ Pyrethrin extracted from the marigold flowers and leaf which used as mosquito repellent. Pyrethrin is natural and safe to human life other than synthetic product. Mosquito repellent may help to kill the mosquitos.⁶

Materials and method

The used flowers were collected from local area and petals discharge from the flowers and were sundried for three days and make powdered.

Preparation

The dried flower petals collected and make powder and in absence of sunlight powder soaked in 250ml of petroleum ether for 2 days and mixed them. The mixture was filtered by using Whatman filter paper no.1 and the filtrate was mixed with 80% methanol, Shaked vigorously and let to settle down after some time separation

of two layers was observed. The upper layer of solvent (pyrethrin) to be isolated from mixture and by using rotatory evaporator the solution was concentrated. Final extract collected and prepared for the testing by making different concentration.⁷

Repellency test- Repellency test performed in a round shape glass box with opening the mosquitoes can escape through. This box placed in the room and 20 mosquitoes were transferred into the box. The solution of the pyrethrin mixed with methanol to make spray and they spread in the box and box was closed for 10 minutes after that how much mosquitoes to be killed was noted.⁸

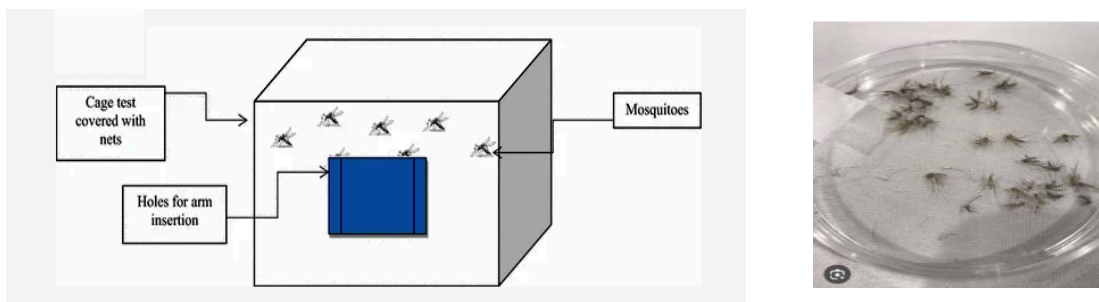


Figure no.1: a) Cage for Mosquito repellent test b) Repellency test results

Results and discussion-

Effectiveness of Mosquito repellency was evaluated using glass box. As glass box seems to be closed, so this activity was also performed in in-house and outer area. The results were shown in table 1

Table 1-Mosquito repellency test in different areas

Areas	Observation	Remark
In house	Mosquito escaped	Repel mosquitoes
Outing	Mosquito escaped	Repel mosquitoes

Table 2- Showing spray toxicity of the formulated repellent with respect to the knock down rate of mosquitoes-

Concentration of pyrethrin spray	Total number of mosquitoes killed	
	in 10 minutes	killed in 15 minutes
2%	07	05
5 %	11	07
10%	18	11
15%	24	13

Conclusion

Synthetic and commercial mosquito repellents contain various synthetic chemicals which cause toxicity or harmful to human health. The marigold flowers which were used in temple for worshipping and discarded plant material has been utilized in this study to prepare spray. The marigold oil containing pyrethrin evaluated as

mosquito repellent, results shows that it shows a good repellent activity and also able to kill the mosquitoes. This spray was found to be effective and cheaper than commercial products and easy to use and not causes any side effect.

References

- [1] Saleem MA, Lobanova I. Mosquito-borne diseases. In *Dengue Virus Disease 2020* Jan 1 (pp. 57-83). Academic Press.
- [2] Hemingway J. The role of vector control in stopping the transmission of malaria: threats and opportunities. *Philosophical Transactions of the Royal Society B: Biological Sciences*. 2014 Jun 19;369(1645):20130431.
- [3] Syed Z, Leal WS. Mosquitoes smell and avoid the insect repellent DEET. *Proceedings of the National Academy of Sciences*. 2008 Sep 9;105(36):13598-603.
- [4] Brielmann HL, Setzer WN, Kaufman PB, Kirakosyan A, Cseke LJ. Phytochemicals: The chemical components of plants. *Natural products from plants*. 2006;2:1-49.
- [5] Soni V, Anjekar A. Use of pyrethrin/pyrethrum and its effect on environment and human: a review. *PharmaTutor*. 2014 Jun 1;2(6):52-60.
- [6] Kawada H. New mosquito control techniques as countermeasures against insecticide resistance. INTECH Open Access Publisher; 2012 Jan 5.
- [7] Mishra SB. *Essentials of Herbal Drug Technology: A Guide of Standardization Quality Control*. Educreation Publishing; 2019 Jan 30.
- [8] Syed Z, Leal WS. Mosquitoes smell and avoid the insect repellent DEET. *Proceedings of the National Academy of Sciences*. 2008 Sep 9;105(36):13598-603.