



## Organic Mosquito Patch: The Use of Lemongrass, Garlic and Marigold

*Nathalie Faith Biñas\*, Ella Mae Cuba, Cholo Anthony Gargarita, Ameer Jordan Minsu, Amara Malaco*

Sultan Kudarat State University, Tacurong City, 9800 Sultan Kudarat, The Philippines.

Correspondence: E-mail: [nathaliefaitbinas@sksu.edu.ph](mailto:nathaliefaitbinas@sksu.edu.ph)

### ABSTRACT

This study aims to determine the possibility of organic mosquito patches as an alternative to mosquito repellents. The results showed that the control group, namely commercial mosquito patches, was able to obtain the highest rate of repelling mosquitoes. However, statistical analysis did not show a significant difference in the three patches. Thus, the manufacture of organic mosquito patches is as effective as commercial mosquito patches at repelling mosquitoes. In addition, organic mosquito patches have the most economical product compared to commercialized patches. Thus, making organic mosquito patches is not only as effective as commercial mosquito patches but also much more affordable than they cost. It is recommended to use an organic mosquito patch as an alternative to mosquito repellent.

© 2021 Universitas Pendidikan Indonesia

### ARTICLE INFO

**Article History:**

*Submitted/Received 07 Nov 2020*

*First Revised 07 Des 2020*

*Accepted 11 Feb 2021*

*First Available online 13 Feb 2021*

*Publication date 01 Mar 2021*

**Keyword:**

*Repelling mosquitoes,  
Organic mosquito patch,  
Commercialized mosquito patch,  
Experimental design,  
Lemongrass,  
Garlic,  
Marigold,  
Experimental group,  
Control group*

## 1. INTRODUCTION

The Philippines have experienced a lot of mosquito-borne diseases resulting in many deaths in the past years. Many are finding ways to either exterminate or repel those mosquitoes. Thus, the study is conducted to produce a repellent that is not only effective but also cost-efficient.

DEET used in commercialized patches may have undesirable side effects (Briassoulis *et al.*, 2001; Bell & Veltri, 2002). Many are interested with Plant-based repellents that are effective and earth economical. The study is to utilize lemongrass, garlic, and marigold (Maia & Moore, 2011). Lemongrass is a natural repellent for mosquitoes as it contains a scent that mosquitoes hate. Garlic contains sulfurs that are successful against mosquitoes. Marigolds possesses an unpleasant smell mosquito hate. However, there is no study about combining those three ingredients as a patch.

The product of study can be a substitute for the commercialized mosquito patch and could open many other possibilities of using natural ingredients as other forms of mosquito repellents.

## 2. METHODS

The research design used in the experiment was experimental and comparative study (Alagumurthi, 2006). The materials were lemongrass, garlic, and marigold to produce the organic mosquito patch. **Table 1** shows the design of the material mix in the manufacture of organic mosquito patches.

The commercialized mosquito patch was utilized as the control of the study. These mosquito patches were tested for its time and effectiveness in repelling mosquitoes. This study is designed by different ratio and proportion based on the measurement of the materials (Revay, 2013).

**Table 1.** Design mix proportion

Treatment	Lemongrass (Table Spoon)	Garlic (Table Spoon)	Marigold (Table Spoon)
1	1/2	1/4	1
2	1/4	1/4	1
Control	Commercialized Mosquito Patch		

## 3. RESULTS AND DISCUSSION

The results revealed that organic mosquito patch has a 100% repelling rate and a mean of 10, which can be interpreted as very high and very efficient within the duration respectively, regardless with the proportion of solutions contain. The results imply that the organic mosquito patch is highly effective in repelling mosquito within the duration of 30 minutes. The presentation of Rejection Rates and Efficiency in Duration of Organic Mosquito Patches are shown in **Table 2**.

**Table 2.** Presentation of the repelling rate and efficiency within duration of the organic mosquito patch within 30 minutes

Treatments	Replication			Total	Repelling Rate %	Interpretation	Mean	Interpretation	SD
	1	2	3						
T1 (1/2 Lemongrass, ¼ Garlir and 1 Marigold)	10	10	10	30	100%	Very High	10	Very Efficient Within Duration	0
T2 (1/4 Lemongrass, ½ Garlic and 1 Marigold)	10	10	10	30	100%	Very High	10	Very Efficient Within Duration	0

The results revealed that commercialized mosquito patch has 100% repelling rate and a mean of 10, which can be interpreted as very high and very efficient within the duration respectively. It simply means that the commercialized mosquito is highly effective in repelling the mosquitoes within the duration of 30 minutes. It simply means that the commercialized mosquito is highly effective in repelling the mosquitoes within the duration of 30 minutes. The repelling rate and the efficiency of commercialized mosquito patch are shown in **Table 3**.

Considering that the F- computed value is lesser than the F – tabulated value at 5% level of significance, then Ho is accepted and Ha is rejected. It implies that there is no significant difference between organic mosquito patches and commercialized mosquito patch in terms of repelling mosquitoes. The difference between organic mosquito patches and commercialized organic patches in terms of its effectiveness in repelling mosquitoes are shown in **Table 4**.

**Table 3.** Presentation of the repelling rate of the commercialized mosquito patch within 30 minutes.

Treatments	Replication			Total	Repelling Rate %	Interpretation	Mean	Interpretation	SD
	1	2	3						
Control (Commercialized Mosquito Patch)	10	10	10	30	100%	Very High	10	Very Efficient Within Duration	0

#### 4. CONCLUSION

The results of this study indicate the commercialized patch got the highest mean compared to the other patches, but statistical analysis showed that there is no significant difference between the control and experimental groups at 5% level regarding the effectiveness of the three treatments during the duration of a given time.

It implies that the organic mosquito patch could be an alternative for Commercialized patches and lemongrass, garlic and marigold can be effective materials in developing organic mosquito repellents.

**Table 4.** Test of Difference Between Organic Mosquito Patch and Commercialized Organic Patch in Terms of Repelling Mosquitoes

Source Variation	DF	SS	MS	FC	F-Values		Interpretation
					0.05	0.01	
Between Groups	2	0.17	0.09	0.83*	5.14	10.92	<b>There is no significant Difference</b>
Within Groups	6	2.82	0.47				
<b>Total</b>	<b>8</b>	<b>3.00</b>					

**5. ACKNOWLEDGEMENTS**

I would like to thank those who have helped complete this research, Sir Elmer R. Verallo, Ma’am Anamarie C. Valdez And Sir Adonis S. Besa, PhD., who have guided me through research to publish this research.

**6. AUTHORS’ NOTE**

The authors declare that there is no conflict of interest regarding the publication of this article. The authors confirmed that the paper was free of plagiarism.

**7. REFERENCES**

Alagumurthi, N., Palaniradja, K., and Soundararajan, V. (2006). Optimization of grinding process through design of experiment (DOE)—A comparative study. *Materials and Manufacturing Processes*, 21(1), 19-21.

Briassoulis, G., Narlioglou, M., and Hatzis, T. (2001). Toxic encephalopathy associated with use of DEET insect repellents: a case analysis of its toxicity in children. *Human and Experimental Toxicology*, 20(1), 8-14.

Maia, M. F., and Moore, S. J. (2011). Plant-based insect repellents: A review of their efficacy, development and testing. *Malaria journal*, 10(1), 1-15.

Revay, E. E., Junnila, A., Xue, R. D., Kline, D. L., Bernier, U. R., Kravchenko, V. D., and Müller, G. C. (2013). Evaluation of commercial products for personal protection against mosquitoes. *Acta Tropica*, 125(2), 226-230.