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THE POSITIVE EFFECT OF THE AROMA OF MARIGOLD LEAF SLICES ON MOSQUITO REPELLENT

Rustam Aji,Jusuf Kristianto,Riang Adeko,Gustomo Yamistada,Jessy Novita Sari
Prodi Keperawatan Curup Poltekkes Kemenkes Bengkulu, Poltekkes Kemenkes RI, Jakarta, Poltekkes Tanjung Karang
Email: adjieroestamadjie@gmail.com, riangdeko18007@gmail.com, tomo@yahoo.co.id, jessyns@yahoo.co.id

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Aedes aegypti mosquitoes, can cause fever, mosquitoes develop in the transition season. Countermeasures by eradicating vector life cycles, by killing mosquito larvae, using fogging, abate powder, which have an effect on the environment. Researchers were looking for a safe and effective natural larvicide solution, researchers looked at marigold plants at the study site. Marigold plants contain essential oils effective as larvicides in mosquitoes Culex quinquefasciatus, Anopheles stephensi and Aedes aegypti. Quasi-experimental research, cross sectional study design. The purpose of knowing the positive effect of the aroma of marigold leaf slices on mosquito repellent as a repellent. The indoor research site provided mosquito net boxes.containing 136 mosquitoes. The results of the Chi-square analysis obtained P = 0.04 < α 0.05, statistically there was a significant positive effect between marigold leaf slices on mosquito repellent, with odds ratio = 4.10 times. In order for students to get used to it, put slices of marigold leaves in the room to repel mosquitoes.

INTRODUCTION

Dengue hemorrhagic fever (DHF) in the community is one type of acute infectious disease that is still a health problem for individuals, families and communities (Sari, Djamaluddin, Djam'an, & Sembodo, 2022). Dengue hemorrhagic fever is an acute viral febrile disease, which is transmitted through the bite of the aedes aegypti mosquito from mosquitoes that transmit the dengue virus to the human body through their saliva that enters the bloodstream, causing dengue hemorrhagic fever WHO (2021) (Rustam Aji, 2015).

Entering the transition period from the dry season to the rainy season, Dengue / DHF cases in Indonesia are observed to increase. Based on records from the Directorate of Infectious Disease Prevention and Control (P2PM) until Week 36, the cumulative number of confirmed dengue cases from January 2022 was reported at 87,501 cases (IR 31.38/100,000 population) and 816 deaths (CFR 0.93%)." In general

there has been an increase in Dengue cases (Mahbub, 2023). The most cases occur in the age group of 14-44 years as much as 38.96 percent and 5-14 years as much as 35.61 percent," Director General of Disease Prevention and Control, Ministry of Health RI Jakarta. (2022) (Mahbub, 2023).

The main strategy of dengue eradication in eradicating adult mosquitoes through fumigation, then the strategy was expanded to use larvicide sown into water reservoirs (TPA) (Rustam Aji, 2017). Both methods until now have not shown satisfactory results. Evidently, from the number of dengue cases increasing and the number of areas infected with dengue. Ministry of Health of the Republic of Indonesia (2020).

Community behavior expected in Indonesia Sehat 2025 is proactive behavior to maintain and improve health, prevent the risk of disease, protect themselves from the threat of disease and other health problems, be aware of the law, and actively participate in public health movements, including organizing healthy and safe communities. (Kemenkes, 2021)

Research results (Sudi Dul Aji, 2017) Environmental factors and indices related to dengue vector larva in Rejang Lebong District.

Dengue hemorrhagic fever (DHF) cases in Bengkulu Province, from January to August 2022, have reached 828 cases. This condition makes the Bengkulu Provincial Government take anticipatory steps so that the disease caused by the aedes aegypti mosquito continues to surge. Head of Disease Control and Eradication (P2P) of the Bengkulu Provincial Health Office. (2022)

There were 76 dengue cases that occurred in Rejang Lebong Regency from January to the end of October 2022, of which three people were declared dead," Head of the Rejang Lebong Health Office (2022).

Results of previous research by (Sudi Dul Aji, 2017) The results of phytochemical tests using the color test method on marigold leaf extract succeeded in identifying alkaloid compounds, flavonoids, saponins, and tannins. The results of protective power tests showed that marigold leaf extract lotion was not effective as a repellent against Ae mosquitoes. Aegypti with a protective power above 90% only last for two hours after smearing, which is at a concentration of 30%.

Research results (Sudi Dul Aji, 2017) There is a significant effect of citronella on the presence of larvae of Aeges aegypti larvae in water reservoirs.

Suharno's research results (Zen et al., 2020) Based on the data of the results of the study there is a very real effect on mortality resulting from any given extraction concentration. Based on research at a concentration of 2% resulted in the highest mortality effect of Aedes sp. mosquitoes. That is with an average of 92.5% with the number of deaths of 37 out of 40 mosquitoes. Extraction of Mohi Kotok leaves (T. erecta) can be used as an alternative in the control of Aedes sp. mosquitoes. Conclusion: The results of the study can be used as a learning resource in the form of modules and are suitable for use with 85.2% validation results.

Research results (Nugroho & Aji, 2015) There is an influence on the role of jumantik performance on the incidence of dengue hemorrhagic fever in Rejang Lebong Regency.

Novelty in this study to determine the side effects of soaking the aroma of sliced leaves, bark, flower buds, flowers, and roots of marigold plants, on mosquito repellent.

The survey conducted by researchers on Saturday, February 11, 2023, saw that Marigold plants were seen growing on the roadside or yard of residents' houses and at the location of the garden of each class of State Elementary School 07 Rejang Lebong. But the public does not know the benefits and influence of marigold plants as mosquito repellent.

The role of the community in eradicating dengue hemorrhagic fever mosquito nests at the research site has not been fully realized optimally, because mosquitoes are still found, community habits when mosquitoes appear in the rainy season, the behavior of community residents killing mosquitoes using sprays, mosquito coils, mosquito rackets, and avoiding mosquito bites using autan, mosquito nets, and others, but mosquitoes still exist (Paryati, Suprihanto, & Akhmad, 2018).

Based on the above background and considering that the highest number of suspected dengue hemorrhagic fever cases are at the research site, the author is interested in conducting research: The Positive Effects of the Aroma of Marigold Leaf Slices on Mosquito Repellent Power, at Public Elementary School 07 Rejang Lebong in 2023.

RESEARCH METHODS

Type of quasi-experimental research, cross sectional study design, which is research that is close to the real experiment, to determine the positive effect of the aroma of marigold leaf slices on mosquito repellent as a repellent of mosquito repellent power. The dependent variable, namely the number of mosquitoes that avoid and perch from the aroma of Marigold Leaf slices.The independent variable is the provision of Marigold Leaf slices, analyzed using 2 x 2 cross tabulation, calculating the odds ratio, and Chi squared test. The sample of the object of study was 136 mosquitoes in a mosquito net box. Conduct of research 3 (three months.

The analysis used was univariate to determine the positive effect of the aroma of Marigold leaf slices on mosquito repellent as a repellent of mosquito repellent and the proportion of each variable studied. Bivariate analysis to determine the positive effects of independent and dependent variables.

RESEARCH TOOLS AND MATERIALS

Researchers used several tools as follows: Knives, water, glasses, scissors, bowls, mosquito stalks, mosquito net boxes, stopwach, clocks, stationery and observation paper, Researchers used several research materials as follows: leaves, bark, flower buds, flowers, and roots of marigold plants.

HOW IT WORKS

The process of how to make a marinade of leaf slices, bark, flower buds, flowers, and roots of marigold plants, as follows:

1. Prepare water 1 glass star fruit or as much as 200 ml.
2. Take 1 gram of marigold leaves. thoroughly washed further sliced.

3. Pieces of marigold leaf slices., put into a bowl, each containing 1 gram of marigold leaves., then processed so that the aroma in the soaking water of marigold leaf slices..
4. Next the soaking water slices of marigold leaves, placed in a bowl and put in a mosquito net box.
How mosquito retrieval works, as follows:
1. Mosquitoes were taken using mosquito stalks, selected normal ones (leg wings exist) totaling 136 mosquitoes.
2. Then 136 mosquitoes were put into the mosquito net box
Implementation of research procedures as follows:
1. Prepare all necessary equipment and materials.
2. Take each bowl containing soaking water.sliced leaves, bark, flower buds, flowers, and roots of marigold plants containing 100 ml of cooled water.
3. Prepare a stopwach or clock, stationery and observation paper.
4. Then take 136 mosquitoes and put them in the mosquito net box.
5. Take stopwach/hour and observe the effect of water bath.sliced leaves, bark, flower buds, flowers, and roots of marigold plants.
6. Then record how many mosquitoes avoid and perch on the bowl containing the marinade of leaf slices, bark, flower buds, flowers, and roots of marigold plants,
7. Tabulation of the data obtained is then analyzed according to the statistical method used.
The data obtained from the observations were first analyzed using a cross sectional study design, analyzed using 2 x 2 cross tabulation, knowing the positive effect of giving soaking water, sliced leaves, bark, flower buds, flowers, and roots of marigold plants and calculating the odds ratio, and Chi squared test. with a significance level of 0.05. Reject Ho if p < (0.05). (Nursalam, 2018).

RESULTS AND DISCUSSION

Hasil Analisis Univariat

Activities in this study included calculating the number of mosquitoes that avoided and landed on a bowl containing a bath of leaf slices, bark, flower buds, flowers, and roots of marigold plants, after treatment. The process of observation on 136 mosquitoes for a maximum of 5 minutes, on each mosquito that insulted and perched on a bowl containing 1 gram of sliced marigold leaves, then the results were obtained as in the following table:
The positive effect of the aroma of marigold leaf slices on mosquito repellent

Table 1 Positive Effects of the Aroma of Marigold *Leaf Slices* on Mosquito Repellent

Positive Effects of Marigold Leaf Slices on Mosquito Repellent			
Positive effect	Mosquito reaction		
The aroma of	Refuse to Avoid	Alight	Total

Marigold leaf slices	n	%	n	%	n	%
Already	125	91,91	11	8,09	136	100
Do not	0	0	136	100	136	100

Based on Table.1 above, it shows that almost all (91.91%) found 125 mosquitoes evading resisting and the remaining 11 (8.09%) mosquitoes perched out of a total of 136 mosquitoes in a mosquito net box with 1 gram of marigold leaf slices in under 5 minutes.

Table 2 Positive Effects of Marigold *Sliced Aroma* on Mosquito Repellent

Positive Effects of Marigold Leaf Slices on Mosquito Repellent

Positive effect The aroma of Marigold leaf slices	Mosquito reaction						OR	p
	Dodge		Alight		Total			
	n	%	n	%	n	%		
Already	125	91,91	11	8,09	136	100	4.10	0,043
Do not	0	0	136	100	136	100		

Bivariate analysis based on table 2 above, shows that the repulsive power that causes mosquitoes to avoid away with p *value* = 0.043, has a positive effect on the aroma of Marigold leaf slices, which is statistically significant on mosquito repellent at *odds ratio* = 4.10 times.

4.4 Research discussion

Based on the results of observations made by the results of soaking water trials, Marigold leaf slices against mosquito repellent with the same formulation, causing the number of mosquitoes that avoid and perch differently with the same time span, the results obtained are as follows:

4.4.1 Positive effect of marinade water aroma of sliced marigold leaves on mosquito repellent

Based on Table.1 above, it shows that almost all (91.91%) found 125 mosquitoes evading resisting and the remaining 11 (8.09%) mosquitoes perched out of a total of 136 mosquitoes in a mosquito net box with 1 gram of marigold leaf slices in under 5 minutes.

Agree with the results of the study (Kamelia, Zein, & Fahlida, 2020) There is a very pronounced effect on mortality resulting from any given extraction concentration. Based on research at a concentration of 2% resulted in the highest mortality effect of Aedes sp. mosquitoes. That is with an average of 92.5% with the number of deaths of 37 out of 40 mosquitoes. Extraction of Mohi Kotok leaves (T. erecta) can be used as an alternative in the control of Aedes sp. mosquitoes. Conclusion: The results of the study can be used as a learning resource in the form of modules and are suitable for use with 85.2% validation results.

In line with opinion (Marini & Khasanah, 2018) The results of phytochemical tests using the color test method on marigold leaf extract succeeded in identifying alkaloid compounds, flavonoids, saponins, and tannins. The results of protective power tests showed that marigold leaf extract lotion was not effective as a repellent against Ae mosquitoes. Aegypti with a protective power above 90% only last for two hours after smearing, which is at a concentration of 30%.

Agree with research results (Alfiah, Maskhur, Subhi, & Muslih, 2022), The results showed that repellent spray had repulsion, control (-) of 50.67%, concentration of 2.5% of 68.33%, concentration of 5% of 78.67%, concentration of 10% of 96% and control (+) of 100%. The results of protective power tests showed that repellent spray containing essential oil of marigold flowers had the highest activity at a concentration of 10%. Based on the results of statistical analysis showed that f count was greater than f table 5% and 1% and the results of SNK follow-up test (Newman Keuls) showed that the concentration of 10% was not significantly different from control (+).

The researchers concluded that soaking marigold leaf slices, it was known that almost all (91.91%) found 125 mosquitoes Evading resisting and the remaining 11

(8.09%) mosquitoes perched out of a total of 136 mosquitoes in a mosquito net box with 1 gram of marigold leaf slices in under 5 minutes.

Based on the results of Chi-square analysis obtained P value = 0.04 < α 0.05, statistically there is a significant effect between marigold leaf slices on mosquito repellent, with odds ratio = 4.10 times.

Research Discussion

CONCLUSION

- Marigold plants contain essential oils effective as larvicides in mosquitoes Culex quinquefasciatus, Anopheles stephensi and Aedes aegypti.
- Marinade of sliced marigold leaves, it is known that
- The researchers concluded that soaking marigold leaf slices, it was known that almost all (91.91%) found 125 mosquitoes Evading resisting and the remaining 11 (8.09%) mosquitoes perched out of a total of 136 mosquitoes in a mosquito net box with 1 gram of marigold leaf slices in under 5 minutes.
- The results of the Chi-square analysis obtained P = 0.04 < α 0.05, statistically there was a significant positive effect between marigold leaf slices on mosquito repellent, with odds ratio = 4.10 times.

BIBLIOGRAPHY

Aji, Rustam (2015) Jumantik performance and incidence of dengue hemorrhagic fever in Rejang Lebong district. Journal of disease control and environmental health, Ministry of Health of the Republic of Indonesia Directorate General of Disease Control and Environmental Health. Issue.5.Dec-2015.p.21-24.ISSN.2089-2907.

Aji Rustam Rochmat, (2017) The Effect of Citronella on the Presence of Aeges aegypti Larvae Larvae in Water Reservoirs.JVK.3 (1) (2017) pp.1-4. http://ejournal poltekkes-pontianak.ac.id/index.php/JVK.

Aji,dkk (2016) Environmental factors and indices related to dengue vector larva in Rejang Lebong District.Irjpeh.Vol.3(7),pp.162-166,July 2016.ISSN.2360-8803.http://dx.doi.org/10.15739/irjpeh.16.021.

Anwar C, Amy Lavita R, Handayani D. Identification and distribution of Aedes Sp. mosquitoes as vectors of Dengue Hemorrhagic Fever in several regions in South Sumatra. MKS. 2014;46(2):111-7.

Champakaew D, Junkum A, Chaithong U, et al. Assessment of Angelica sinensis (Oliv.) diels as a repellent for personal protection against mosquitoes under laboratory and field conditions in Northern Thailand. Parasit Vectors. 2016;9:373-. doi:10.1186/s13071- 016-1650-y

Devika R, Justin K. Screening and evaluation of bioactive components of Tagetes Erecta L. by gc – ms analysis. Asian J Pharm Clin Res. 2014;7(2):5-7.

Rejang Lebong Health Office (2022). Annual Report on Dengue Incidence in Rejang Lebong Regency.

Director General of Disease Prevention and Control, Ministry of Health of the Republic of Indonesia Jakarta. (2022). Annual report of the Directorate of Infectious Disease Prevention and Control (P2PM). Jakarta

Embong NB, Sudarmaja IM. The effect of temperature on the hatching rate of Aedes aegypti eggs. E-Journal Med. 2016;5(12):1-

InfoDatin Ministry of Health. Dengue situation in Indonesia [Internet]. InfoDATIN. [Accessed February 26, 2017] Available from http://www.depkes.go.id/resources/download/ pusdatin/infodatin/infodatin dbd 2016.pdf.

Ministry of Health of the Republic of Indonesia (2020). The main strategy of dengue eradication. Jakarta.

Head of Disease Control and Eradication (P2P) of the Bengkulu Provincial Health Office. (2022)

Ministry of Health of the Republic of Indonesia. (2021).. Community behavior expected in Indonesia Sehat 2025. Jakarta

Case Report of dengue hemorrhagic fever (DHF) in Bengkulu Province, from January to August 2022 Bengkulu Province.

Marini, et al (2018) Repellent Potency of Marigolds (Tagetes erecta L.) Leaves ExtractAgaints Aedes aegyptiMosquitoBALABA Vol.14 No.1, June 2018: 53-62.Received date: 1503-2017, Revised date: 13-02-2018, Accepted date: 21-05.2018Research and Development of Disease Control Sourced from Baturaja Animals Jl. Jenderal Ahmad Yani KM. 7 Kemelak Baturaja South Sumatra.

Nursalam, 2018) Concept and Application of Nursing Research Methodology (Thesis Guidelines, Thesis and Nursing Research instruments) Jkarta.Salemba Medika.

Nur Alfiah Irfayanti 1*, Jasmiadi1 , Alda Ta.ri1 (2022). Formulation and Activity Test of Repellent Spray Marigold Flower Essential Oil (Tagetes erecta L.) in Aedes aegypti Mosquitoes) Journal Syifa Sciences and Clinical Research (JSSCR). **Volume4Nomor2**. JournalHomepaghttp://ejurnal.ung.ac.id/index.php/jsscr, E-ISSN:2656-9612P-ISSN:2656-8187. DOI :https://doi.org/10.37311/jsscr.v4i2.14161

Suharno Zen [1*], Notty Elmar Yusup [1], Marlina Kamelia [2] (2020) Effect of Mole Kotok Leaf Extract (Tagetes erecta) on Mortality of Aedes sp. as a Resource for Learning Biology in Module Form. Vol. 04, No. 01: 66-72. June. 2020

BIOEDUSCIENCE. ISSN: 2614-1558 (Online)- ISSN: 2614-154X (Print).. doi:http://dx.doi.org/10.29405/j.bes/4166-724873Biology Education Study Program, University of Muhammadiyah Metro, Lampung, Indonesia.
WHO (2021) Dengue Cases in the Word.

Prasetyowati H, Astuti EP, Ruliansyah A. Use of household insecticides in population control of Aedes aegypti in Dengue Hemorrhagic Fever (DHF) endemic areas in East Jakarta. ASPIRATORS. 2016;8(1):29-36.

Zen S, Noor R. Inventory of plants that have potential as bioinsecticides for Aedes aegypti mosquitoes in Metro City of Lampung Province. Bioeducation 2016;7(2):139-43.