








Socialization and Demonstration Utilization of Citraimona Plants (*Cymbopogon nardus* L. Rendle) as an Anti-Mosquito Spray Product in Taba Air Pauh Village

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Abstract

Mosquitoes are often considered to disrupt human life. Various efforts are used to reduce the mosquito population, including using anti-mosquito spray. The anti-mosquito spray that is usually used is chemical-based. This is due to the public's lack of knowledge about the use of plants around them, such as citronella, to be used as an anti-mosquito spray. Therefore, activities were carried out aimed at increasing public understanding about the use of anti-mosquito spray, with a focus on plants around them, such as citronella which can be processed into useful ingredients. Through this outreach, we can provide useful information to the public, making them aware that citronella not only functions as a kitchen spice, but also as an ingredient in making an easy-to-make anti-mosquito spray. This research uses descriptive methods because it involves very specific experiments and research. This work program focuses on outreach and training to the community, from teenagers to adults, regarding the use of anti-mosquito spray from citronella. This activity consists of a preparation stage and an implementation stage. Based on the results of community service in Taba Air Pauh village showed high enthusiasm from the community and had a positive impact on increasing knowledge about the dangers of mosquitoes, chemicals, and making mosquito repellent liquid.

A. Introduction

Indonesia is one of the tropical countries in the world with high air humidity which triggers the breeding of mosquitoes such as *Aedes aegypti* so that dengue fever is easily transmitted through the bite of the *Aedes aegypti* mosquito (Budi et al., 2021; Halim & Fitri, 2020; Lesmana & Halim, 2020). This causes health problems because there are many endemic areas, so the number of sufferers is increasing and the spread is becoming more widespread to other areas with increasing mobility and population density. Dengue Hemorrhagic Fever is a major public health problem throughout tropical and subtropical regions (Dania, 2016; Husna et al., 2016; Retang et al., 2021). The spread of this disease occurred rapidly with an increase in incidence 30-fold in the last 50 years. The World Health Organization (WHO) estimates that 50-100 million cases of infection occur every year and almost half of the world's population lives in endemic countries. Currently, around 75% of the global population at risk of exposure to the dengue virus is in the Asia-Pacific region (Akbar & Syaputra, 2019).

The use of anti-mosquito drugs made from chemicals has positive and negative impacts. The positive impact is that it can eradicate mosquitoes, while the negative impact can cause air pollution, cause a strong

odor and can cause shortness of breath, which will affect health. Currently, there are many types of mosquito repellents available and sold freely. Mosquito repellent sprays are very common and may be sprayed on clothing or skin. Some of the best sprays contain DEET and high concentrations are effective for several hours even when walking through forests where there are thousands of mosquitoes.

The extensive use of synthetic insecticides over the last five decades has resulted in environmental hazards and also in the development of physiological resistance in major vector species. Despite this, chemical-based mosquito repellents have an excellent safety profile, they are toxic to the human skin and nervous system and can cause rashes, swelling, and eye irritation. Increasing the number of diseases transmitted by mosquitoes is by carrying out important activities, namely by carrying out control. The increase in mosquito numbers occurs mainly due to deforestation, industrial agriculture and waterlogging.

Special compound products are needed to repel mosquitoes from ancient times, namely natural ingredients. Botanical insecticides are single or compound active ingredients derived from plants that can be used to control nuisance organisms. This vegetable insecticide can function as a repellent, attractant, anti-fertility (sterile), killer and other forms. In general, a vegetable insecticide is defined as an insecticide whose basic ingredients are from plants which are relatively easy to make with limited skills and knowledge. In general, vegetable insecticides can be made using simple or traditional technology, namely by crushing, pounding, burning or pressing.

Indonesia, as a tropical country, has biodiversity that produces essential oils, so it has great potential as an important producing country in the world's essential oil business. Our country has around 40 types of the 80 types of aromatic plants that produce essential oils that are traded in the world.

One of the plants as an anti-mosquito agent is the citronella plant (*Cymbopogon nardus L. Rendle*) which produces starch or essential oil known as Citronella Oil (Djarami et al., 2022; Nadirah et al., 2022; Rasydy et al., 2020). Citronella oil contains two important chemical compounds, namely Citronellal and Geraniol, which function as mosquito repellents (Maradona & Hujjatusnaini, 2022; Sawitri et al., 2022). Herbal Lemongrass plants, especially the stems and leaves, contain substances such as geraniol, methyl heptenone, terpenes, terpene alcohol, organic acids and especially citronellal which can be used as a mosquito repellent (Fitri et al., 2023; Permatananda et al., 2023; Sari et al., 2023).

Ethanol extract of citronella leaves and stems can be used as a botanical pesticide to control *Aedes aegypti* mosquitoes and contains saponins, tannins, quinones and steroids. From the distillation of citronella, essential oils can be obtained, mainly consisting of geraniol and citronellal, which can be used to repel mosquitoes (Rahmawati et al., 2020). Ash from lemongrass leaves and stalks contains 45% silica which causes desiccation (continuous release of bodily fluids) on insect skin so that the insect will die from dryness. Citronellol and geraniol are active ingredients that insects, including mosquitoes, dislike and avoid, so using these ingredients is very useful as a mosquito repellent.

Based on the description above, activities were carried out aimed at increasing public understanding about the use of anti-mosquito spray, with a focus on plants around them, such as citronella which can be processed into useful ingredients.

B. Research Method

The S1 Chemistry Thematic KKN activity regarding "Making Anti-Mosquito Spray" was held on September 2 2023 in Taba Air Pauh Village, Tebat Karai District, Kepahiang Regency. This service uses a descriptive method because a very specific experimental and research process is carried out, and this work program focuses on outreach and training to the community from teenagers to adults about the use of anti-mosquito spray from citronella. The stages described in this activity include the preparation stages and implementation stages.

1. Preparatory stages

The preparation stage is to conduct a survey of the materials that will be used and determine the target group in society who will receive the outreach. Next, prepare material in the form of power point slides or presentation tools that will be used to convey information to the public about anti-mosquito spray from citronella and the steps for making it. After that, prepare the tools and materials needed to demonstrate making anti-mosquito spray from citronella. This includes equipment and materials used in the demonstration process.

2. Implementation stage

The implementation stage begins with providing an explanation or presentation about the dangers of dengue fever mosquitoes to the community, including the impact on the environment and human health. Then carry out a demonstration of the steps for making anti-mosquito spray from citronella so that the public can see and understand firsthand the process of making it. After that, he invited the public to apply the manufacture of anti-mosquito spray from citronella in their daily lives as an alternative to mosquito coils or mosquito sprays that contain chemicals.

The way to make anti-mosquito spray from citronella is to prepare the necessary tools and materials first, such as a stove, pan, knife, cutting board, basin, spray bottle, measuring cup, filter, funnel, citronella, water and alcohol.

The steps for making anti-mosquito spray from citronella are as follows:

- Prepare enough citronella; wash clean and cut into small pieces. Once dried, crush or grind the citronella so it is easier to release the essential oils
- Boil lemongrass with water; Boil water in a pan, after the water boils, add the prepared citronella into the boiling water. Let the lemongrass boil for some time to release the essential oils into the water. The lemongrass decoction contains essential oils which function as a mosquito repellent
- Strain liquid; After the lemongrass has been boiled for a sufficient amount of time, strain the liquid to separate the boiled lemongrass fibers from the water containing the essential oils.
- Inserting liquid into a spray bottle; After the liquid is filtered, let the liquid cool. Then, put it in a spray bottle and add alcohol (this mixing is done in a ratio of 4 mL of citronella liquid: 1 mL of alcohol)
- Application of anti-mosquito spray from citronella; Anti-mosquito spray is applied directly by spraying the liquid on parts of the body (such as hands, feet and neck) or sprayed on the surface of bed sheets or cloth and can also be sprayed directly in the room at home.

C. Result and Discussion

The S1 Chemistry Thematic KKN activity regarding "Making Anti-Mosquito Spray" was carried out on September 2 2023. The results achieved in this activity were increasing public understanding in Taba Air Pauh Village, Tebat Karai District, Kepahiang Regency regarding this Anti-Mosquito Spray. because the people in the village know that the plants around them, such as citronella, can actually be beneficial if processed properly, after conducting outreach regarding the citronella plant.



Figure 1. Socialization of Making Anti-Mosquito Spray

Apart from that, the public knows that making and using anti-mosquito spray from citronella is very simple without using tools and materials that are difficult to find. The public also became enthusiastic about wanting to know that repelling mosquitoes does not require using dangerous chemicals but instead uses traditional plants such as citronella.

The lack of knowledge of the community in Taba Air Pauh Village regarding mosquito repellent plants could potentially make this activity an improvement in the educational aspect where the community knows about the citronella plant which is used to repel mosquitoes. On the social aspect, this activity can increase public education about maintaining health, especially to prevent dengue fever. In the economic aspect, this activity can help local communities to produce products that they can produce or create themselves.

The results of filtration of citronella and boiled water produce the compounds geraniol and citronellal and these compounds are used to repel mosquitoes. Citronellal and geraniol are active ingredients that are

disliked and avoided by insects, including mosquitoes, so using these ingredients is very useful as a mosquito repellent. This is because mosquitoes can detect CO₂ compounds produced by glands in human skin through smell and sight. Citronella with VCO formulation is a type of plant that can be used as a mosquito repellent in accordance with the repellent requirements, namely that it does not interfere with use, is made from natural ingredients, is not sticky or sticky, smells good, is non-toxic and does not cause irritation to the skin and makes use of the yard environment and is easy to use. to be cultivated.



Figure 2. Demonstration Process for Making Anti-Mosquito Spray.

The socialization of this anti-mosquito spray was carried out by providing an explanation to the public about the benefits of lemongrass stalks, where so far lemongrass stalks have been considered only as a kitchen spice. The results of the outreach show that outreach using the demonstration method directly influences increasing knowledge about the dangers of mosquitoes and chemical substances as well as how to make mosquito repellent liquid. This is because the demonstration method is more motivating for someone to take action and has a high enough intensity to be able to provide experiences received through the five senses, making it easier to receive the messages conveyed.



Figure 3. Product Results for Making Anti-Mosquito Spray

The color characteristic of lemongrass plants that have been boiled with water and added with 70% alcohol is pale yellow. The results of the trials carried out also showed results that were in accordance with established Indonesian national standards. Apart from consisting of active substances, spray preparations also require additional ingredients such as carriers, cosolvents and preservatives. The additional ingredient chosen is 70% alcohol because based on FI III the solubility of essential oils is in alcohol, the cosolvent material is propylene glycol because the properties of propylene glycol, apart from being a cosolvent, can also function as a humectant, that is, it can retain the moisture and odor resistance of the lemongrass so that a preparation can be produced. which is comfortable.

This activity has limitations, namely that it only reaches people from 1 village. In the future, this can be done with even broader targets. With this activity, in the future the community will be able to process the citronella plants around them into something of economic value, for example as an anti-mosquito spray.

D. Conclusion

Based on the results of the outreach to the community that has been carried out, it can be concluded that this activity went smoothly and received very good enthusiasm from the people of Taba Air Pauh Village. Through this outreach, useful knowledge can be provided and the public will learn that lemongrass, which is usually only used as a kitchen spice, can also be used as an ingredient in making anti-mosquito spray, which is very easy to make.

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