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THE EXTRACTION OF DRIED LEMONGRASS (CYMBOPOGON CITRATUS) WITH DISTILLED WATER AS A REPELLENT TO REDUCE DISEASES CAUSED BY BITES OF MOSQUITOES (CULICIDAE) IN INDONESIA

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Abstract

Indonesia is a country that has the diversity of plants that can be used as one source of essential oils (Feriyanto, 2013). Lemongrass oil in the health field can be used as an anticeptic, anti- inflamation, analgetik, and sedative (Giuliani and Satuhu, 2012)Lemongrass can be used for the treatment and can be utilized as an ingredient of SOAP, insect repellent, as well as aroma therapy. Essential oil from lemongrass herbs can be obtained by means of presses. In addition, Lemongrass scented myrrh essential oil can be obtained by means of distillation. The principle of distillation is to isolate or separate two or more component liquid based on the boiling point of water distillation methods, these materials then will be distilled directly with boiling water, as the result, the material will float above the water or submerged completely (Sastrohamidjojo, 2004). The results of the distillation is generally in the form of essential oils containing rough water, the necessary process for withdrawal of water from the essential oil so that the quality of essential oils will improve and the color will become more clear. Method of withdrawal of water using sodium sulfate (Na2SO4) anhydrous, where water will be pulled by the anhydrous Na2SO4 to produce essential oils with high purity. After obtained essential oils with a high concentration of manufacturing process is done, then a lotion will be blended with essential oils as well as some sweet scent, in order to get the anti mosquitos lotion in essential oil.

Keywords: Lemongrass oil, Essensial oil of herba serai, Distillation.

1. Introduction

Indonesia is a country that has a high case number of sufferers due to mosquito bites in the world. The following are some of the diseases caused by mosquito bites:Dengue (DBD is a disease caused by dengue virus which belongs to the Arthropod-Borne Virus, of the genus Flavivirus, family Flaviviridae and. DBD is transmitted through mosquito bites from the Aedes genus, especially Aedes aegypti or Aedes albopictus. Diseases of the DBD can occur throughout the year and can attack the entire age group. The disease is related to environmental conditions and behavior of the public. In 2014, the number of DBD sufferers reported as many as 100,347 with the number of death case as much as 907 people (IR/Number of pain = 39.8 per 100,000 inhabitants and. CFR/death rate = 0.9%). Compared to the year 2013, with the case as much as 112,511 , as well as IR 45.85 decline cases in 2014. The target of the Ministry of health figures for Renstra pain DBD 2014 of ≤ 51 per 100,000 population, thereby, Indonesia has reached target Renstra 2014. The following figures in pain HE MIGHT during the 2008-2014.

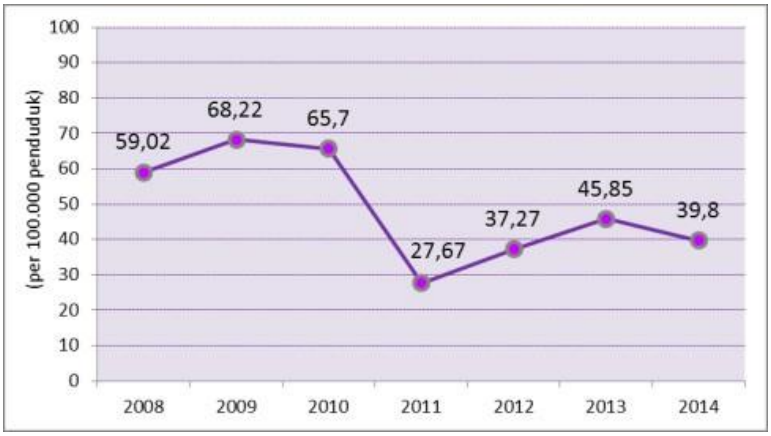


Figure 1. The number of dengue dengue pain Per 100,000 population 2008-2014 Source: Ditjen PP & PL, Kemenkes RI, 2015

Malaria is an infectious disease caused by the parasite Plasmodium which lives and breeds in human red blood cells, is transmitted by mosquitoes (Anopheles) malaria females, can attack all those good men or women in all age groups from infants, children and adults. Nationally, the number of pain, malaria during the year 2005–2014 tend to decrease from 4.1 per 1,000 population at risk in 2005 to 0.99 per 1,000 population at-risk in 2014. While the Ministry of health strategic plan targets for numbers of pain, malaria (fire/annual parasite incidence) 2014 1 per 1,000 population < risky. Thus the scope targets 2014 FIRE Renstra 2014. The decline in FIRE can be seen in the picture below.

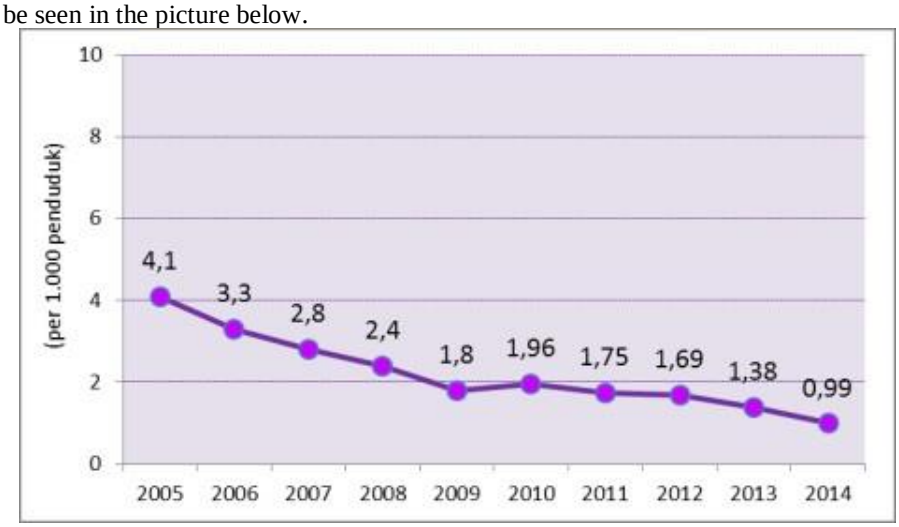
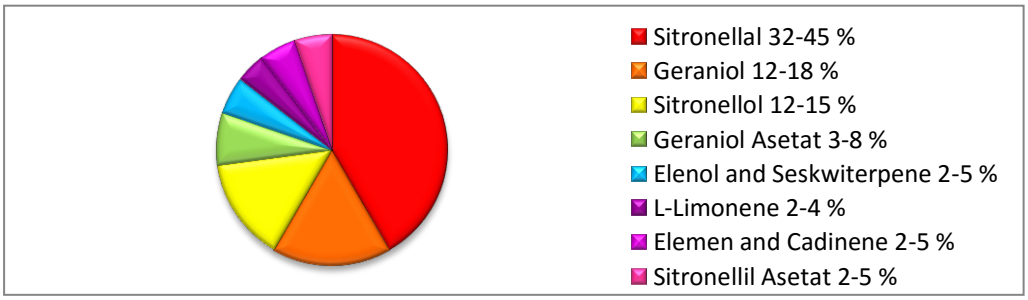


Figure 2. Figures are in pain of malaria (annual incidence paracite/api) Per 1,000 inhabitants the risky year 2005- 2014 Source: Ditjen PP & PL, Kemenkes RI, 2015

Lemongrass or citronella are members of the grass – the herbaceous utilized as ingredients for the scent of food. Essential oil is the oil obtained by distilling the way the top of Lemongrass. Essential oils can be used as a mosquito repellent, either in the form of plants or in the form of its oil (Muhlisah 1999). Kingdom: Plantae, Subkingdom: Trachebionta, Division: Spermatophyta, Subdivision: Island Class: Monocotyledonae, Sub class: Commelinidae, Order: Poales, Family: Poaceae, Genus: Cymbopogon, Species: Cymbopogon citratus

In addition to the great benefits based off with some of the content is known to have a very cheap price. In 1 kg of lemongrass, valued only Rp 10,000. The price is cheap enough, let alone pertained to the level of consumption of a fairly stable at serai community Indonesia. The chemical content of the Lemongrass, among others, contains 0.4% essential oil with a component that consists of sitral, sitronelol (66-85%), α-pinene, kamfen, sabinen, mirsen, β-felandren, psimen, limonen, cis- osimen, terpinol, sitronelal, borneol, terpinen-4-ol, α-terpineol, geraniol, farnesol, methyl heptenon, n-desialdehida, dipenten, methylheptenon, bornilasetat, geranilformat, terpinil acetate, acetic sitronelil, geranil acetate, β-elements, β- kariofilen, β-bergamotentrans-metilisoeugenol, β-kadinen, elemol, kariofilen oxide (anonymous, 1984; Anonymous, 1985; and Rusli et al., 1979 in Christian, 2013).

Diagram 1. The Chemical Makeup Of Fragrant Lemongrass Oil



Chemical components in volatile oil of Lemongrass are quite complex, but its most important component is the sitronellal and geraniol. The levels of the chemical components of the major constituent in Lemongrass oil is not fixed, and depends on several factors. Usually if the levels are high then geraniol sitronellal levels are also high (Harris,1987). The main components of essential oil of Lemongrass is also known as total compound that

can be dasetilasi and can determine the intensity of the fragrance, the value and the price of essential oils (,1973 Wijesekara). Processed products that can be developed is the anti mosquitos lotion made of Lemongrass (Cymbopogon citratus), i.e. a type of drug that will be packaged in the form of lotion. The function of the lotion is to add interest in the purchasing power of young people that in fact his lazy use of oil.

2. Methods

This research has the purpose to isolate and control any conditions relevant to a situation that was examined and then do the observation of the effect or influence when the conditions are manipulated. The results of the distillation is generally in the form of essential oils containing rough water, the necessary process for withdrawal of water from the essential oil so that the quality of essential oils was increasing and the color becomes more clear. Method of withdrawal of water using sodium sulfate (Na2SO4) anhydrous, where water will be pulled by the anhydrous Na2SO4 to produced essential oils with high purity. This research describes how to obtain essential oils on Lemongrass that would then be in the mix with lotion and fragrance of a perfume, so that the products generate anti mosquito lotion from the Lemongrass.

2.1. Tools and materials

2.1.1. The tools: a set of tools, analytical balance of distilled water bottle, vial, erlenmeyer flask, becker glass, ovens, filter paper, electric, pasteur pipette scales, thermometer, measuring flasks, blender, pipette volume, funnels, bottle of lotion.

2.1.2. Ingredients: Lemongrass, 1 kg of anhydrous Na2SO4, vasellin, Aquades, ethtanol, fixative, mineral oil, vitamin E, beeswax, shea butter, lavender, green tea, orange peel, ginger.

Sample preparation

Preparation of the sample starts with Pruning the leaves of Lemongrass, then sorted, washed and dried. Lemongrass is dried by means of dried for 3 days.

2.3. Distillation of Lemongrass

Weigh the material as much as 1 kg of dried Lemongrass, then cutting done on each ingredient ± 2 cm. Material dried Lemongrass put in the distillation flask filled with aquades until the entirematerial is awash in a aquades 4,5 hours. Essential oil distillation yield Na_2SO_4 is added with a dose of 2-5% into an erlenmeyer flask to absorb aquades which is still contained in the essential oil. Essential oil that has separated from the aquades, moved into the bottle vial and analyzed further.

2.4. Additional Materials for the distillation of the scent on a Lotion

Basic materials (lavender/orange peel/green tea/ginger) smashed into small using a blender. Enter the base material which already decimated last into the distillation tools already contains clean water. Next up is the process of distillation (distillation) and boiled until it gained steam (moisture content) the results are distilled in the condenser pipe, steam (moisture) results in fragrance oils distilled Cider (seeds of perfume). Combine steam (moisture) the result is distilled with mineral oil (phenyl ether alcohols) and fixative to obtain seeds of perfume that durable and long lasting. The final process is to enter the seed into the bottle of perfume packaging by using injections.

2.5. Making Lotion

Heat the oil and beeswax and vitamin E oil in a container resistant to heat. Can steamed like when melting the chocolate rod or can be warmed in the microwave. Make sure the material is melted and well blended. Let stand oil mixture until the temperature goes down to be warm. Pour a solution of oil last into a blender. Blend until smooth. Add warm water (make sure the temperature approaches the temperature of the oil to be mixed). A blender again, then add a little warm water again. The Blender again. Do constantly until all ingredients are well blended and not left in the blender. If it gets mixed with a texture resembling lotions, aroma deodorizer tambahnkan: citrus, lavender, green tea, or ginger. Then move the lotion last into a sealed container.

2.6. Test

The lotion is examined by means of these applications on the part of the arm, then insert the arms into the crate containing the mosquito for 5 minutes.

3. Results

3.1 The results of the extraction of Lemongrass (Cymbopogon citratus) Sampling conducted important miyak Lemongrass with distilled water, 1 kg milk soaked aquadest get as much as essential oil ml. 7.20

3.2 Organoleptic essential oil

Table 1. Results Of Organoleptic Essential Oil

Sample	Characteristics			
	Form	Color	Odor	Taste
Lemongrass (*Cymbopogo citratus*)	Liquid	White Yellowish	Typical	Bitter

3.3 The results of the extraction of ginger and orange peel

The taking of the sample extract from ginger and orange peel that soaked aquadest is obtained:

Table 2. The results of the extraction of ginger and orange peel.

Sample	Amount (Kg)	Result (ml)
Ginger (*Zingiber officinale*)	5 kg	4,23
Orange (*Citrus sinensis*)	5 kg	3.65

3.4. The results of the Lotion

On the methodology of the research done 10 times lotion Formulation of essential oil (Cymbopogon citratus) and comparison of 5 concentrations of essential oils that is 5%; 10%; 15%; 20%; and 25%. Estimation of the time of effectiveness of lotions are by way of treatment of mosquitoes that is three times every 3 minutes, 5 minutes, 10 minutes.

The results obtained from test lotion against mosquitoes is 10%; 20%; and 25%. Formula preparations obtained has the effectiveness of different reppelant, the value of effectiveness is influenced by high concentration. The higher the concentrations given then the better power protection against mosquitoes.

Table 3. Test Data Effectiveness Lotion Lemongrass Oil (Cymbopogon citratus)

The concentration of essential	The number of mosquitoes	The number of mosquito bites			Avarage			Mosquito who die on			Avarage		
		3	5	10	3	5	10	3	5	10	3	5	10
5%	25 tails	5	6	6	80%	76%	76%	1	0	0	4%	0%	0%
10%	25 tails	4	5	6	84%	80%	76%	2	2	1	8%	8%	2%
15%	25 tails	4	5	5	84%	80%	80%	4	2	2	16%	8%	8%
20%	25 tails	2	2	3	92%	92%	88%	8	7	6	32%	28%	24%
25%	25 tails	1	1	1	96%	96%	96%	10	8	6	50%	32%	24%

4. Discuusion

Based on the data above, it can be noted that the concentration of the bik as repellant lotion Lemongrass extract contained on with a concentration of 20% and 25% for being able to reject the presence of mosquitoes of arms since the beginning of the treatment until the end of the treatment. Here the author is not using the highest concentration or higher because, uses of essential oils will give too much negative impact on the skin such as:

1. Skin irritation
2. Allergies
3. Are carcinogenic
4. Damage of the liver
5. Death

The authors hope the results of the Development potential of the anti mosquitos from lotion Lemongrass may help decline in diseases caused by mosquito bites like (dengue fever, Malaria, Filariasis Dengue, Chikungunya) based grounds that Indonesia society is a society that is less self-hygiene (hygiene) and sanitary environment that is less clean so that it becomes a place of being both developing mosquitoes. Therefore, it becomes a great opportunity for the development of business lotion

5. Conclusions

Lemongrass oil in the health field can be used as an antiseptic, anti-inflamation, analgetik, and sedative (Giuliani and Satuhu, 2012). This research shows that the extract of Lemongrass can make preparations in lotion, and effective as a repellant against mosquitoes. Lotion is a liquid emulsion consisting of oil phase and water phase stabilised by emulgator, containing one or more active ingredients in it. The lotion is intended for external use as a skin Protectant (Lachman et al 1994). Lemongrass Extract making preparations in the form of lotion because it contains compounds of volatile oil in the form of citronellol and geraniol are have the ability as a rapellant that can repel mosquitoes.

Lemongrass extract lotion percentage against the total number of mosquitoes that rested on the arm probandus during treatment with a time of 3 minutes, 5 minutes and 10 minutes i.e. 5% concentration: concentration of 10% to 15% concentration: 20%: concentration, and concentration of 25%:

Based on the data above, it can be noted that the concentration is good as there is on rapellant Lemongrass extract lotion with a concentration of 20% and 25% for being able to reject the presence of mosquitoes from the arms of probandus since the beginning of the treatment until the end of the treatment

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