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Article Title

Formulation of Balm from Lemongrass Oil as Aromatherapy

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ABSTRACT

This study aims to make a balm formulation from lemongrass essential oil as aromatherapy and to find the results of a physical evaluation of a balm made from lemongrass essential oil. This research uses the experimental method. The research was conducted at the STIKES Bhakti Pertiwi Pharmacy Laboratory, Luwu Raya Palopo. Data obtained from observations and results of laboratory examinations were computerized and presented in tabular form with explanations. The results showed that the preparation of lemongrass leaf balm, which included organoleptic tests, homogeneous tests, pH similarity tests, and irritation tests, resulted in several conclusions. First, formula A, with a concentration of 15% citronella essential oil, meets the requirements for topical balm preparation. Second, formula B, containing 20% citronella essential oil, meets the requirements for topical balm preparation. Third, formula C with a concentration of 25% citronella essential oil does not meet the requirements for topical balm preparation because the preparation undergoes separation between solid and liquid preparations. Therefore, it is recommended for further research to focus on observing the concentration of 25% citronella essential oil so that it can be successfully used as a balsam preparation using laboratory equipment. That is more supportive or can be combined with other chemical substances to make it more homogeneous. In addition, further research is needed regarding more efficient packaging so that it can be easily used by patients, namely in the form of balm sticks, so that the general public likes the aroma of lemongrass. Furthermore, research is needed on the storability test of lemongrass balm formulations.

Keywords: *Aromatheraphy; Balsem; Lemongrass.*

INTRODUCTION

As a tropical country, Indonesia has diverse biological and natural resources. This diversity is very beneficial, especially the many medicinal plants used by the community as medicine. Even for generations, these herbs and medicinal plants have been used as traditional medicines because they are easy to find, affordable, easy to mix, and have low side effects compared to chemical drugs. Therefore, people use it as a traditional medicine for daily health maintenance.

Lemongrass is an herbal plant in the grass family Poaceae and belongs to the Cymbopogon genus (Pranaka et al., 2020). The Cymbopogon genus consists of 140 species that thrive in tropical climates, namely the continents of Asia, America, and Africa. Members of the Cymbopogon genus produce essential oils and are also known as aromatic grasses (Kumar et al., 2009). A strong lemon scent is the main characteristic of this type of grass due to its high oil citral content. This oil's aroma is used in soaps, detergents, and perfumes. As a good source of citral, it has found many applications in the perfumery and food industries (Srivastava et al., 2013).

In lemongrass, the content that is often used as an alternative to herbal medicine is its essential oil (Howarto et al., 2015). To take advantage of the usefulness of the lemongrass, it will be processed to extract its essential oil. Essential oils are substances that give aroma to plants. Lemongrass essential oil consists of a complex mixture of volatile phytochemicals from different classes, including monoterpenes,

sesquiterpenes, and phenylpropanoids. Currently, essential oils have been used as perfumes, cosmetics, food additives, and medicines (Prabandari & Febriyanti, 2017). Many researchers have studied crucial oils' antibacterial, antifungal, antioxidant, and antiviral properties (Azizah et al., 2022). This essential oil is active against many different viruses, such as influenza virus (IFV), human herpes virus (HSV), human immunodeficiency virus (HIV), yellow fever virus, and avian flu (Ma & Yao, 2020).

Aromatherapy is a non-pharmacological therapy using essential oils or pure oil extracts to maintain or improve health, arouse passion, and enthusiasm, stimulate healing processes, and refresh and calm the soul (Manurung & Noviya, 2019). Aromatherapy can trigger changes in the limbic system that will affect heart rate, blood pressure, breathing, and the release of various hormones to create a feeling of calm. Aromatherapy has the effect of reducing pain and anxiety, increasing energy and short-term memory, and relaxation. The application of aromatherapy can be used as inhalation and massage therapy, diffuser, and hot or cold compresses (Gaware et al., 2013). Using aromatherapy given directly through the nose (inhalation) is much faster than other methods.

Several previous studies have also examined the effectiveness of lemongrass essential oil. Lemongrass has also been processed to extract its essential oil, known as citronella oil, for various purposes, including aromatherapy and liniment, for pain relief and increased blood circulation (Santoso et al., 2020).

Usrina (2018) researched the effectiveness of citronella essential oil as a pain reliever. Based on research conducted, it has been found that certain essential oils of lemon grass have relaxing, sedative, and pain-relieving effects. Purba et al. (2020) found that citronella essential oil could be produced as a lip balm in different concentrations, namely 15%, 20%, and 25%. Lemongrass oil can provide an aromatherapy effect characterized by a refreshing aroma when inhaled into a nutritious product that can give a warm feeling. The best concentration as an aromatherapy preparation is 25% because it gives preference to the aroma, and the highest test is based on the results of the preference test conducted on 15 respondents.

Most Indonesian people use limited essential oils in topical oil preparations. Therefore, it is necessary to innovate other preparations, such as stick balm preparations, to increase user comfort and ease of application. Balms are preparations that are applied by rubbing them into the skin with your hands (Warditiani et al., 2020). A galenic-shaped balm applied by hand requires an innovation, namely an aromatherapy balm formulation with warm and soothing properties and a refreshing aroma (Yati et al., 2018). Lemongrass oil once considered "old fashioned" and often used by old people, has become more stylish and modern with a convenient form of balm that can be used as a perfume and can be used by anyone (Rahayu & Naimah, 2010).

Based on the description above, this study aims to make balm formulations from lemongrass essential oil as aromatherapy and to find out the results of a physical evaluation of balm preparations from lemongrass essential oil.

METHOD

A. Overview of Research Methods

This study used an experimental method, which began with sample collection and processing, Simplicia characterization, phytochemical screening, preparation of balsam preparations, and preparation testing. The research was conducted at the STIKES Bhakti Pertiwi Pharmacy Laboratory, Luwu Raya Palopo. The sample used in this research is lemongrass.

This study uses several methods in the data collection process, namely:

1. Primary data is data collected by the researchers. Data regarding the manufacture of balm preparations as aromatherapy were obtained from Laboratory Tests, namely carrying out examinations using the tools available in the research laboratory accompanied by documentation.
2. Secondary data comes from literature searches, research results, relevant literature books, reports, and related agencies.

The tools and materials in this research are as follows:

1. The tools used were a pestle, stirring rod, porcelain cup, measuring cup, mortar, pipette, PH meter, horn spoon, spatula, and digital scales.
2. Ingredients in the manufacture of balm preparations as aromatherapy, namely; lemongrass essential oil, menthol, oleum menthae, liquid paraffin, and album vaseline.

B. Working Method

The workings of making citronella essential oil balm in the Laboratory are as follows:

All ingredients were weighed: paraffin liquid, albumin vaseline, menthol, and oleum menthae. Album vaseline is melted over a water bath. The mortar is heated, and then put liquid paraffin, menthol, oleum menthae, melted vaseline album, and ground until homogeneous. After that, add the essential oil of the citronella plant and stir until it is homogeneous, then leave it to cool. Put it in the available balm container (Indratmoko et al., 2017).

C. Preparation Evaluation Test

1. Organoleptic test

It is an examination that aims to observe whether there is a change or separation of the emulsion, odor or not, and color changes (Pitaloka, 2019).

2. Homogeneity Test

The homogeneity test aims to see whether or not the particles are separated or the dispersed phase is evenly distributed in the dispersing phase visually and by touch (Pitaloka, 2019).

3. pH similarity Test

An examination aims to determine whether the pH of the preparation is compatible with the pH of the skin, namely 4.5-6.5 (Tranggono & Latifah, 2017). It is because if the pH of a product is too high or low, it will irritate the skin. Apriliani and Aniriani (2017) explains that skin products should have a pH of around 5.5, while according to SNI Number 16-4399-1996, the recommended pH for cream products ranges from 4.5-8.0.

4. Irritation Test

An irritation test was carried out to determine the irritating effect of the Balm Cream preparations after being used on the skin so that the safety level of the Balm preparations could be determined before being sold to the public (Jumriani et al., 2022). This irritation test is done to prevent side effects on the skin (Wasitaatmadja, 2019).

D. Data Analysis

The data obtained from the observations and the results of laboratory examinations were processed computerized and presented in tables accompanied by explanations.

RESULTS

The results obtained during the manufacture of nutritional products from Cymbopogon citratus (DC) Stapf essential oil were divided into 4 (four) samples, as follows:

A. Organoleptic/Sensory test

Table 1. Organoleptic/Sensory Test Results

Indicator	Formula	Obervation	
		Week I	Week II
Color	A	White	White
	B	White	White
	C	White	White
Form	A	Semi Solid	Solid
	B	Semi Solid	Solid
	C	Semi Solid	Liquid
Odor	A	Lemongrass	Lemongrass
	B	Lemongrass	Lemongrass
	C	Lemongrass	Lemongrass

Source: Primary Data 2022

Information:

1. Formula A: Lemongrass Essential Oil Concentration 15%
2. Formula B: Lemongrass Essential Oil Concentration 20%
3. Formula C: Lemongrass Essential Oil Concentration 25%

B. Homogeneity Test

Table 2. Homogeneity Test Results

Formula	Obervation	
	Week I	Week II
A	Homogen	Homogen
B	Homogen	Homogen
C	Homogen	Inhomogenous

Source: Primary Data 2022

C. pH similarity Test

Table 3. pH Similarity Test Results

Formula	PH Standard of Human Skin	Observation	
		Week I	Week II
A	4,5 – 6,5	5	5
B	4,5 – 6,5	5	5
C	4,5 – 6,5	5	5

Source: Primary Data 2022

D. Irritation Test

Tabel 4. Irritation Test Results

Formula	Volunteer	Observation After Giving	
		12 hours	24 hours
A	5	0	0
B	5	0	0
C	5	0	0

Source: Primary Data 2022

Based on HET-CAM is a method used to classify the irritating potential of compounds. In this study, the index of severity of irritation reaction, no irritation: 0.0, very slight irritation: 0.1-0.4, slight irritation: 0.41-1.9, moderate irritation: 2.0-4.9, irritation severe: 5.0-8.0.

DISCUSSION

In this study, the active ingredient used was lemongrass essential oil. It contains compounds such as citronella, citral, geraniol, methylheptenone, eugenol-methylether, dipentene, eugenol, kadinene, cadinol, limonene, saponins, flavonoids, polyphenols, and alkaloids. Based on research conducted by Khasanah et al. (2011), it was found that certain essential oils from citronella leaves act as relaxants, sedatives, and pain relievers. Aromatherapy oil produced from lemongrass aromatherapy functions as an antidepressant, namely suppressing and eliminating depression or stress so that it can cause a feeling of relaxation in both body and mind (Sumiartha et al., 2012).

Additives used in this study were menthol to create a relaxed and fresh feeling, champora as an anti-irritant, solid paraffin to solidify the base layer of the balm and album petroleum jelly as a background layer that sticks to the skin. The physical evaluation of the preparation includes sensory tests, homogeneity tests, pH tests, and irritation tests. Inoculant sensory testing (Table 1) showed that the sensory test of the three formulations from the first week to the second week had the best A and B

formulations from semisolid to solid. Formula C does not produce good semisolids to liquids. From the results of observing the composition, it was found that conditioners with formula A at a concentration of 15% and B at a concentration of 20% had a solid texture. In comparison, formula C at a concentration of 25%, had a solid-liquid texture. If the main ingredient of lemongrass essential oil is too large, it will affect the level of mixing, causing the ingredients to be inconsistent. The results of a different study conducted by Romadhonni and Anastasia (2019) with formulations A and B found that the two formulations with different concentrations showed good, best formulations and had dense textures.

Research conducted by Purba et al. (2020) formulated citronella essential oil with concentrations of 15%, 20%, and 25%. The higher the concentration of essential oils, the more oily the preparation will be, and the consistency of the stick balm will become softer. Thus, the reason for adding citronella leaf essential oil at a concentration of 15% was because, at this concentration, there was already a distinctive lemongrass aroma, and it gave the stick balm consistency that was good and not too oily.

Observations on the colour of the preparations obtained from formulas A, B, and C from week 1 to week two did not change colour during storage; formulas A, B, and C were still plain white. As with previous studies where samples showed that the balsam preparation during storage time was stable (Usrina, 2018). Conduct a homogeneity test of Cymbopogon citratus (DC) Stapf essential oil formulation to determine whether the resulting formulation contains coarse particles. When a variety of fine balsams are used, they must be free of particles or particles that retain agglomerates. The homogeneity test procedure includes taking up to 0.5 g of the preparation and spreading it on three slides to observe homogeneity. The balm is said to be homogeneous if there are no large particles on the three blades (Romadhonni & Anastasia, 2019).

Homogeneity testing of the stick balm preparation is carried out by smearing the stick balm preparation on the surface of a glass object or other transparent material. Good homogeneity results Stick balm with 20% citronella essential oil. Results of Simplicia Characterization before the essential oil is taken into a stick balm preparation, the lemongrass leaves are first characterized. In research conducted by Triana (2019) on homogeneity tests on ginger essential oil preparations with formula concentrations 1 to 5 (0%, 5%, 10%, 15%, and 20%) by applying them to glass (glass object) shows no lumps and flat structure and has a uniform colour from the starting point of application to the endpoint.

Based on Table 2, observing the homogeneity of the preparations made in the first week of samples A, B and C gave homogeneous results. However, in the second week, samples A and B remained homogeneous, showing a formula where the composition

of the balm was homogeneous, but sample C showed heterogeneous properties where the active ingredients were: Lemongrass essential oil separated into liquid. The factor that affects the homogeneity of preparation is the process of mixing the ingredients (Dwi Rachmawati., 2018). In this study, the mixing process was carried out by melting all the ingredients at a certain temperature so that this process determined whether the stick balm preparation was homogeneous or not.

Because only two formulations gave consistent preparation results and met the consistency test requirements, the results of the pH similarity test were obtained in Table 3. The parameters observed in the pH testing process were carried out after the balm made from Cymbopogon citratus (DC) Stapf citronella essential oil was made with different concentrations. This test was carried out using a universal pH through a sample of the balm preparation from the essential oil of citronella leaves, weighed as much as 1 gram, put in a porcelain cup, and then melted. The pH requirements for an excellent topical preparation must match the pH of human skin, which is 4.5-6.5 (Usrina, 2018).

The Irritation test on the balm formulation from the essential oil of Cymbopogon citratus (DC) Stapf citronella leaves aims to determine whether the preparations are safe. Based on Table 4, the results of observations of the irritation test of the preparations carried out in the first 12 hours on the skin given samples A, B and C did not show any irritation reactions. Furthermore, at 24 hours, samples A, B and C remained consistent, showing no signs of irritation to the skin given the balm preparation formula. The results of this study are in line with research at a concentration of 15% and 20%, which was conducted by Purba et al. (2020), where the three formulas did not show irritation to the skin given a balm in the form of a stick in aromatherapy made from citronella oil by applying a stick balm preparation to the skin of the arm, then left for 30-60 minutes and observed skin reactions that occur. An irritant reaction occurs when there is a rash or swelling, itching, or a small lump in the area that is being treated. In the 25% concentration treatment, there was a difference in where the treatment was carried out; there was a separation of solid and liquid preparations due to different treatment times.

The limitation of the test in our study was that the observation time was only carried out for two weeks, so the hedonic test observation to observe the concentration of aromatherapy was the most preferred by respondents. Similar research was conducted by Triana (2019) regarding aromatherapy for white ginger balsam preparations, showing that respondents preferred aroma at a concentration of 20%. In addition, further research is needed regarding more efficient packaging so that it can be easily used by patients, namely in the form of balm sticks, so that the general public likes the aroma of lemongrass. Furthermore, research is needed to be related to the storability test of lemongrass balm formulations.

CONCLUSIONS AND SUGGESTIONS

Based on the research results in the manufacture of lemongrass leaf balm preparations which included organoleptic tests, homogeneous tests, pH similarity tests, and irritation tests, resulted in several conclusions. First, formula A, with a concentration of 15% citronella essential oil, meets the requirements for topical balm preparation. Second, formula B, containing 20% citronella essential oil, meets the requirements for topical balm preparation. Third, formula C with a concentration of 25% citronella essential oil does not meet the requirements for topical balm preparation because the preparation undergoes separation between solid and liquid preparations. Based on these conclusions, it is recommended for further research focus on observing the concentration of 25% citronella essential oil so that it can be successfully made into balsam using laboratory equipment that is more supportive or can be combined with other chemical substances to make it more homogeneous. In addition, further research is needed regarding more efficient packaging so that it can be easily used by patients, namely in the form of balm sticks, so that the general public likes the aroma of lemongrass. Furthermore, research related to the storability test of lemongrass balm formulations is needed.

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