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YLANG FLOWER GEL ANTIFUNGAL EFFECTIVENESS

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ABSTRACT

Ylang flower (Cananga odorata) has effectiveness as an antibacterial and antifungal because the ylang flower plant contains the main compounds, namely -linalool (12.8%), -caryophyllene (8.99%), farsenol (6.8%), germacren- D (5.35%), -bergamotene (8.45%), and benzyl benzoate (5.9%). The substances contained in ylang flower essential oil are alcohol (53% - 65%) with methylbenzoate esters, linalool esters, and terpineol esters, sesquiterpenes which have anti-inflammatory, antimicrobial, antioxidant properties, and also prevent bacteria and germs and have anti-inflammatory activity. local anesthetic. The essential oil of ylang flower has antibacterial properties because the substances contained therein are in the form of an active component called kariofilen. This karyophylene compound has anti-inflammatory, antimicrobial and germ-preventing properties. This study was conducted to determine the effectiveness of the antifungal contained in the gel from ylang flower (Cananga odorata) using the disc diffusion method, which is the method used in microbial testing, and to determine the concentration of hydroxy propyl methyl cellulose (HPMC) with the addition of propylene glycol used. as a humectant in order to maintain the stability of the gel preparation on physical properties and the effectiveness of ylang flower essential oil as an antifungal by making a gel preparation. The essential oil gel from ylang flower was used as a test of the physical properties of the gel (pH, viscosity, homogeneity, dispersion and adhesion). The results of the research that have been carried out prove that the gel formula from ylang flower extraction using HPMC base with a concentration of 5% has good physical properties of the gel because it is seen in the organoleptic test, pH test, viscosity, homogeneity, dispersion and adhesion meet the specified requirements. in stock. It can be concluded in this study that the gel preparation of ylang flower has antifungal activity or can inhibit the presence of M.furfur fungus from a gel based on HPMC with a concentration of 5% has good gel physical properties and better antifungal activity compared to gel which has a better concentration 10% and 15%.

Keywords: antifungal; cananga odorata; gel; ylang flower

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INTRODUCTION

The various types of plants found in Indonesia have many benefits listed in it, one of the plants in question is the ylang plant (Cananga odorata), not only the plants that have efficacy but the flowers of the ylang plant which can produce essential oils. This flower comes from various countries, especially in the Philippines, Thailand and in our country Indonesia (GWP Sari Supartono, 2014). The benefits listed in essential oils are as skin diseases, shortness of breath, mosquito repellent, anti-microbial and antioxidant. Cananga oil is used as an antibacterial or antifungal because the compounds listed have hydroxyl (-OH) and carbonyl functional groups, ylang oil also functions as an antioxidant because it contains benzyl benzoate which has anti-free radical properties. Compounds found in ylang flowers include saponins, flavonoids, and volatile oil compounds containing polyphenols, farsenol, metal benzoate, and benzyl benzoate (Ariyanti, Ariyanti, Tyas, 2016).

Ylang flowers have a distinctive floral aroma, with light yellow to dark yellow patterns. Ylang flower is one of the plants that can be used as traditional healing. The extracts listed in it have anti-inflammatory, antibacterial, antifungal or antimicrobial properties, antioxidants and many more properties listed in ylang flowers (Rahma Yulis et al., 2020). Essential oils are odorous substances contained in plants, these oils are commonly referred to as volatile oils, etheric oils, and essential oils because at room temperature they evaporate. The properties and natural activities of essential oils are bound to the chemical content in them. The chemical components listed in essential oils determine the commercial value for industrial raw materials. One of the essential oils produced in Indonesia is ylang oil because it has a complex chemical content and has various natural activities, because the chemical composition of ylang ylang oil includes hydrocarbon sesquiterpenes, alcohols, esters, ethers, phenols and aldehydes (Pujiarti et al., 2015).

In order to obtain the essential oil from the ylang flower so that it is carried out by the steam distillation method, with this method, an essential oil with a strong aroma is produced. Isolation of ylang flower essential oil components using steam distillation procedure for 8 hours (Rachmawati et al., 2013). Essential oils were obtained from as much as 5 kg of ylang flowers by steam distillation at a temperature of 108°C for 8 hours after which 55.20 ml of essential oil was obtained, the yield was 1.02% (Herlina et al., 2020). We often encounter diseases caused by microorganisms such as fungi in Indonesia because Indonesia has a tropical climate, causing high humidity with an average temperature of 27-33°C. Malasezia furfur (M.furfur) is a fungus that infects humans a lot, this type of fungus causes skin disorders, namely tinea versicolor, which is often found in skin diseases, both women and men, small children to old people because of the influence of aspects of hygiene and sanitation that are not good (Sihombing & Saraswati, 2018). So in this antifungal treatment there are ylang plants whose flowers can be used as an antifungal treatment because in ylang flowers there are main compounds, namely -linalool (12.8%), -caryophyllene (8.99%), farsenol (6.8%) , germacren-D (5.35%), -bergamoten (8.45%), and benzyl benzoate (5.9%). The substances listed in the ylang flower essential oil are alcohol (53%-65%) with methylbenzoate esters, linalool esters, and terpineol esters, sesquiterpenes which have anti-inflammatory, antimicrobial, antioxidant properties, and also avoid germs or bacteria and have anti-inflammatory activity. local anesthetic.

One of the pharmaceutical dosage forms is gel or commonly called jelly, gel preparation is a semi-solid preparation consisting of a suspension made of small inorganic particles or large particle molecules, penetrated by a liquid. The advantages of gel preparations compared to other preparations are that it facilitates thorough consumption on the skin and can stick easily and easily absorbs on the skin, easy to apply so that it can be used by small children to old people and also easy to clean with water (Rachmaniar et al., 2015). Gel preparations are made because they have several advantages, namely the application does not spill, is elastic and can be created in shape (Illsanna & Eka, 2018). The formulas commonly used in gel preparations consist of gel base ingredients and additives. Common types of gel bases are hydroxy propyl methyl cellulose (HPMC) and propylene glycol. The concentration of HPMC in the gel preparation can affect the viscosity. Gel viscosity can affect the release of essential oils in gel preparations containing essential oils, if the gel is thick, the gel can trap essential oils in the preparation (Emi Rahma Wulandari, Indri Hapsari, 2011).
The gel preparation was chosen because it is not sticky when used, requires light energy to make formulations, is a constant preparation, and has good aesthetic value. This gel preparation can be obtained by formulating several types of gelling agents, but it is important to emphasize the selection of gelling agent materials. This research tried the formulation of

gel extract from ylang flower by modifying the concentration of the HPMC base with the addition of propylene glycol as a humectant, and methyl paraben and evaluation of the gel in the form of homogeneity tests, organoleptic tests, pH, dispersion and also gel adhesive energy used as antifungals in M fungi. furfur (Yusuf et al., 2017).

METHOD

The antifungal compound test is a test of a compound that can inhibit the growth of fungi by measuring the response of the growth of the population of microorganisms to antifungal agents. This study uses the disc diffusion method, this method is often used for antimicrobial testing. Consists of 3 steps, the first step is extracting ylang flowers to produce essential oils using the steam distillation method. The second step was to determine the lowest concentration of ylang flower gel in inhibiting and killing the M.furfur fungus. The last step was to test the antifungal activity using the disc diffusion method in order to determine the biological activity of the ylang flower gel compound group that could inhibit the growth of the fungus M.furfur.

Ingredient

The materials used in this study were SDA (Saboround Dextrose Agar) agar medium, ylang flower extract (yanga flower essential oil), ethanol, HPMC, propylene glycol, aquades, vaseline, small ceramic stones, and M.furfur fungus.

Tool

The tools used include glassware, petri dishes, pH meters, stirring rods, incubators, autoclaves, analytical balances, steam distillers, mortars and stempers, spirit lamps, round loops, erlenmeyer, tweezers, paper discs, test tubes. , tripod, Bunsen burner, distillation flask, hose, flat flask, tweezers, metal spatula, viscometer (Rion VT-04), universal pH paper, silica gel F254, micropipette, UV detector, temperature and humidity meter (Octaviani et al., 2019).

Research Stages

1. Extraction of ylang flower essential oil

The manufacture of essential oil from ylang flowers uses the steam distillation method to produce essential oils by inserting ylang flowers in a steam flask then small ceramic stones are inserted into the distillation flask that has been assembled then the water tap is turned on so that it flows through the distillation hose, then the Bunsen fire is lit under the flask. The distillation is allowed to produce steam and the essential oil is accommodated in the erlenmeyer that has been provided.

2. Preparation of essential oil gel preparations from ylang flowers

The gel is made by developing an HPMC base with aquadest and then mixed with ylang flower extraction in the form of essential oil and then with an additional ingredient, namely propylene glycol (Mikhania et al., 2019). The HPMC concentrations used in the formula are 5%, 10% and 15%. Ylang flower gel formulation can be seen in Table 1.

Table 1.
Gel formulation from ylang flower

extractionSample	Gel formula			
	F1	F2	F3	KN
Essensial oil (g)	8	8	8	-
HPMC (%)	5	10	15	5
Propilenglikol (g)	5	5	5	6
Aquadest ad (g)	50	50	50	50

Information :
F1 = formula containing essential oil from ylang flower and gel base from 5% HPMC material
F2 = formula containing essential oil from ylang flower and gel base from 10% HPMC material
F3 = formula containing essential oil from ylang flower and gel base from 15% HPMC material
KN (negative control) = formula that does not contain ylang flower essential oil and 5% HPMC gel base
The positive control (KP) used in this study was 2% ketoconazole gel sold in pharmacies.

3. Test the antifungal activity of ylang flower essential oil gel on M.furfur
Several stages of testing were carried out including sterilization of tools, manufacture of SDA (Saboround Dextrose Agar) media. The SDA media was heated until it melted, poured into 3 test tubes, placed at an angle, allowed to solidify, then the fungal colonies were taken to be scratched on the media so that they were tilted and incubated at 36°C for 1 day. To make a suspension of M.furfur mushrooms, the mushrooms were planted and then incubated at 36°C for 24 hours (Sihombing & Saraswati, 2018). The antifungal activity was tested using the 7 mm diameter paper disc diffusion method. Put the M.furfur mushroom suspension in a petri dish then add the liquid SDA media and let it solidify. On top of the SDA media, place the disc paper that has been smeared with ylang flower gel, slightly pressed, left for 30 minutes and incubated at 36°C for 24 hours. After 24 hours, observe the clear zone around the disc paper. If a clear zone is formed, then the measurement is carried out with a caliper. This clear zone indicates the presence of antifungal activity. Parameters were measured to determine the antifungal inhibition zone in gel preparations that have a class of compounds contained in ylang flowers.

4. Evaluation of gel preparation which includes organloleptic test, homogeneity test, pH test, dispersion test, adhesion test and viscosity test.

RESULTS
Evaluation for ylang flower gel included organoleptic test, homogeneity test, pH test, dispersion test, adhesion test, and viscosity. The results of the observations obtained from the organoleptic test of the gel are shown in Table 2, the results of the evaluation of the homogeneity test, pH test, dispersion test, adhesion test, and viscosity test are in Table 3.
Organoleptic Test.

Table 2.
Results of the observation of the ylang flower gel organoleptic test

	Characteristics		
	Color	Smell	Consistency
KN	Clear	Odorless	Thick
F1	Light yellow	Special ylang flower	A bit thick
F2	Light yellow	Special ylang flower	Thick
F3	Light yellow	Special ylang flower	Very thick

The organoleptic test was carried out by observing directly the color, odor, and consistency of the gel preparation. The difference in the concentration of the HPMC base material does not affect the color and odor of the gel preparation but does affect the consistency of the gel, the higher the concentration of HPMC, the thicker the gel consistency (GWP Sari Supartono, 2014).

pH test

pH was measured by dipping a universal pH stick in a gel preparation that had been made which had previously been diluted with distilled water. The type of concentration of the HPMC material did not change the pH of the gel in all the test formulations carried out, the resulting pH was 5, but in the negative control the resulting pH was different, namely pH 6, this was due to the addition of extraction material from ylang flower. The pH of good topical preparations generally ranges from 5 to 6.5. This means that the pH that has been carried out in the study is in accordance with the desired pH.

Spreadability Test

The ylang flower gel spreadability test with the same load resulted in an ylang flower essential oil gel using a 5% HPMC base concentration to obtain dispersion in accordance with the conditions specified in general topical preparations, which is in the range of 5-7 cm. Gels with different concentrations of 10% and 15% dispersion produced did not meet the specified requirements because it was less than 5-7 cm dispersion, due to the higher base concentration of HPMC used, the lower the spreadability of the gel preparation. This dispersion is inversely proportional to the presence of viscosity. The greater the viscosity of the preparation, the thicker the consistency, and the smaller the spreadability obtained.

Adhesion Test

All ylang flower gel formulas that have been tested, the results of the positive control and negative control have met the specified requirements because the adhesion produced is more than 1 second. The results of the study showed that the greater the concentration of the HPMC base used, the longer the stickiness of the gel preparation. This is because the base of HPMC expands and forms colloids when dissolved in plain water or hot water. The higher the concentration of the HPMC base, the more colloids formed, so that the resulting adhesion is high.

Table 3.
The results of the evaluation of ylang flower gel that have been carried out are as follows:Gel

	Homogeneity	Ph	Spreadability (cm)	Adhesion (cm)	Gel Viscosity (mPa.s)
KN	Homogeneous	5	5,9	1,15	3507
KP	Homogeneous	6	5,06	1,06	-
F1	Homogeneous	5	5,5	1,37	4590
F2	Homogeneous	5	4,5	2,15	7450
F3	Homogeneous	5	3,5	3,05	9908

3.5 Viscosity Test

The results of the viscosity test that have been carried out show that the higher the concentration of the HPMC base for each formula, the higher the viscosity, due to the thick gel so that the viscosity is higher. The viscosity of the preparation is inversely proportional to diffusion, therefore the higher the concentration of the HPMC base, the greater the viscosity of the preparation, the smaller the release of the active substance.

Based on the gel evaluation that has been carried out, it can be seen that increasing the concentration of HPMC base 5%, 10% and 15% in each ylang flower gel preparation can increase the viscosity of the gel, stickiness, decrease gel spreadability, and affect the increase in gel consistency over time. organoleptic test without changing the pH test of the gel preparation and the homogeneity of the gel preparation. The formula that has good gel physical properties can be seen in the results of the physical properties test of the gel preparation, namely organoleptic test, homogeneity test, pH test, dispersion test, adhesion test and viscosity. concentration of 5% because almost all tests with that concentration met the requirements specified in the gel preparation compared to concentrations of 10% and 15%.

Antifungal Activity Test

The antifungal activity test of ylang flower gel was carried out using the disc diffusion method. This test was carried out with the aim of knowing the amount of release of the active substance by measuring the diameter of the fungal growth inhibition zone (Triana et al., 2016). The results of the antifungal activity tests that have been carried out on this ylang flower gel preparation are listed in Table 4 as follows:

Table 4.
Test results of antifungal activity of ylang flower essential oil gel

	Obstacles zone (mm)	Activity power
KN	-	-
KP	29,1	Very strong
F1	25,5	Very strong
F2	19,2	Strong
F3	15,5	rong

Table 4, it can be seen that the ylang flower essential oil gel using HPMC base has antifungal activity against M.furfur fungi as seen from the formation of inhibition zones. The results of the antifungal activity test on HPMC based gel with a concentration of 5% could inhibit the growth of the fungus the highest, then on HPMC gel with a concentration of 10% and 15%.

DISCUSSION

Gel formulation containing ylang flower essential oil used HPMC gel base. The gel base made from HPMC is a gelling agent which is commonly used in a mixture of cosmetics and drugs, because the gel preparation is clear, easy to wash with running water and has a low toxic effect, is neutral, has a stable pH between 3 and 11, is resistant to acid and base, resistant to microbial attack as well as heat resistance. The gel base of HPMC material has better dispersion than carbopol, methylcellulose and others, so it can be applied to the skin. Good gel preparations have a short spread time (Yusuf et al., 2017). Observation of the homogeneity test of the gel preparation was carried out by smearing on a piece of glass, then observing the presence or absence of coarse grains and the resulting color was the same or not. The results of the research that has been carried out on all test formulas and negative controls show that if there is a color similarity, namely light yellow and the absence of particles or coarse granules in the gel preparation, the gel preparation can be said to be homogeneous and fulfill the requirements (Rumayar et al., 2020).

The difference in inhibition was caused by the effect of the release of the HPMC base to inhibit the fungus. It is shown by the greater the concentration of the HPMC base, the greater the viscosity, the greater the resistance (Yusuf et al., 2017). The smaller the dispersion power, the more difficult it is for the active substance to release the active substance which can cause the lower inhibitory power of the M.furfur fungus to be obtained. The positive control gel had a greater inhibitory power than the negative control which had absolutely no antifungal activity because there was no active substance (ylang flower essential oil).

Furthermore, the antifungal activity test that has been produced is then carried out statistical tests. The data from the antifungal activity test results that were not suitable for non-parametric tests were the Kruskall Wallis test and continued with the Mann Whitney test. The results of the Kruskall Wallis statistical test obtained a significant value, namely $p = 0.014$ ($p < 0.05$), it can be concluded that there was a significant difference between each treatment control of the inhibition zone caused by the fungus M. furfur. Next, the Mann Whitney test showed that there was no significant difference between the treatment group and the positive control gel with a 5% HPMC base concentration because it had an inhibitory zone against fungi. Meanwhile, the gel control group with concentrations of 10% and 15% had a significant difference because the diameter of the fungal inhibition zone was smaller than the positive control. From the antifungal activity research, it was found that the higher the concentration of the HPMC base used in the ylang flower gel preparation, the more difficult it was to release the active substance so that the inhibition zone of the fungus produced was smaller or even the antifungal activity was smaller in the M.furfur fungus (Yusuf et al., 2017).

CONCLUSION

From the research that has been done on the effectiveness of antifungal gels from ylang flower extraction, the results showed that the antifungal activity of the M.furfur type and the gel containing the HPMC base with a concentration of 5% had good physical properties of the gel and had better antifungal activity than the gel. HPMC-based concentrations of 10% and 15%.

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