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EFFECTIVENESS OF ANTIBACTERIAL SOAP COMBINATION OF SWEET ORANGE PEEL ESSENTIAL OIL AND BASIL LEAVES

Gigih Kenanga Sari*[1]
Maulita Saraswati *[2]
*[1,2,3] Universitas An Nuur Purwodadi, Jawa Tengah, Indonesia
Email : *gigihkenangasariapt@gmail.com*

Abstract: *Bacterial skin infection by Staphylococcus aureus, namely boils, impetigo, cellulitis, and Staphylococcal Scalded Skin syndrome (SSSS). Synthetic antibacterials can prevent infection, but have their own problems, such as irritation. Natural ingredients can be used as an alternative, namely sweet orange (Citrus sinensis) and basil (Ocimum basillicum L.) leaves. This study aims to determine the antibacterial effect of liquid soap containing essential oils of sweet orange peel (Citrus sinensis) and basil leaves (Ocimum basillicum L.). Method: Liquid soap essential oil of sweet orange peel (Citrus sinensis) and basil leaves (Ocimum basillicum L.) against Staphylococcus aureus was tested by disc diffusion. This study used Dettol Original soap as a positive control which was stored for 28 days and analyzed using SPSS one-way ANOVA with 95% confidence level, followed by well diffusion to see the diameter of the zone of inhibition (mm). Result: The results showed that all concentrations had inhibitory potential against Staphylococcus aureus which was determined based on the zone of inhibition, with a mean of >20 mm or 30 mm. Conclusions: Liquid soap combination of essential oils from sweet orange peel and basil leaves showed a very strong antibacterial effect against Staphylococcus aureus bacteria.*

Keywords: *Antibacterial; Sweet orange peel; Basil leaves; Soap*

Introduction

Health is a healthy condition, both physically, mentally, spiritually and socially that allows everyone to live productively socially and economically as stipulated in the Law of the Republic of Indonesia Number 36 of 2009 concerning health. One of the factors that is considered important in the welfare of the population in Indonesia is health. However, many health problems in Indonesia are still found and must be resolved1. Infection is a disease that often occurs because of microorganisms that enter the body, causing normal physiological disturbances in the body. Staphylococcus aureus is the most common and common cause of infection. The use of antibacterial from synthetic materials can prevent infection, but not a few have side effects such as irritation. This encourages the shift to the use of preparations derived from nature.

Soap is a preparation used by the public as a washing cloth and skin or other cleaners. There are various types of soap on the market in various forms, ranging from washing soap, bath soap, hand soap, household cleaning soap in the form of cream, solid or bar, powder and liquid form2, in terms of use, liquid soap is easier to use3 .

Indonesia has several types of plants that are proven to have antibacterial activity. One of the plants that contain one or more active ingredients that can be used as an antibacterial is sweet orange peel and basil leaves. The main ingredients in sweet orange peel and basil leaves are essential oils. The essential oil in sweet orange peel and basil leaves has the ability to inhibit the growth of Staphylococcus aureus bacteria4. Essential oil is one type of secondary metabolites produced by a plant. This secondary metabolite is used as a defense against various microbial attacks.

Staphylococcus aureus is a bacterium that is often found on the skin and is one of the normal flora found on the skin surface. Almost everyone has experienced a Staphylococcus aureus infection in their life, with varying degrees of severity, from food poisoning or mild skin infections to severe infections. Based on this, the researchers were interested in making a liquid hand soap formulation of essential oils of sweet orange peel (Citrus sinensis) and basil leaves (Ocimum basillicum L.)

by looking at the preparations having good physical and physical properties, and having antibacterial activity against Staphylococus aureus.

Metode

Sampling and Processing

The raw materials of sweet orange and basil that have been collected are sorted wet and then washed with running water. The skin of the sweet orange and basil is peeled and cut into several parts. Samples of sweet orange peel and basil were dried in the open air and not exposed to direct sunlight. Furthermore, it is sorted dry and weighed and stored in an airtight container, dry, kept away from direct sunlight and clean.

Oil Refining by Steam-Water Distillation Method

The sample is distilled for ± 3-4 hours. The distillate is separated in a separatory funnel, the oil will separate from the water to form a layer on the surface. The water at the bottom is separated by opening the separatory funnel. Then the oil obtained was centrifuged and anhydrous Na2SO4 was added. The oil is then collected and stored in a tightly closed container and protected from light. Furthermore, the yield calculation and essential oil quality testing were carried out by measuring the refractive index and specific gravity of the essential oil.

Phytochemical Screening

The identification carried out in this study was the identification of essential oils, alkaloids, flavonoids, tannins, saponins, phenols, steroids and terpenoids.

Terpenoid Thin Layer Chromatography (TLC) Analysis

TLC was carried out by spotting the essential oil on the TLC Silicagel Gel 60 F254 plate. The mobile phase used was ethyl acetate and n-hexane (1 : 9). Observed under UV light of 254 um and 366 um. Then sprayed with vanillin and H2SO4 to form a purple color.

The Liquid Bath Soap formulation is in Table 1. Modified formula for hand washing liquid soap, essential oil of sweet orange peel and basil leaves @ 100 ml.

Antibacterial Effectiveness Test

Antibacterial effectiveness test using disc diffusion method (Kirby-Bauer test). Each test bacteria were inoculated on Mueller-Hinton Agar (MHA) media. Paper discs were placed on the surface of the media, then samples of liquid bath soap, essential oil of sweet orange peel and basil leaves with varying concentrations. Positive control (dettol) and negative control were dripped as much as 20 L on paper discs. Petri dishes were incubated at 37°C for 24 hours and then observed the inhibition zone formed which was interpreted by looking at the clear area around the disc which indicated that there was no bacterial growth8.

Data analysis

using SPSS one-way ANOVA with 95% confidence level, followed by well diffusion to see the diameter of the inhibition zone (mm).

Result and Discussion

The results showed that all concentrations had inhibitory potential against Staphylococcus aureus which was determined based on the zone of inhibition, with a mean of >20 mm or 30 mm.

The liquid soap formula used is the result of a modification of the material from research on the formulation of liquid soap preparations of basil leaf extract and research on optimization of HPMC concentration on the quality of menthol liquid soap. The ingredients used in the liquid hand soap formula for essential oils of sweet orange peel and basil leaves are sodium lauryl sulfate (SLS), stearic acid, potassium hydroxide (KOH), carboxyl metal cellulose (CMC), butyl hydroxy toluene (BHT), methyl paraben, castor oil, aquadest in table 1.

Antibacterial activity test was carried out in BSC class II type A1 by well diffusion method with a 6 mm bore hole with Staphylococcus aureus as the test bacteria. And then measured the inhibition zone formed. The results of the tests carried out are obtained in table II. In the table, the results show that essential oil liquid soap at a concentration of 3%, 6%, 9% formula, negative control, shows the average diameter of the inhibition zone which is categorized as very strong, namely > 20 mm. The test results in table II, the lowest concentration of 3% has the strongest inhibition zone, because it is not only the concentration in a formula that

affects the size of the inhibition zone formed but the number or volume of samples inserted into the wellbore greatly affects the inhibition zone formed.

Conclusions

Liquid soap combination of essential oils from sweet orange peel and basil leaves showed a very strong antibacterial effect against Staphylococcus aureus bacteria.

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