

Liquid Soap Formulation Ethanol Extract Avocado Skin (*Persea americana*) Against Bacteria *Staphylococcus aureus*

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Abstract

Avocado peels contain Flavonoid compounds and alkaloids as antibacterial. In this study, the ethanol extract of Avocado peels was formulated as a liquid soap using concentrations of FI (1%), FII (3%) and FIII (5%). This study aimed to formulate a liquid soap from a sample of Avocado peel extract against the antibacterial activity of *Staphylococcus aureus* using the agar diffusion method in wells. Physical evaluation of liquid soap preparations includes several parameters, namely organoleptic tests including odour, shape and colour, pH test, foam stability test, viscosity test and homogeneity test. The results obtained from testing liquid soap using ethanol extract of Avocado peels with varying concentrations of 1%, 3% and 5% can inhibit the growth of *Staphylococcus aureus* bacteria, namely 1% = 19.6, 3% = 21.6 and 5% = 25.8. Based on the results of this study it can be concluded that the ethanol extract of Avocado peels (*Persea americana*) can be formulated in the form of liquid soap and is effective against inhibition of *Staphylococcus aureus* bacteria. In this study, FIII fulfilled the physical quality evaluation test and had activity as an antibacterial, with the resulting inhibition zone at a concentration of 5% = 26.6 mm, a powerful category.

Keywords: Liquid soap; *Staphylococcus aureus*; skins.

A. INTRODUCTION

Indonesia is a country that has enormous natural resources. One of the natural resources that is utilized is plants which are used as raw materials for traditional medicine. Indonesian people have long used medicinal raw materials from plants around them whose benefits have been proven empirically or from generation to generation. There are many types of plants used as medicinal plants, one of which is avocado skin. Apart from being known as a medicinal plant, avocado skin is also used as a vegetable which is consumed daily by Indonesian people and even abroad. Avocado skin has many benefits, namely it can reduce blood sugar levels and is anti-inflammatory, antioxidant and antimicrobial (Fitriana, 2017).

Skin infections caused by various bacteria, including the bacteria *Staphylococcus aureus* one of the infectious problems that can cause morbidity and death in developing and developed countries. The *Staphylococcus aureus* bacteria is the main pathogen for humans, almost everyone experiences several *Staphylococcus aureus* infections throughout their lives, such as food poisoning and skin infections due to external pollution and dust. One way to avoid skin infections caused by bacteria is by bathing, but if you only shower without using soap as a cleanser, microbes on the skin will continue to multiply, for this reason, antibacterial liquid bath soap is made as an effort to minimize bacteria on the skin (Yulianti et al. , 2015).

Liquid soap is a cosmetic product that is used as a daily body cleanser. As time goes by, people prefer soap in liquid form because it is easy to carry wherever it is stored in a tightly closed and more hygienic container. Based on the properties of the avocado skin plant as an antibacterial, in this research, a liquid bath soap preparation will be made from avocado skin extract to see its activity against skin infections caused by *Staphylococcus aureus* bacteria. In research conducted by (Dimaet al, 2016) using ethanol extract from avocado skin using high concentrations, namely 5%, 10%, 20%, 40% and 80%, can inhibit the growth of *Staphylococcus aureus* bacteria, where the higher the concentration, the greater the antibacterial activity, so that this formulation is used Use low concentrations, namely 1%, 3% and 5% to see the antibacterial activity against the growth of *Staphylococcus aureus* bacteria which was tested on agar medium in the form of liquid bath soap with ethanol extract of avocado skin.

B. METHOD

1. Tool

The tools used include autoclaves, blenders, stirring rods, Petri dishes, Erlenmeyers, measuring cups, beakers, incubators, tube needles, watch glasses, scale rules, micropipettes, dropper pipettes, tube racks, spirit tubes, thermometers, analytical scales.

2. Material

The ingredients used include distilled water, ethanol extract of avocado skin, 96% ethanol, steric acid, BHT, glycerin, HPMC, KOH, NaCl, VCO, MHA (Mueller Hinton Agar), *Staphylococcus aureus* bacteria, Dettol liquid soap (positive control).

3. Work Procedures

a. Sampling

The sample used was avocado skin. Samples were taken in the Lede sub-district, North Maluku province directly from the tree.

b. Sample processing

The avocado skin that has been collected is cleaned of dirt, washed under running water until clean (wet sorting), cut into small pieces and then dried in the air until the water content in the skin is reduced. The dried sample is ready for extraction.

c. Preparation of extract avocado skin

Avocado Sample skin that has been dried or has gone through a maceration process is made into powder by blending the dry sample until smooth. A total of 500 grams of avocado skin sample powder was then put into a maceration container then added with 96% ethanol solvent, left for 3 days in a closed vessel and protected from direct sunlight while stirring periodically. After 3 x 4 hours filtering is carried out

Table 1. Avocado Skin Extract Liquid Soap Formulation Design

| No | Baham's name | Utility | Formulation and Composition % w/v | | |
|----|-----------------|------------------|-----------------------------------|-----|-----|
| | | | F 1 | F 2 | F 3 |
| 1. | Avocado Peel Ex | Active substance | 1% | 3% | 5% |
| 2. | Stearic Acid | Neutralizer | 3 | 3 | 3 |
| 3. | KOH | Surfactant | 5 | 5 | 5 |
| 4. | BHT | Antioxidant | 1 | 1 | 1 |
| 5. | VCO | Oil base | 15 | 15 | 15 |
| 6. | Glycerin | Softener | 5 | 5 | 5 |
| 7. | HPMC | Fastening | 3 | 3 | 3 |
| 8. | Aquadest | there's 60 ml | | | |




The dregs are macerated again 2 times and a liquid ethanol extract is obtained. The results obtained are then evaporated by cooling until a thick extract is obtained.

4. Preparation of ethanol extract liquid bath soap formulation avocado skin

a. Making liquid bath soap preparations

Prepare all the tools and materials that will be used. Weigh all the ingredients that will be used carefully, then put the VCO into a beaker, add steric acid which has previously been melted in a water bath little by little until it dissolves then add KOH little by little and heat at a temperature of 50-60°C until a soap base is formed. . HPMC which has previously been developed in hot distilled water is added to the mixture and then stirred until homogeneous. Add the dissolved glycerin then add the avocado skin extract, stir until mixed homogeneously then add the BHT, add 60 ml of distilled water, put it in a container (Yulianti et al., 2015).

Table 2. Formulation Results of Avocado Skin Extract Liquid Soap

| Formula 1 | Formula 2 | Formula 3 |
|---|--|---|
|  |  |  |
| Extract 1% | Extract 3% | Extract 5% |

b. Evaluation of liquid preparations

1) Organoleptic test

This test is carried out to see the physical preparations including smell, colour and shape. This test was carried out by looking directly at the liquid bath soap preparation in terms of shape, colour and odour produced (Lailiyah & Rahayu, 2019).

2) Test pH

This test is carried out to see the acidity level of the preparation so that it cannot irritate the skin using a pH meter. The pH of liquid bath soap preparations is based on SNI requirements, namely the pH range of 8-11. In general, liquid bath soap preparations tend to be alkaline. This is caused by the basic ingredient that makes up liquid soap, namely KOH, which is used to produce a saponification reaction (Lailiyah & Rahayu, 2019).

3) Foam Stability Test

This test was carried out to determine the height of the foam produced by the liquid bath soap preparation by placing 1 ml of liquid bath soap into a test tube, then shaking it and leaving it for 5 minutes. The high requirement for liquid soap foam is 13-220 mm and good stability is above 70% (Lailiyah & Rahayu, 2019).

4) Viscosity Test

This test was carried out to determine the viscosity of the liquid bath soap preparation by using a VT- viscometer on spindle number 4 at a speed of 60rpm (Yulianti et al., 2015).

5) Homogeneity test

This test is carried out to see the level of homogeneity or distributed substance evenly distributed in bath soap preparations (Lailiyah & Rahayu, 2019)

5. Antibacterial testing

a. Sterilization of tools

The tools used in this research were cleaned first, then wrapped in paper, and then the wrapped tools were put into an autoclave at a temperature of 121°C with a pressure of 1 atm for 15 minutes. Place in the oven at 100°C for one hour to dry the tool.

b. Preparation of bacterial suspension

Take 2 bacterial cultures using a sterile tube, then suspend them in a 0.9 NaCl solution until turbidity is obtained according to the 0.5 MacFarland standard or equivalent to a bacterial count of 10 CFU/ml.

c. Making MHA (Mueller Hinton Agar)

Weighed 3.8 grams of Muller Hinton Agar (38gr/L). medium composition (Beef infusion 300 gr, Casamino acid 17.5 gr, Agar 17 gr). Dissolved in 100 ml distilled water. Heat until boiling, and sterilize for 15 minutes in an autoclave with an air pressure of 1 atm 121° C (Yulianti et al, 2015).

Table 3. Chemical Physics Evaluation

| No. | Test | F0 | F1 | F2 | F3 |
|--------------|----------------|---|-------------|-------------|-------------|
| 1 | Organoleptic | | | | |
| | Form | CK | CK | CK | CK |
| | Aroma | Typical | Typical | Typical | Typical |
| | Colour | Clear | Light green | Dark green | Deep Green |
| 2 | pH | 9.1 | 9.8 | 8 | 8.5 |
| 3 | Viscosity | 8660 mPas | 8400 mPas | 8410 mPas | 8530 mPas |
| 4 | Foam Stability | | | | |
| | Early | 100 | 140 | 130 | 140 |
| | TB | 100 | 100 | 100 | 110 |
| 5 | Final TB | Homogeneous | Homogeneous | Homogeneous | Homogeneous |
| | Homogeneity | | | | |
| Information: | | | | | |
| | F0 | : Liquid bath soap formula without using extract | | | |
| | FI | : Liquid bath soap formula with 1% concentration | | | |
| | FII | : Liquid bath soap formula with a concentration of 3% | | | |
| | FIII | : Liquid bath soap formula with a concentration of 5% | | | |

d. Antibacterial activity test

Making the Mueller Hinton Agar medium. Weighed 2.3 grams of MHA then put it into an Erlenmeyer, dissolved in 100 ml of distilled water. Heated until completely dissolved, then the still warm MHA solution was poured into test tubes, each filled with 10 ml, then sterilized for 15 minutes in an autoclave with air pressure of 1 atm 121° C (Yulianti et al., 2015)

e. Testing of liquid bath soap with ethanol extract of avocado peel against *Staphylococcus aureus* bacteria

This process is carried out using the agar diffusion method using a well method, namely by adding a sterile MHA solution, and then 0.2 ml of bacteria. *Staphylococcus aureus* into different sterilized Petri dishes. Then the filled petri dish is shaken back and forth so that the bacteria and media are mixed evenly, and left a few minutes until it hardens, after it hardens, a hole is made in the petri dish and the preparation is tested with different extract concentrations is inserted into the hole, then cover the petri dish then wrapped in clean paper and incubated at a temperature of 37°C for 24 hours. After that, observations were made which could be seen based on the formation of an obstacle area in the form of a clear zone around the well hole. After that, the diameter of the clear zone formed was measured. Tests were also carried out without the active substance or ethanol extract as a negative control (-) and a comparison preparation on the market as a positive control (+), namely using Dettol liquid soap (Yulianti et al, 2015).

Table 2.Inhibitory Power Test

| Formulas | Replication 1 | Replication 2 | Replication 3 | Average value Inhibitory power | Information |
|----------|------------------|------------------|------------------|---|---|
| FI | 19.7mm | 19.2mm | 19.9mm | 19.6mm | Strong |
| FII | 20.5mm | 22.0mm | 22.4mm | 21.6mm | inhibitory |
| FIII | 26.6mm | 25.6mm | 25.3mm | 25.8mm | power |
| K+ | 26.9mm | 30.2mm | 28.4mm | 28.5mm | The inhibitory |
| K- | 0 | 0 | 0 | 0 | power is very strong |
| | | | | | The inhibitory power is very strong |
| | | | | | The inhibitory power is very strong |
| | | | | | Weak inhibitory power |

C. RESULT AND DISCUSSION

In this research, a preparation was made, namely a liquid bath soap preparation from ethanol extract of avocado skin as an antibacterial which was tested directly against *Staphylococcus aureus* bacteria. The extract used is thick ethanol extract of avocado skin with different concentrations, namely 1%, 3% and 5% with a comparison substance or positive control, namely Dettol.

Testing of chemical and physical tests includes organoleptic test results obtained by looking at smell, shape and colour. Based on SNI, in organoleptic testing liquid bath soap preparations must have a thick liquid form, has a distinctive smell and colour. In this study, it had a thick liquid form, a distinctive odour, namely the smell of avocado skin extract and a dark green colour. Based on research (Lailiyah & Rahayu, 2019), liquid bath soap preparations that comply with SNI have a distinctive odour, and colour according to the extract used and are in liquid form.

Discussion

Testing against The pH of the liquid bath soap preparation at a concentration of 1% is pH 9.8. At a concentration of 3%, namely at pH 8, a concentration of 5%, a concentration of pH 8.5 and a negative control or not using an active substance, namely pH 9.1. (Lailiyah & Rahayu, 2019) in this case the pH produced is in accordance with SNI where the pH standard for liquid bath soap preparations is 8-11, which is alkaline. In general, this is due to the basic ingredient that makes up liquid soap, namely KOH, which is used to produce a saponification reaction.

Foam is an important thing in a product, especially in liquid soap preparations. To determine the quality of the soap, soap stability testing is carried out. This test was carried out to see the height of the first soap foam and the height of the soap foam after leaving it for 5 minutes. The results of this soap stability test were obtained by the percentage of soap foam, namely FI (71.42%) FII (76.92%) and FIII (78.57%), in this case the soap preparations made meet the standards, which are the stability standards. soap is >70%. Based on (Amin, 2006) the characteristics of soap foam are influenced by several factors, namely the presence of surfactants, foam stabilizers and other ingredients that make up liquid soap.

Viscosity testing can be seen based on the graph that there are differences in viscosity in each formula. This is because there are differences concentration of the extract used. Based on research (Yulianti et al, 2015), the reduction in viscosity in liquid bath soap preparations may be influenced by the temperature and concentration of the extract used.

This test is carried out to determine the homogeneity of a preparation. In this test it is carried out using 2 glass objects, then dripping the liquid soap preparation on them. One drop is placed on the first glass, then the second glass is placed on top of the first glass and then observed. In this case, the results obtained are that the liquid bath soap preparation is homogeneous, this is indicated by the absence of coarse grains in the glass. In research (Yulianti et al, 2015) the liquid preparation was homogeneous when there were no grains on the glass object.

Antibacterial testing of ethanol extract liquid bath soap Avocado skin against *Staphylococcus aureus* bacteria. This test was carried out using the agar diffusion method using wells. The medium used is MHA, 7 ml of MHA medium is first added as a base medium and a pipette is implanted, then the MHA solution is put in a test tube in which bacteria have been suspended into a petri dish, shaken slowly so that the bacteria are evenly distributed. Then liquid bath soap was added with a concentration of 1%, 3%, 5% positive control/Dettol and negative control (without extract), the medium was put in an incubator at a temperature of 37° C for 1x24 hours, after being in the incubator, observations were made by looking at the zone. The clear fluid that forms around the preparation is then measured using a caliper.

From the results of observations shows that liquid bath soap has inhibitory power against *Staphylococcus aureus* bacteria. This can be seen from each liquid bath soap preparation with different concentrations, namely 1% concentration = 19.7 mm, 3% concentration = 20.5 mm, and 5% concentration = 26.6 mm. while the positive control is 26.9 mm and the negative control is 0 mm or has no inhibitory power.

The existence of an inhibitory zone resulting from this liquid bath soap preparation can be seen from the content of the compounds contained in the avocado skin extract. Based on research conducted by (Dima et al, 2016), avocado peel extract has antibacterial activity against the *Staphylococcus aureus* bacteria. The alkaloid compounds found in avocado peel are the largest secondary plant substances so that alkaloids have antibacterial capabilities.

Observation data showed that the preparation of liquid bath soap with ethanol extract of avocado peel had an inhibitory response against *Staphylococcus aureus* bacteria. From the results of 3 replications, the average value of bacterial inhibitory power from the three concentration variations had the greatest inhibitory power, namely 5% (25.8 mm) and was in a strong category. However, concentrations of 1% and 3% also have good spreading power and are included in the strong category, this is because the inhibition zone obtained from a concentration of 1% = 19.6 mm) is strong and 3% = (21.6) > 20 mm is very strong. strong. In research conducted by (Dima et al, 2016) ethanol extract of avocado skin with a concentration of 5% was very strong in inhibiting the growth of *Staphylococcus aureus* bacteria.

D. CONCLUSION

Based on the results of the research carried out, it can be concluded that ethanol extract of avocado skin (*Persea americana*) can be made in liquid bath soap dosage form, liquid bath soap preparation from ethanol extract Avocado skin meets the physical quality test, and the liquid bath soap preparation with ethanol extract of avocado skin has antibacterial activity with the resulting inhibition zone at a concentration of 5% = 25.8 mm in the very strong category.

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