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ABSTRACT

Long-term use of antibiotics leads to resistance. Rambutan fruit is a fruit which grows seasonally, but the utilization of the fruit skin is still lacking. Several studies have been carried out but limited to the flesh and leaves. The purpose of this study was to utilize rambutan peel waste into a liquid soap preparation and then carry out an antibacterial test against Staphylococcus aureus bacteria. The content of compounds from the skin of rambutan fruit (Nephelium lappaceium Linn) is thought to have antibacterial properties. The content test was carried out using a phytochemical screening method. The screening results of rambutan peel extract showed the presence of alkaloids, flavonoids, saponins, and tannins. The antibacterial test method used the well diffusion method with concentrations of 20% 40%, 60% positive control of Biore liquid soap and negative control of soap base. The test parameters for liquid soap preparations include: organoleptic test, homogeneity test, pH test, foam height. The results showed the best concentration of 60% had the ability as antibacterial against Staphylococcus aureus.

Keywords: Antibacterial, Liquid soap, Nephelium lappaceium Linn, Staphylococcus aureus

INTRODUCTION

Rambutan plant is a plant that is famous for its fruit, but this plant produces waste in the form of wood, leaves, skin and fruit seeds. Based on traditional medicine, rambutan plants are used as medicine, among others, to treat canker sores, which are used in the wood, diarrhea in the leaves (Hanum, 2008). According to previous research, the phytochemical compounds they contain include alkaloids, tannins, saponins, and flavonoids (Kusumaningrum, 2012). In this study, researchers wanted to see the preparation of liquid soap from rambutan peel extract against Staphylococcus aureus so that it became an alternative to soap preparations.

The characteristics of liquid soap depend on the composition of the ingredients, the use and the manufacturing process. The advantages of liquid soap include being practical and also more hygienic because it is usually stored in tightly closed containers (Wijana et al, 2005).

METHODS

A. Materials

The materials used in this study were Rambutan Peel, S. aureus, E. coli, NaCl 0,9%, etanol 70%, etanol 96%, HCl 2N, HCl pekat, Sagestam® krim, serbuk Magnesium, pereaksi Dragendorff, pereaksi Liebermann-Bouchard (asam asetat anhidrat-H_2SO_4), air suling, Kloroform, plat silica, Metanol, Etanol, Butanol, Asam Asetat, Nutrient agar (NA), Vogel Johnson Agar (VJA), Endo Agar (EA), Mueller Hinton Agar (MHA), Brain Heart Infusiom (BHI), larutan standar Brown II, Heart Infusion Agar (HIA), Sulfide Indol Motilitas (SIM), Kliger Iron Agar (KIA), Lisin Iron Agar (LIA), Simmon Citrat.

B. Setup Simplicity

Rambutan Peel are washed with running water to remove the existing contaminants, then dried at a temperature of 400C using an oven, mashed by using a grinding machine until it becomes powder.

C. Making Extract

A total of 1000grams of Rambutan Peel simplicia powder was macerated with 3000ml 70% ethanol solvent for 72 hours, then the resulting extract was evaporated using a vacuum rotary evaporator. The results of the evaporation were put into the oven at a temperature of 40oC to obtain a thick extract. The results of the concentration were then tested for ethanol free and the extract yield was calculated.

D. Formulation of Cream of Rambutan Peel Extract

In this study, a Vanishing cream base was used which also functions as a topical carrier base for Rambutan Peel extract, the composition of the formulation can be seen in table 1.

Table 1st. Cream formula

No.	Materials	Liquid Soap - (ml)	Rambutan Peel extract-shoap 20% (ml)	Rambutan Peel extract-shoap 40% (ml)	Rambutan Peel extract shoap 60% (ml)
1	Minyak Zaitun	15	15	15	15
2	KOH	8	8	8	8
3	CMC	0,7	0,7	0,7	0,7
4	SLS	0,7	0,7	0,7	0,7
5	Asam Stearat	0,35	0,35	0,35	0,35
6	BHA	0,7	0,7	0,7	0,7
7	Extract Rambutan Peel	0	10	15	20
8	Aquades	Ad 50	Ad 50	Ad 50	Ad 50

E. Antibacterial Activity Test

The ethanol extract of rambutan peel was then tested microbiologically against S. aureus bacteria using the diffusion method to determine antibacterial activity on MHA media. The wells are made using a drill prop and placed on the agar medium which is planted with microorganisms that will diffuse into the agar medium. Positive results can be seen in the clear area on the surface of the media which indicates the inhibition of bacterial growth by antibacterial agents (Pratiwi 2008).

F. Data Analysis

Data analysis using SPSS, namely normality and homogeneity tests were observed because they were required for the One Way ANOVA test with a confidence level of $\alpha = 95\%$ with three repetitions of the antibacterial activity test at each concentration. This data analysis aims to see a significant difference in each concentration of the preparation. H0 is accepted. When the value of sig>0.05, it means that there is no difference in the concentration of each extract. Meanwhile, if H0 is rejected if the value of sig <0.05 which means there is a significant difference, the difference that occurs in each extract concentration, a post hoc Tukey HSD test is carried out

RESULTS AND DISCUSSION

A. Antibacterial activity test results

Table 2nd. The results of the antibacterial activity test of the diffusion method based on the measurement of the diameter of the well (mm)

Konsentrasi Ekstrak (mg/mL)	Nilai rata-rata KHM (mm)	Nilai KBM
K (+)	10,53	-
K (-)	0	+++++
20	2,58	++++
40	5,76	+++
60	7,89	++

The inhibition zone test was carried out to determine the presence of antibacterial activity in the extract of Rambutan Peel and the diameter of the inhibition zone against S. aureus and E. coli bacteria. In the cream base test group with the addition of surfactants there was no inhibition zone, this was due to the absence of nutritious ingredients that could cause the development and growth of bacteria and showed that the surfactant used in the cream base was not antibacterial. The same thing was also produced by the cream-based test group without the addition of surfactant, where there was no inhibition zone. The positive control group using Genalten® cream containing 1% gentamicin sulfate had an inhibition zone indicating that the positive control had antibacterial activity against S. aureus with the inhibitory zone activity shown to be greater against S. aureus than the inhibition zone that occurred. against

The 10% Rambutan Peel extract cream test group had an inhibitory zone comparable to the positive control group, where the inhibition zone was greater against S. aureus than the E.coli inhibition zone. This occurs because S. aureus which is a Gram positive bacterium contains thicker peptidoglycan than E. coli which is a Gram negative bacterium, where peptidoglycan is a polar layer found on the bacterial cell wall, making it easier for the Rambutan Peel extract to penetrate the cell wall of S. aureus. (Collins & Lyne's, 2004; Rostinawati, 2009). The Rambutan Peel extract cream 60% also showed an inhibitory zone activity comparable to the positive control against but the Rambutan Peel extract cream 20% gave an inhibition zone that was not comparable to the positive control against S. aureus. This could be due to the ability of 20% Rambutan Peel extract to escape from the cream base to diffuse and affect the inhibition zone. Rambutan Peel extract cream 60% has a higher concentration than 20% Rambutan Peel extract, so it can inhibit the diffusion ability of Rambutan Peel extract to be separated from the cream base on the test medium.

CONCLUSION

Rambutan Peel extract with a concentration of 40% has antibacterial activity against S. aureus by the diffusion method based on the diameter 5,76 mm of the inhibition zone, 60% namely the diameter of the inhibition zone against S. aureus 7,89 mm.

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