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Anti-Acne Effectiveness Test Of Cinnamon (*Cinnamomum burmanii*) Essential Oil and Its Application in Facial wash

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Abstract:
Background: Indonesia is a tropical country with high humidity which makes it possible for various plants and microorganisms to grow properly. Skin conditions that are easy to sweat and moist, poor personal hygiene, and lack of health knowledge are factors that allow the occurrence of skin diseases, one of the most common skin problems is acne. The bacteria that commonly infect acne are natural ingredients that are empirically known to have antibacterial properties, namely the cinnamon plant (Cinnamomum burmanii). Essential oil from the cinnamon (Cinnamomum burmanii) can provide inhibition on Staphylococcus aureus, Staphylococcus epidermis, and Propinonibacterium acne. Natural ingredients that are empirically known to have antibacterial properties are cinnamon plants (Cinnamomum burmanii).
Materials and Methods: Facial wash with various concentrations of cinnamon essential oil, there are 7%, 6%, 5%, 4%, 3%, physical evaluation of facial wash preparations which includes organoleptic tests, pH tests,foaming tests, viscosity tests, and homogeneity test. And also tested for antibacterial activity against Staphylococcus aureus bacteria using the well diffusion method with positive control of Acnes Creamy Facial Wash containing the active ingredients of salicylic acid, vitamin C, and Saxifraga sarmentosa extract and a negative control using facial wash without the active ingredient of cinnamon essential oil.
Results: Facial washwith variations in the concentration of cinnamon essential oil had physical evaluation results consisting of organoleptic tests, pH tests, foaming tests, viscosity tests and homogeneity tests for all formulas in all tests obtained data that matched the parameters of the facial washand there is no effect between variations in the concentration of essential oils on the physical form of facial washof cinnamon essential oil, the difference is only seen in the color of the soap which is getting darker yellow at the highest oil concentration. And the antibacterial activity test on facial wash with variations in concentrations of 7%, 6%, 5%, 4%, and 3% did not affect inhibiting the growth of Staphylococcus aureus bacteria. The average diameter of the inhibition zone of Staphylococcus aureus bacteria formed at various concentrations of cinnamon essential oil was 7%, 6%, 5%, 4%, and 3% in the category of strong inhibition, there are 22.8333 mm, 23 mm, 24.1667 mm, 23.3333 mm, 22.1667 mm and higher than the average inhibitory power of positive control which had moderate inhibition and negative control which had weak inhibition.
Conclusion: Cinnamon facial wash preparations have dosage forms that meet the physical evaluation parameters of facial wash preparations and have antibacterial activity against Staphylococcus aureus bacteria with strong inhibition zone categories at variations in the concentration of cinnamon essential oil 7%, 6%, 5%, 4 %, and 3%.)
Key Word: Essential Oil, Cinnamon, Facial Wash, Antibacterial Activity, Staphylococcus Aureus, Physical Evaluation.

I. Introduction

Indonesia is a tropical country with high humidity which makes it possible for various plants and microorganisms to grow properly. Skin conditions that are easy to sweat and moist, poor personal hygiene, and lack of knowledge about health are factors that allow the growth of fungi that cause skin diseases[1]. One of the most common skin problems is acne. Acne is an abnormal skin condition due to excessive production of sebaceous glands which causes blockage of hair follicle channels and skin pores. One of the causes of acne is the activity of skin bacteria. Although acne is not caused by direct bacterial infection, bacteria play a role in making the situation worse. When the oil is trapped in the hair follicles, *Staphylococcus aureus* bacteria will multiply in the blocked skin pores. They will produce chemicals that change the composition of the oil, which makes it more irritating to the skin and causes inflammation[2].

Natural ingredients that are empirically known to have antibacterial properties are cinnamon plants (*Cinnamomum burmanii*). The essential oil from the cinnamon (*Cinnamomum burmanii*) can inhibit *Staphylococcus aureus*. The inhibition that appears is due to the content of the antibacterial compound

cinnamaldehyde[3]. The cinnamon essential oil showed better antibacterial activity on Gram-positive than Gram-negative bacteria. The highest inhibition was found in *Staphylococcus aureus* and the lowest was in *Escherichia coli*. Based on previous research, the cinnamon essential oil has antibacterial activity against *Staphylococcus aureus* at a concentration of 0.1%[4].

After that, to ensure the comfort and effectiveness of essential oils, they are made in the form of facial wash. Facial wash is effective for removing dirt attached to the surface of the skin, both fat-soluble and water-soluble[5]. So in this study, the researchers conducted a study on the antibacterial activity of facial wash of cinnamon essential oil (*Cinnamomum burmanii*) against *Staphylococcus aureus* bacteria to determine the antibacterial activity and concentration of essential oils in the form of facial wash against *Staphylococcus aureus* bacteria.

II. Material And Methods

his research was carried out in the formulation and dosage technology laboratory, campus 2 Polytechnic Indonusa Surakarta. This research is planned to take place within a period of 3 months.

Types of research: In this study, the authors used the experimental method. An experimental method is a research method used to determine the effect of a particular treatment on other variables under controlled conditions[8].

Independent variables: Independent variables are variables that affect the variables that cause changes or the emergence of variables. In this study, the independent variable was the concentration of cinnamon essential oil.

Dependent variable: The dependent variable is a variable that is affected by one or more independent variables. The dependent variable in this study was a physical evaluation which included organoleptic tests, pH tests, foam power tests, viscosity tests, and homogeneity tests on the formulation of cinnamon essential oil (*Cinnamomum burmanii*) facial wash as well as the results of measuring the diameter of the inhibition zone of *Staphylococcus aureus*.

Material: The materials usedwere aquadest, myristic acid, stearic acid, cocamidopropyl betaine, glycerin, KOH, cinnamon essential oil (*Cinnamomum burmanii*), Na EDTA, propyleneglycol, SLS, stearyl alcohol, triethanolamine, distilled water, Staphylococcus aureus bacteria, nutrient agar media, cinnamon essential oil, sodium chloride, Acnes Creamy Facial Wash.

Tool: The tools used include a stirring rod, porcelain dish, beaker, measuring cup, arlogi glass, electric stove, millimeter block, pH meter, dropper, soap pot/container, test tube rack,spoon, spatula, test tube, viscometer, autoclave, petri dish, colony counter, erlenmeyer, incubator, sterile ose needle, laminar air flow, micropipette, digital analytical balance, oven, bunsen burner, spreader glass, syringe.

Formula:

Part	Material	F1	F2	F3	Efficacy Of Ingredients
A	Myristic Acid	2,9	2,9	2,9	Penetration Boost
	Stearic Acid	3	3	3	Solvent Agent
	Stearyl Alcohol	5	5	5	Hardener
B	Aquadest	6	6	6	Solvent
	KOH	1	1	1	Ph Regulator
	Glycerin	3	3	3	Emolient
	Propyleneglycol	6	6	6	Solvent
C	SLS	6	6	6	Surfactant
	Cocamidopropyl Betaine	10	10	10	Surfactant
	Triethanolamine	2	2	2	Emulsifiing Agent
D	Na EDTA	0,1	0,1	0,1	Chelating Agent

	Aquadest	48	50	52	Solvent
E	Cinnamon Essential Oil	7	5	3	Active Substance

Procedure methodology

Procedure: The first step in the procedure for making facial wash is to prepare the necessary tools and materials according to calculated needs. Then, all parts A were melted at 70C. Part B, heated with distilled water and KOH at 70C, added glycerin and propylene glycol. Part A was added to part B with rapid stirring at 80-85C for 60 minutes. Parts C and D were added to parts A and B and were cooled at a temperature of 55-60 C. The mixture was cooled to room temperature and then cinnamon essential oil was added.

Physical evaluation :

Organoleptic Test: An organoleptic test is a test that is carried out visually using the five senses, organoleptic evaluation components include odor, color, shape, and texture of the preparation

pH Test: Measurement of the pH value in liquid facial soap preparations uses a pH meter, the electrode is dipped in liquid facial soap, and a stable pH value is listed in the tool and then recorded.

Foaming Test: The ability to form facial wash foam is measured by dissolving the sample in water in a measuring cup. The sample was weighed 1 gram, put into a test tube, then added 10 ml of distilled water, shaken by turning the test tube upside down. The foam formed is measured in height. The ability to form foam is calculated by measuring the height of the foam and the stability of the foam is measured by calculating the time the foam begins to disappear.

Viscosity Test: The viscosity of the facial wash was measured using a digital viscometer to obtain the viscosity number in Cps units.

Homogeneity test: The homogeneity test was carried out by applying 1 gram of facial wash on a transparent glass and visually observing the homogeneity. Good facial wash does not contain coarse grains.

Antibacterial Activity Test Procedures:

Tool Sterilization: Sterilization of equipment is carried out using wet heat sterilization (autoclave) and dry heat sterilization (oven). Blue tip, yellow tip, and heat resistant device in the autoclave for 15 minutes at 121℃. Glassware including beakers, test tubes, erlenmeyer, and spreader glass was sterilized by dry heat in an oven at 200℃ for 1 hour[9].

Media Preparation:

a. Sloping Nutrient Agar

Nutrient Agar (NA) as much as 0.46 g was taken and dissolved in 20 mL of distilled water (23 g/1000 mL) using an erlenmeyer. Then homogenized with a stirrer over a water bath until it boils. A total of 5 mL each was poured into 3 sterile test tubes and covered with aluminum foil. The media was sterilized in an autoclave at 121ºC for 15 minutes, then left at room temperature for ± 30 minutes until the media solidified at a slope of 30. Oblique agar medium was used for bacterial inoculum[10].

b. Bacterial Inoculation Media And Testing Media

NA media (Nutrient Agar) was prepared by weighing 2.8 grams of NA powder and then dissolved in 100 mL of sterile distilled water, heated until dissolved and clear, and autoclaved for 15 minutes at 121℃. Sterile NA media is poured into sterile petri dishes, and wait until solidified[9].

Bacterial Rejuvenation:

Bacterial rejuvenation is carried out using the scratch method. Pure culture of S*taphylococcus aureus* bacteria was taken one ose and then inoculated by scratching on NA media in a zig-zag way. Then incubated at 37℃ for 24 hours[11].

Preparation of *Staphylococcus aureus* Bacteria Suspension:

Preparation of Bacterial Suspension Test Bacteria on an inclined agar medium was taken with sterile wire and then suspended into a tube containing 2 mL of 0.9% NaCl solution until the turbidity was the same as the standard turbidity of Mc. Farland[10].

Bacterial Inhibition:

The NA agar medium was poured as much as 15-20 ml into each petri dish and allowed to harden. *Staphylococcus aureus* bacteria suspension was inoculated as much as 1 ml on the surface of the media, then flattened using a bent rod (spreader glass). Then 3 wells were made in each medium, the holes were filled with variations of facial wash with cinnamon essential oil, positive control (Acnes Creamy Facial Wash), and negative control (facial wash variation without cinnamon essential oil). Each medium is used for one variation/soap formula. All petri dishes were incubated at 37℃ for 24 hours, after which it was seen whether

there was an inhibition zone formed. If there is, the diameter of the resistance area around the backing is measured using a ruler by measuring horizontally and vertically then the results obtained are reduced by a 5 mm diameter of the well[10].

Statistical analysis

Data was analyzed using SPSS version 20. Student's *t*-test was used to ascertain the significance of differences between mean values of two continuous variables and confirmed by nonparametric Mann-Whitney test. In addition, paired *t*-test was used to determine the difference between baseline and 2 years after regarding biochemistry parameters, and this was confirmed by the Wilcoxon test which wasa nonparametric test that compares two paired groups. Chi-square and Fisher exact tests were performed to test for differences in proportions of categorical variables between two or more groups. The level $P < 0.05$ was considered as the cutoff value or significance.

III. Result

Organoleptic Test

Table no 1: Shows result of organoleptic test.

Formula	Replication 1	Replication 2	Replication 3
F1 Color Smell Texture	 Yellow (+++++) Cinnamon Thick (+)	 Yellow (+++++) Cinnamon Thick (+)	 Yellow (+++++) Cinnamon Thick (+)
F2 Color Smell Texture	 Yellow (++++) Cinnamon Thick (+)	 Yellow (++++) Cinnamon Thick (+)	 Yellow (++++) Cinnamon Thick (+)
F3 Color Smell Texture	 Yellow (+++) Cinnamon Thick (+)	 Yellow (+++) Cinnamon Thick (+)	 Yellow (+++) Cinnamon Thick (+)
F4 Color Smell Texture	 Yellow (++) Cinnamon Thick (+)	 Yellow (++) Cinnamon Thick (+)	 Yellow (++) Cinnamon Thick (+)
F5 Color Smell Texture	 Yellow (+) Cinnamon Thick (+)	 Yellow (+) Cinnamon Thick (+)	 Yellow (+) Cinnamon Thick (+)

Table no 1: The organoleptic test results for the preparation of cinnamon essential oil facial wash in the form of a thick liquid, the color produced shows a difference, where as the preparation with the highest concentration of essential oil shows a more concentrated yellow color, this is because cinnamon essential oil is yellow. The aroma that is present smells typical of cinnamon. All formulas do not undergo visual separation.

pH Test

Table no 2: Shows result of pH Test.

Formula	Replication 1	Replication 2	Replication 3	Mean ± SD	Explanation	Sig
1	6	6	6	6 ± 0	Compatible	
2	6	6	6	6 ± 0	Compatible	
3	7	7	7	7 ± 0	Compatible	1,0
4	7	7	7	7 ± 0	Compatible	
5	7	7	7	7 ± 0	Compatible	

Table no 2:The analysis pH of cinnamon facial wash begins with a normality/hommogenity test, where the result show that data is not normally distribuuted. With a sig value of 0,0 so we continued with the kruskal wallis test, the sig value obtaied is 1,0 which mean the data did not show a significant difference in pH from formulas 1 to 5.

Foaming Test

Table no 3: Shows result of foaming test.

Formula	Replication 1	Replication 2	Replication 3	Mean ± SD	Sig

1	9	7	6,5	7,5000 ± 1,33229	
2	9	8	7,5	8,1667 ± 0,7638	
3	7,5	7	6,5	7,0000 ± 0,5000	0,488
4	7,5	7	6,5	7,0000 ± 0,5000	
5	8	8	6,5	7,5000 ± 0,8660	

Table no 3: The results of statistical tests showed that there was no significant difference in the cinnamon essential oil facial wash formula, indicated by test showed that the data were normally distributed with a sig value 0,064 and homogenous with sig value of 0,196, so it was continued with the ANOVA test. In ANOVA test, the sig obtaibed is 0,488, this indicares that there is no significant difference in the formula, because the sig value in ANOVA test is> 0.05. This shows that the foam height in the cinnamon essential oil facial wash is not significantly different.

Viscosity Test

Table no 4: Shows result of viscosity test

Formula	Replication 1	Replication 2	Replication 3	Mean ± SD	Sig
1	801,0	817,4	809,6	809,3333 ± 8,2032	
2	809,9	799,3	807,4	805,5333 ± 5,5411	
3	798,7	796,8	786,2	793,9000 ± 6,7357	0,193
4	797,6	784,9	787,2	789,9000 ± 6,7668	
5	789,7	782,4	779,9	784,0000 ± 5,0922	

Table no 4: The results of the analysis showed the data is not normally distributed with sig value 0,016 and rhe viscosity data is not homogeneously distributed with sig value 0,002 o, we contonued with the kruskal wallis test. Kruskal wallis showed that there was no significant difference in the viscosity of the 5 preparations, this was indicated by the sig value in the Kruskal Wallis test, there is 0,193 was > 0.05. There was no significant difference.

Homogenity Test

Table no 5: Shows result of homogenity test

Formula	Replication 1	Replication 2	Replication 3	Explanation
1	Homogen	Homogen	Homogenous	Compatible
2	Homogen	Homogen	Homogenous	Compatible
3	Homogen	Homogen	Homogenous	Compatible
4	Homogen	Homogen	Homogenous	Compatible
5	Homogen	Homogen	Homogenous	Compatible

Table no 5: The results showed that the preparation of cinnamon essential oil facial wash in the 5 formulas did not show any physical immiscibility, no coarse particles, and evenly mixed colors. This shows that the 5 facial wash formulations are homogeneously mixed.

Anti-Bacterial Activity Test

Table no 6: Shows result of anti-bacterial actifity test

Formula	Replication			Mean ± SD	Sig.
	1 (mm)	2 (mm)	3 (mm)		
1	23	21,5	14	22,8333 ± 1,2583	0,970
2	19	25	17	23 ± 3,4641	
3	19	22,5	13	24,1667 ± 6,1712	
4	23,5	21,5	30	23,3333 ± 1,7599	
5	19,5	21,5	22	22,1667 ± 3,0551	
K (+)	20	20	16,5	18,8333	
K (-)	13	14	17	14,6667	

Explanation:
Formula 1: Contains 7% cinnamon essential oil
Formula 2: Contains 6% cinnamon essential oil
Formula 3: Contains 5% cinnamon essential oil
Formula 4: Contains 4% cinnamon essential oil
Formula 5: Contains 3% cinnamon essential oil
K (+) = Positive control (Acnes Creamy Wash soap contains the active ingredients of salicylic acid, vitamin C, and saxifraga sarmentosa extract)

K (-) = Negative control (formula facial wash without cinnamon essential oil active ingredient)

Table no6: Based on the results of the observation of the inhibitory power obtained data showing the formation of a clear zone in all formulations. The diameters of the inhibition zones formed were of different sizes, then measured using a ruler which was carried out horizontally and vertically and then the results obtained were reduced by the diameter of the well, which was 5 mm. To determine whether or not there was an effect between the formulas on the inhibition of *Staphylococcus aureus* bacteria,statistical analysis was carried out, because the inhibitory data obtained were parametric data which were normally distributed and homogeneous with a sig value is 0,200 and 0,089 where both significance value are > 0,05 so it was continued with the One-way Anova test. The results obtained a significance value (0.970) > (0.05) which indicates there is no significant difference between the formulas and there is no effect between facial wash and variations in the concentration of essential oils used on the inhibition of *Staphylococcus aureus* bacteria.

IV. Discussion

Organoleptic Test

An organoleptic test is a test that is carried out visually using the five senses, organoleptic evaluation components include odor, color, shape, and texture of the preparation. The organoleptic test results for the preparation of cinnamon essential oil facial wash in the form of a thick liquid, the color produced shows a difference, where as the preparation with the highest concentration of essential oil shows a more concentrated yellow color, this is because cinnamon essential oil is yellow. The aroma that is present smells typical of cinnamon. All formulas do not undergo visual separation.

pH Test

pH TestMeasurement of the pH value in liquid facial soap preparations uses a pH meter, the electrode is dipped in liquid facial soap, and a stable pH value is listed in the tool and then recorded.The analysis pH of cinnamon facial wash begins with a normality/hommogenity test, where the result show that data is not normally distribuuted. With a sig value of 0,0 so we continued with the kruskal wallis test, the sig value obtaied is 1,0 which mean the data did not show a significant difference in pH from formulas 1 to 5. According to Noor and Nurdyastuti (2009), the pH of facial wash preparations should range from 4.5 to 6.5 to be well received on the skin. The results of the pH test on the preparations in formulas 1 and 2 showed pH 6, and in formulas 3, 4, and 5 showed pH 7. The pH of the 5 cinnamon essential oil facial soap formulas was following the pH range of the skin, so it was acceptable to the skin. Well in accordance with research conducted by Noor and Nurdyastuti (2009).

Foaming Test

The ability to form foam is calculated by measuring the height of the foam and the stability of the foam is measured by calculating the time the foam begins to disappear.Facial wash is a preparation that is identical to foam. The foam height test aims to determine the ability of the preparation to produce foam. SLS has a role as a producer of facial cleansing foam. The results of statistical tests showed that there was no significant difference in the cinnamon essential oil facial wash formula, indicated by test showed that the data were normally distributed with a sig value 0,064 and homogenous with sig value of 0,196, so it was continued with the ANOVA test. In ANOVA test, the sig obtaibed is 0,488, this indicares that there is no significant difference in the formula, because the sig value in ANOVA test is> 0.05. This shows that the foam height in the cinnamon essential oil facial wash is not significantly different, because the SLS concentration formula is not varied/fixed. In the 5 formulas for facial wash, cinnamon essential oil with high foam has met the parameters, which are in the range of 1.3 – 22 cm (SNI 06-4085-1996). This result conducted by Nurwaini and Meidhia (2019) which said that the difference in foam heigh was not significant.

Viscosity Test

Viscosity test was carried out to see the difference in viscosity/thickness of the cinnamon essential oil facial wash preparations in the 5 formulas. The results of the analysis showed the data is not normally distributed with sig value 0,016 and rhe viscosity data is not homogeneously distributed with sig value 0,002 o, we contonued with the kruskal wallis test. Kruskal wallis showed that there was no significant difference in the viscosity of the 5 preparations, this was indicated by the sig value in the Kruskal Wallis test, there is 0,193 was > 0.05. There was no significant difference because the variation of cinnamon essential oil in the formula did not affect the viscosity of the preparation. The viscosity value of the preparation itself is in accordance with the viscosity range for liquid facial wash, namely 500 - 20,000 Cps (SNI 06-4085-1996) in the 5 cinnamon essential oil facial wash formulas.

Homogenity Test

The homogeneity test aims to determine whether the preparation of cinnamon essential oil facial wash is homogeneously mixed or not. The homogeneity test was carried out by leveling the preparation on a glass plate and observing the presence of coarse particles/color differences. The results showed that the preparation of cinnamon essential oil facial wash in the 5 formulas did not show any physical immiscibility, no coarse particles, and evenly mixed colors. This shows that the 5 facial wash formulations are homogeneously mixed. This is in accordance with the homogeneity standard of the preparation, which is homogeneously mixed

Anti-Bacterial Activity Test

Based on the results of the observation of the inhibitory power obtained data showing the formation of a clear zone in all formulations. The diameters of the inhibition zones formed were of different sizes, then measured using a ruler which was carried out horizontally and vertically and then the results obtained were reduced by the diameter of the well, which was 5 mm. To determine whether or not there was an effect between the formulas on the inhibition of *Staphylococcus aureus* bacteria,statistical analysis was carried out, because the inhibitory data obtained were parametric data which were normally distributed and homogeneous with a sig value is 0,200 and 0,089 where both significance value are > 0,05 so it was continued with the One-way Anova test. The results obtained a significance value (0.970) > (0.05) which indicates there is no significant difference between the formulas and there is no effect between facial wash and variations in the concentration of essential oils used on the inhibition of *Staphylococcus aureus* bacteria.Then for the antibacterial strength of cinnamon essential oil is determined by the size of the inhibition zone formed. The antibacterial power is categorized according to the classification table for the inhibition of bacterial growth according to Greenwood (1995), where there are 4 classifications of inhibition, namely the first no inhibition if the diameter of the resulting inhibition zone is <10 mm, the second is weak inhibition if the diameter of the inhibition zone is 10-15 mm was produced, the third was moderate inhibition when the diameter of the resulting inhibition zone was 16-20 mm, and the fourth was strong inhibition with the resulting inhibition zone diameter >20 mm. In the observations, the average inhibitory power in the positive control was 18.8333 mm in the medium inhibitory category, in the negative control the inhibitory power was 14.6667 mm in the weak inhibitory category, this indicates that facial wash without cinnamon essential oil has activity Inhibition against *Staphylococcus aureus* bacteria and all facial wash formulas had the following results, for formula 1 with a concentration of 7% cinnamon essential oil, the average inhibitory power was 22.8333 mm, for formula 2 with a concentration of 6% cinnamon essential oil, the average inhibitory power was obtained. 23 mm, formula 3 with a concentration of 5% cinnamon essential oil obtained an average inhibition of 24.1667 mm, formula 4 with a concentration of 4% cinnamon essential oil obtained an average inhibition of 23.3333 mm, and formula 5 with a concentration of cinnamon essential oil 3% obtained an average inhibition of 22.1667 mm, from these results it can be concluded that all soap formulas with variations Cinnamon concentration resulted in an average inhibition of > 20 mm in the category of strong inhibition and higher than the average inhibitory power of positive control and negative control.Meanwhile, when compared with previous research on 0.1% cinnamon essential oil with an inhibition zone diameter of 18.773 mm according to Aqmarina, Priani, and Gadri (2016) the 5 of formulas cinnamon waciall wash produced had a higher diameter of inhibition zone, because variations in the concentration of essential oils used in soap were higher than 0.1%, namely 7%, 6%, 5%, 4%, 3%.

V. Conclusion

Based on the results of the research that has been done, it can be concluded as follows:

Cinnamon essential oil can be formulated in facial wash preparations because it meets the physical evaluation parameters of facial soap, from the organoleptic test of cinnamon essential oil facial wash in the form of thick liquid, the resulting color shows differences, where the preparation with the highest concentration of essential oil shows color. a darker yellow color, this is because cinnamon essential oil is yellow. The aroma that is present has a distinctive cinnamon smell and all formulas do not experience visual separation, the pH test shows the pH of the 5 cinnamon essential oil facial wash formulas is in accordance with the skin's pH range, there is pH 4.5 - 6.5 , in the foam height test for the 5 formulations, the foam height was appropriate, in the range of 1.3 - 22 cm, in the viscosity test the viscosity range for facial wash was 500 - 20,000 for the 5 formulas and for the test homogeneity shows that the 5 facial wash formulations are homogeneously mixed.

Facial wash containing essential oil of cinnamon (*Cinnamomum burmanii*) has antibacterial activity against the growth of *Staphylococcus aureus* bacteria. The application of cinnamon essential oil to facial soap with various concentrations of 7%, 6%, 5%, 4%, 3% had no effect on inhibiting the growth of *Staphylococcus aureus* bacteria. The average diameter of the inhibition zone of *Staphylococcus aureus* bacteria formed at various concentrations of cinnamon essential oil was 7%, 6%, 5%, 4%, 3% in the category of strong inhibition,

there are 22.8333 mm, 23 mm, 24.1667 mm, 23. .3333 mm, 22.1667 mm and higher than the average inhibitory power of positive control which had moderate inhibition and negative control which had weak inhibition.

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