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FORMULATION AND PHYSICAL TEST OF SOAP PREPARATIONS MADE FROM MORINGA LEAVES AND LEMON JUICE AS FEMININE HYGIENE

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Abstract. Soap functions as a cleaner from dirt and germs that stick to the surface of the skin using water as a medium. Soap is a product that is commonly used as feminine hygiene. The feminine area is a quite sensitive area, so you need a cleanser that does not cause skin irritation and is suitable for the pH of the skin in the feminine area, so in this study soap made from feminine herbs is used which has an anti-microbial effect, cleans and makes the skin healthy, such as a moringa-lemon combination. This research design uses experimental research. This research aims to formulate a solid soap made from moringa-lemon, then a physical quality test of the solid soap will be carried out which includes organoleptic tests, pH tests, and foam stability and homogeneity tests. Moringa leaves are made into an extract using a maceration process with 70% ethanol, while the lemon used is lemon juice from squeezed lemons. Then it is formulated into solid soap using the cold method (Cold Process) for Formula 1 and Formula II using the Melt and Pour method. Based on the results of observations on formula I soap, a light green color was obtained, which was brighter than formula II which had a dark green color. Meanwhile, the smell of the two formulas is not very strong but smells slightly of leaves. However, between the two formulas, formula I has a stronger aroma than formula II. For the second form, the soap formula is in solid form. However, to the touch, formula I is denser than formula II. Meanwhile, the acidity levels of Formula I and Formula II are both acidic, for formula 1 the average pH is 4.3 while for formula 2 the average is 5.3. So Formula I soap has a pH that is suitable for the feminine area, while Formula II can only be used as feminine hygiene on the outside, such as the vulva, vagina, and cannot be used on the inside because the pH of the soap is suitable for the inside of the woman, around 3.5-4. .5 In the foam stability test, the foam stability was obtained in accordance with the parameters, namely at F1 it was 71% and F2 was 61%. Based on the results of observations of the soap homogeneity test for the two formulations, there were no grains in the soap.

Keywords: Soap made from Moringa leaves and lemon juice

1. INTRODUCTION

Soap is a cleaner for dirt, dust and bacteria (germs) that stick to the surface of the skin. Soap is a product that is used as a cleaner mixed with water, in general soap is in solid or liquid form. In general, soap is made from three types of oil, namely coconut oil, olive oil and palm oil. Of the three types of oil, each has elements or components that function as foam makers, stabilizers and skin moisturizers (Widiastuti & Maryam, 2022) Innovation in bath soap is currently developing rapidly, some are made from synthetic ingredients, some are made from herbal ingredients, however, with the development of products made from herbal ingredients that do not irritate the

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skin, they have become the best choice for consumers. Therefore, this research produces feminine hygiene soap made from natural ingredients, safe, healthy and does not cause skin irritation, is antimicrobial and in accordance with the pH of the feminine area, therefore we modified Moringa-Lemon as the basic ingredient for the soap.(Karray et al. 2021) Moringa is known to have a soft, brightening, healthy and antibacterial effect on the skin and lemon contains vitamin C which is good for the skin and is able to make soap more acidic and in accordance with the pH of the feminine area. Therefore, Moringa-Lemon blend soap is very suitable for feminine hygiene soap. One of the aspects that must be paid attention to when making feminine cleansing liquid soap is pH. This is done to ensure that the preparation is safe to use so that it does not cause irritation to feminine skin. If the pH of the preparation does not match the pH in the feminine area, it can cause problems and damage the normal vaginal flora (Lolok et al., 2020). The pH required for feminine cleansing liquid soap must match the normal pH of the feminine area, namely 3.5–4.5. (Putri & Mardianingrum, 2023) Soap made from moringa-lemon has antibacterial properties and has acidic properties which can be used as feminine hygiene soap, which is in accordance with the normal pH of the feminine area. By using feminine soap we have taken good care of the genitalia so that we can avoid vaginal discharge. Caring for the feminine area by cleaning the vagina can be done using clean water and soap as an antiseptic against bacteria or fungi to maintain vaginal moisture and prevent vaginal discharge in women. (Putri & Mardianingrum, 2023) In general, soap making uses a saponification reaction, which is a hydrolysis reaction of oil, fat or fatty acids in an alkaline environment which produces salts from fatty acids, thus producing hard soap or bar soap (Suhadi & Rasmito, 2018). The saponification reaction can be written as follows: C3H5(OOCR)3 + 3 NaOH -> C3H5(OH)3 + 3 NaOOCR. The soap making reaction or saponification produces soap as the main product and glycerin as a side product. (Widiastuti & Maryam, 2022) Moringa leaves (Moringa oleifera) are a plant native to the western region and around the sub-Himalayan region and its surroundings which is a plant that is rich in nutrients and is widely used as herbal and traditional medicine, especially its leaves. Moringa leaves are rich in protein, beta-carotene, vitamin C, iron, calcium and potassium. (Al-Sharfi 2017) Because they are rich in nutrients, Moringa leaves are very beneficial for body health. Moringa leaves can treat pain, infections, have anticancer properties, and increase breast milk. Moringa leaves are very good for skin health because they can optimize the regeneration process of dead cells, prevent acne, brighten the face and prevent aging. Lemon is a fruit that is consumed by almost all households in Southeast Asia, especially as a flavoring for cooking, making drinks and various traditional medicines. In addition, lemons are rich in vitamin C and have great antioxidant properties. (Shaiful Bahari et al. 2021) By combining Moringa and lemon for healthy facial skin, it is hoped that it can make facial skin brighter and can prevent acne from appearing and can regenerate dead cells, making the skin more nutritious and bright and having acidic properties that match the pH of the feminine area.

2. RESEARCH METHODS

Research Tools and Materials

The tools used in this research are analytical scales, baking sheets or trays, knives, cutting boards, beaker glass, Erlenmeyer, stirring rod, measuring cup, test tube, filter paper, universal indicator, measuring cup, ruler, pH meter.

The materials used in this research were Moringa leaves and lemon juice. etanol 70%, oil VCO, NaOH, aquades dan soap base. The sample used was a sample of Moringa leaves originating from Rangkas-Banten and had been determined at Universitas Faletehan.

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Making Moringa leaf extract and lemon juice
Moringa leaf extraction is made using the maceration method. using 70% ethanol solvent. Moringa leaves weighed 300 grams were soaked using 3 liters of 70% ethanol solvent for 3x24 hours while stirring occasionally at the same time, then carried out a filtering process then filtered using filter paper and evaporated using a water bath at a temperature of 60oC until a thick extract was obtained. Meanwhile, making lemon juice is done by squeezing the lemons with a juicer until lemon juice is obtained.

Soap making
Soap formula 1 (cold process) Prepare the raw materials and additional materials as well as the tools used to make solid soap, weigh all the ingredients according to the formula. Make a NaOH solution. Dissolve 100 grams of NaOH in 200 mL of water, wait until it cools, then mix with 300 mL of VCO, stir until smooth, then mix with 100 mL of Moringa leaf extract and 50 mL of lemon juice, then stir until homogeneous (trace later), immediately pour into the soap mold until solid, wait until The cold soap preparation is left at room temperature for 1-3 days to harden completely, remove from the mold

Formula II Soap (Melt and Pour)
Prepare 200 grams of soap base then cut into small pieces then heat for 5 minutes, then stir until all the soap chunks melt, then add 150 mL of moringa extract and 50 mL of lemon until evenly distributed (trace) immediately pour into the soap mold until solid, wait until it cools. Leave the soap preparation at room temperature for 1-3 days to harden completely, remove from the mold

Physical Quality Testing of Solid Herbal Soap Preparations Moringa leaf extract and lemon Juice

Organoleptic Test
Prepare formula I soap and formula II soap that have been printed. Then observe the color, smell and shape of the two soap formulas.

pH Test
Prepare formula I soap and formula II soap then grind the soap by grating it then weigh 1 gram then put it in a beaker then dissolve it with 10 mL of distilled water stir until even/homogeneous then measure the pH with a universal indicator, adjust the pH on the scale pH di indicator universal

Foam Stability Test
Prepare solid soap then mash it (grate it) then weigh 1 gram of soap then put it in a test tube then add 10 mL of distilled water then shake it by hand (covering the end of the test tube) for 1 minute then measure the height of the initial foam after leaving it for 5 minutes then measure the height again. foam with a ruler then calculate the % of foam lost. Foam stability (1 hour) = 100% - % Foam lost Where % of foam lost = (Initial foam height- final foam height)/ initial foam height x 100% The foam stability test procedure is carried out using Measure the height of the foam, then wait for 5 minutes, and calculate the percentage of foam lost in triplicate.

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Homogenitas Test

The homogeneity test is carried out by taking a small amount of the soap preparation and then smearing it on transparent glass. After that, observe whether there are particles and record the results obtained. The requirement for the homogeneity test is that there are no visible grains in the soap. (El Hajj et al. 2020)

3. RESULTS AND DISCUSSION

In this research, two soap formulations have been made, namely using the cold process and melt and pour methods. We combine both with natural ingredients Moringa and Lemon to improve their quality in brightening, healthy and killing bacteria found on the skin, especially in the feminine area, which will be used as soap for feminine hygiene. The amount of moringa and lemon added to the soap preparation has the same weight and ratio as lemon. From these two methods, we want to see whether the quality of the soap produced meets the SNI requirements of the water content test, stability test, water content and pH.

In the organoleptic test we compare color, shape and smell. Formula I uses the cold process method by mixing VCO and NaOH, while formula II uses the melt and pour method, both of which are mixed with elor and lemon with the same weight and ratio. Based on the results of observations on formula I soap, a light green color was obtained, which was brighter than formula II which had a dark green color. Meanwhile, the smell of the two formulas is not very strong but smells slightly of leaves. However, when compared between the two formulas, formula I has a stronger aroma than formula II. For the second form, the soap formula is in solid form. However, to the touch, formula I is denser than formula II

Table. 1 Organoleptic test on Moringa-lemon solid soap.

No	**Physical Test on soap**		**Formula**	
			I (Cold process)	**II (Melt and pour)**
1	Organoleptik Test	colour	Light green	Dark green
		Form	Congested	Congested
		Smell	The scent is quite strong	The scent is quite strong

n the pH test (degree of acidity) the two soap formulas had an acidic pH below pH 7. This was due to the addition of lemon which is acidic. The addition of lemon in this study aims to lower the pH of the soap so that it matches the pH of the feminine area. Because if the soap is not suitable for the feminine area, this can cause problems and damage the normal vaginal flora. So the soap used in the feminine area must be acidic and must match the normal pH of the feminine area, namely 3.5–4.5 (Putri and Mardianingrum 2023). However, based on checking the acidity level of the two soaps, both Formula I and Formula II still have a pH above 4.5. So both Formula I and Formula II cannot be used as feminine hygiene, because they do not match the pH in the feminine area.

Based on the results of measurements carried out in triplicate, the pH values for formulation 1 soap were respectively 4, 5 and 4. Meanwhile, the pH values for formulation 2 were respectively 5, 5 and 6. From these results it can be stated that formulation I soap is more acidic than formulation II. So it can be stated that the degree of acidity of Formula I and Formula II is

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acidic, for formula 1 the average pH is 4.3 while for formula 2 the average is 5.3. So Formula I soap has a pH that is suitable for the feminine area, while Formula II can only be used as feminine hygiene on the outside, such as the vulva, vagina, and cannot be used on the inside because the pH of the soap is suitable for the inside of the woman, around 3.5 - 4.5.

Table. 2 pH test results on soap formulations made from moringa-lemon

pH (acidity)	**Formula**	
	F1	**F2**
measurement 1	4	5
measurement 2	5	5
measurement 3	4	6

In the foam stability test, it was found that the foam stability was in accordance with the parameters, namely at F1 it was 71% and F2 was 61%. Based on the measurement results, it can still be said that the two formulations comply with the foam stability criteria within 5 minutes and are said to be stable if the foam stability is in the range of 60 – 70%.

Foam Stability	**Formula**	
	F1	**F2**
Initial foam height	3,8	3,3
Final Foam Height	2,6	2,0
Foam Stability	71%	61%

Based on the results of observations of the soap homogeneity test for the two formulations, there were no grains in the soap. This shows that the process of making soap, especially the mixing process, occurs well so that no air is trapped in it.

4. CONCLUSION

Based on the results of observations on formula I soap, a light green color was obtained, which was brighter than formula II which had a dark green color. Meanwhile, the smell of the two formulas is not very strong but smells slightly of leaves. However, when compared between the two formulas, formula I has a stronger aroma than formula II. For the second form, the soap formula is in solid form. However, to the touch, formula I is denser than formula II. Meanwhile, the acidity level of Formula 1 averages pH 4.3, while Formula 2 averages 5.3. So Formula I soap has a pH that is suitable for the feminine area, while Formula II can only be used as feminine hygiene on the outside, such as the vulva, vagina, and cannot be used on the inside because the pH of the soap is suitable for the inside of the woman. In the foam stability test, it was found that the foam stability was in accordance with the parameters, namely at F1 it was 71% and F2 was 61%. Based on the results of observations of the soap homogeneity test for the two formulations, there were no grains in the soap.

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