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Transparent Solid Soap Formulation Using California Papaya (a Variety of *Carica papaya L.*) Fruit Extract with Variations of Sucrose and ee Concentration

Mutiara Dyah[1], Amanda Tiara[1], Rani Retno[1], Dera Ayu[1], Siti Aisyah[1], Silviana Rhoqimatul[1]
[1] *Politeknik Indonusa Surakarta*

*Corresponding author: iinsuhesti@poltekindonusa.ac.id

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ABSTRACT
Papaya fruit (*Carica papaya* L.) has an antioxidant activity value of IC_{50} 33.537 µg/mL, so it can be used as an active ingredient for the preparation of transparent solid soap. The study aims to find out the influence of sucrose and glycerine variations on the evaluation of the supply of solid soap. The research was carried out by formulating pepper extract into a solid soap. The three formulas refer to the results of a homogeneous, transparent, yellow-coloured, solid round-shaped and lemon-aromatic result with a successive pH value of F1: 11.07 ± 0.01; F2: 10.42 ±0.03; F3:10.73 ±0.1; foam stability test F1 =77.33% ± 23.67; F2 =84.33 % ± 7.02, F3 =73.00% 12.12; water content test F1 =28.36 ± 8.87; F2: 25.87 ± 13.33, F3: 25.69 ± 10.33. The Annova SPSS test tube showed the influence of variations in sucrose and glycerine concentrations on pH values. SPSS T Test results show that transpararent solid soap has good stability.

Keywords: antioxidants; california papaya; free radicals; transparent solid soap

INTRODUCTION
Free radicals in the body are generated from internal oxidation reactions and enzymatic reactions, as well as external sources such as radiation from electronic devices, cigarette smoke, pollution, excessive sun exposure and vehicle fumes. Such exposure can make the body susceptible to various diseases. Antioxidants are compounds that function against these free radicals (1)

Antioxidants are compounds that provide electrons to minimize or prevent the negative effects of oxidants on the body, so as to protect it from the influence of free radicals. According to the source, there are two types of antioxidants, namely natural and synthetic. It is recommended to use natural ingredients such as vitamin E, vitamin A, and vitamin C, as well as compounds containing polyphenols as antioxidants because they are considered safer than synthetic ones (2).

One type of fruit that contains vitamin C is California papaya. In addition, California Papaya is also famous for its antioxidant activity. There are many types of pharmaceutical products including cosmetics, which can be used for body care, such as solid bath soap. The content of the soap consists of potassium or sodium compounds obtained from animals or plants, can be in solid or liquid form that produces foam. The use of this soap is very important to clean the skin from bacteria, dirt, pollution and other substances (3).

For this reason, it is necessary to conduct new research on antioxidant soaps using active ingredients from California Papaya fruit. California papaya is a popular cultivar of Carica papaya L. that is widely consumed due to its sweet taste, soft texture, and consistent fruit size. Compared to other varieties such as Bangkok or Arumanis, California papaya tends to have a higher yield, shorter maturation period, and is more suitable for commercial cultivation (Aravind et al., 2013). In addition, studies have shown that

different papaya varieties may vary in their phytochemical content, including vitamin C, polyphenols, and flavonoids, which can influence their antioxidant potential (Leny et al., 2021). In addition to its sweet taste, this fruit is also rich in Vitamin C, Vitamin A, Vitamin B, minerals, energy, and antioxidants. Therefore, the development of antioxidant soap made from California Papaya fruit is very important (4)

Transparent solid soap has a bar shape with a clear surface, forming a soft foam and a shiny appearance than other types of hand soap. Transparent soap can also be called glycerine soap, because about 10-15% glycerine is added in its manufacture. The elegant and luxurious appearance of transparent soap makes it have a high selling price. Transparent solid soap is a product innovation that makes it more attractive. Compared to opaque soap (soap that is not transparent), transparent soap produces a more textured foam (5).

METHODS

Tool

Some of the equipment used in the study consisted of parchment paper, analytical balance, porcelain cup, watch glass, glass jar, stirring rod, horn spoon, metal spatula, hot plate, waterbath.

Materials

Some of the necessary ingredients include stearic acid, 96% ethanol, cocamide DEA, fragrance (lemon), VCO (Virgin Coconut Oil), sucrose, glycerine, 30% NaOH, and California Papaya as an efficacious substance obtained from the market in Boyolali.

Detailed Procedure

The research was conducted using an experimental method, where California Papaya Fruit was formulated into a transparent solid soap preparation as an antioxidant. Each evaluation of the preparation data was then statistically analyzed using SPSS.

Work Procedures

1. **Raw material collection**
   California papaya (a variety of *Carica papaya* L.) fruit samples used in this study were obtained from the market in Boyolali Regency. The sample used was the yellowish inner fruit. The samples were dried in a dryer at 200°C until dry and then pollinated.
2. **Extraction**
   California papaya (a variety of *Carica papaya* L.) fruit powder of 250 grams was macerated using 96% ethanol solvent as much as 1.25 L. This maceration was carried out for 3 × 24 hours. The filtrate from maceration was then filtered and placed in a closed glass container.
3. **Phytochemical screening**
   a. Flavonoids
      A total of 1ml of California papaya fruit extract (a variety of *Carica papaya* L.) was added with 2 drops of 4% NaOH. If there is a green or blue color change, it shows that the sample contains flavonoids (6).
   b. Saponin
      Take papaya fruit extract (Carica papaya L.) and mix it with 10ml of hot water. Then let it cool, shake it for 5-10 seconds. In no less than 10 minutes, many froths with a height of 1-10cm will form (6).
   c. Tannins

The extract is added 1ml of NaCl solution. If a greenish black, dark blue, or blackish blue color appears, it means that there are tannin compounds in the California Papaya fruit extract (6).

d. Alkaloid
The extract was weighed as much as 0.5 g then added 1 ml of HCL 1 M and 9 ml of 96% ethanol, heated with a waterbath for 2 minutes, left at room temperature then filtered. The filtrate was used in the following experiment:
- Three drops of filtrate were taken and two drops of Mayer's reagent were added.
- Three drops of filtrate was taken and given two drops of Dragendorff reagent.
The extract is considered positive for alkaloids when a precipitate occurs (6).

e. Phenolic
The extract was put into a test tube, then mixed with distilled water and shaken. After that, 10% FeCl3 is added. If there is a color change from black to bluish, it indicates the presence of phenolic compounds in the sample (6).

4. Formulation of California Papaya Fruit Transparent Solid Soap

All ingredients were weighed to the required amount. Glycerine and 30% NaOH solution were put in a glass container and stirred until evenly distributed. Then, VCO was put into a glass container heated with a hot plate, and the temperature was controlled until the temperature reached 90-100°C. After the temperature was suitable, stearic acid that had dissolved was added to the VCO. With the addition of stearic acid, the temperature was measured again until it reached 90°C and the hot plate was turned off.

The mixture of 30% NaOH and glycerine was infused by stirring until homogeneous and thickened. The temperature of the mixture was checked again, and when it reached 70°C, sucrose was added slowly while stirring evenly. The mixture is heated again until it reaches a temperature of 75°C. Next, ethanol is added while stirring slowly in a closed state so that it does not evaporate. Once the mixture looks even, cocamide DEA and fragrance can be added. At 50-60°C, the temperature is measured again and the mixture is incorporated into the California Papaya fruit extract. After everything has been mixed, the mixture is filtered and can be poured into a mold, then left to solidify.

Table 1. Formulation of California Papaya Fruit Extract Transparent Solid Soap

Material Name	F1	F2	F3	Function
Viscous Extract	1%	1%	1%	Active substance
VCO (*Virgin Coconut Oil*)	10%	10%	10%	Soap base, emolient
Stearic acid	10%	10%	10%	Soap hardener, stabilizes foam
NaOH 30%	12%	12%	12%	Alkali
Sucrose (granulated sugar)	10%	15%	20%	Transparency
Cocamide DEA	5%	5%	5%	Foaming agent
Gliserin	12%	14%	16%	Softener, transparency
Fragrance (lemon essense)	1%	1%	1%	Fragrance

Etanol 96% ad	100	100	100		Solvent, transparency

5. Evaluation of California Papaya Fruit Transparent Soap Preparation

a. Organoleptical
Testing is done by observing it visually to see the color, shape, and aroma produced (7).

b. Homogeneity
The examination is carried out by examining the transparent solid soap preparation containing California Papaya fruit extract, then observing whether there are coarse grains formed in the soap (7).

c. pH test
The pH test was carried out by weighing a sample weighing 1 g and then dissolving it with 10 ml of water. Next, a pH meter was dipped into the solution to measure the acidity level (7).

d. Foam Stability Test
Foam testing can be carried out by mixing as much as 1 g of soap sample in 10 ml of water, then shaken by inverting the test tube. The foam height is measured after shaking for 5 minutes as the initial height, then left for 5 minutes and the height of the foam formed is measured again (7).

e. Transparency Test
The finished soap is prepared with a thickness of 0.6 cm and on the back of it is written with font size 14. If the paper with font 14 can be read through such thick soap, it is concluded that the soap preparation has good transparency results (7).

f. Moisture Content Test
To determine the moisture content, 5 grams of soap samples were weighed and placed in a cup of known weight. Then, the sample is heated in an oven at 105°C for 2 hours until the weight stabilizes (7).

g. Stability by Cycling test Method
The solid soap stability test was conducted using the Cycling test method. This method involves storing the sample at 40° C for 24 hours, followed by storage at the same temperature for another 24 hours. Each cycle consists of these two stages. The test was carried out for 6 cycles and changes in the preparation were carefully observed (8).

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RESULT AND DISCUSSION

Phytochemical Screening

Table 1. Phytochemical Screening Results of California Papaya Fruit Extracts

No	Phytochemical Screening	Results According to Literature	Results obtained	Conclusion
1	Flavonoid	Formed yellow color (Alkali test)	Yellow color formed	Positive
2	Saponin	30 seconds foam formed	No foam formed	Negative
3	Tanin	Formed yellow precipitate	Yellow precipitate formed	Negative
		Formed yellow precipitate (Mayer Reagent)	Yellow precipitate formed	Positive
4	Alkaloid	Formed red precipitate (Dragendroff Reagent)	Red precipitate formed	Positive
5	Fenolik	Formed bluish black color	Formed bluish black color	Positive

From the California Papaya fruit extract, phytochemical screening tests were carried out which included flavonoid, saponin, tannin, alkaloid, phenolic tests. In the flavonoid test, positive results were obtained as indicated by the formation of yellow color. In the saponin content test, negative results were obtained because no foam was formed. In testing the tannin content obtained negative results because it does not form a yellow precipitate. In testing the alkaloid content used 2 reagents, on the reagent. Positive results in the Mayer reagent test are indicated by the formation of a yellow color. While the Dragendorf reagent obtained positive results characterized by the formation of red color. Finally, in testing the phenolic content, positive results were obtained which were marked by the formation of a bluish black color.

Organoleptical Test

Table 2. Organoleptical Test Results

Formula	Shape	Colour	Aroma
1	Solid Round	Turmeric Yellow	Lemon
2	Solid Round	Turmeric Yellow	Lemon
3	Solid Round	Turmeric Yellow	Lemon

Organoleptic tests are carried out to evaluate the presence of granules in the preparation, as well as to produce solid soaps with attractive colors, aromas that users like, and shapes that are comfortable to use (9). Organoleptic tests that have been carried out on the soap in this study show that the three formulas that have

been observed have a solid round shape following the shape of the mold used, the color produced is turmeric yellow and has a lemon scent according to the fragrance added.

Homogeneity Test

Table 3. Homogeneity Test Results

Formula	Results
1	Homogen
2	Homogen
3	Homogen

The homogeneity test is carried out to evaluate the extent of uniformity of the mixture of ingredients used, both as active substances and additives in the formulation. Homogeneity is characterized by the absence of coarse grains in the preparation (10).

The homogeneity test on transparent solid soap in this study has proven that all formulations tested are homogeneous. The stirring process turned out to be one of the factors that influenced the homogeneity of the preparation.

Test pH

Table 4. pH Test Results

Replication	pH		
	Formula 1	Formula 2	Formula 3
1	11.06	10.45	10.74
2	11.08	10.41	10.72
3	11.08	10.40	10.74
Average	11.07 ± 0.01	10.42 ± 0.03	10.73 ± 0.01

Assessment of pH is a very important factor in solid bath soap because the quality of bath soap is determined by its pH value. Testing the pH level not only aims to improve the quality of soap, but also to maintain the right level of acidity so as not to harm the skin (11).

Based on the data obtained above, the pH value that has met the requirements is 10-11.8 (SNI, 1994). The pH test that has been carried out on transparent solid soap in this study shows that there are different results. One factor that affects the pH difference is the use of 30% NaOH. If the pH value does not meet the requirements, it causes skin irritation (12).

The test data were then statistically analyzed using the Annova Test through the SPSS application. The results of the Annova test showed that between the treatment groups of formulas one, two, and three produced a sig value of 0.000 <0.05, which means that there is an effect of variations in the concentration of sucrose and glycerine on the pH value.

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Foam Stability Test

Table 5. Foam Stability Test Results

Replication	% Stability		
	Formula 1	Formula 2	Formula 3
1	50	91	66
2	91	77	87
3	91	85	66
Average	77.33 ± 23.67	84.33 ± 7.02	73.00 ± 12.12

Foam stability testing is done to ensure that the foam produced by solid soap remains stable. The foam stability test is qualified if the results range between 60-70% within 5 minutes (13). In this experiment, within 5 minutes the soap produced foam levels between 50 - 91%, these results indicate that the foam has not been stable, which means that the soap does not meet the standard. There are a number of factors that affect foaming in soap, including surfactants or active ingredients of soap, foam stabilizers, and other soap constituents. Cocamide DEA is a non-ionic surfactant that functions as a foam stabilizer and viscosity enhancer. The addition of Cocamide DEA to soap formulations can improve foam quality and stability by changing the foam structure to be smoother and more consistent. For example, in liquid soap formulations, the addition of 2.5% Cocamide DEA has shown significant improvement in foam stability (Nafisah *et al.* 2024).

On the other hand, glycerin is a humectant that attracts moisture from the environment to the skin, helping to maintain skin moisture. However, high concentrations of glycerin can increase the viscosity of the formulation and potentially interfere with foam formation and stability. This is due to the nature of glycerin which can increase the viscosity and adhesion of the product, making it difficult to form and maintain the foam structure (Bogdan *et al*. 2024).

The test data was then statistically analyzed using the Annova Test through the SPSS application. Based on the results of the Annova test, it shows that between the treatment groups, namely formula one, two and three, the sig value is 0.694> 0.05, which indicates that there is no effect of variations in sucrose and glycerine concentrations on the results of the foam stability test.

Transparency Test

Table 7. Transparency Test Results

Formulation	Results
1	Transparent
2	Transparent
3	Transparent

The soap transparency test was conducted to determine the clarity of the product. From the test results, the three formulas showed a good level of transparency, but Formulation 1 was considered the best because the higher 96% ethanol content was able to affect the transparency level of the preparation.

Moisture Content Test

Table 8. Moisture Content Test Results

Replication	% Water Content		
	Formula 1	Formula 2	Formula 3
1	37.63	40.88	36.98
2	27.51	21.32	23.35
3	19.95	15.42	16.73
Average	28.36 ± 8.87	25.87 ± 13.33	25.69 ± 10.33

The results of the water content test on soap preparations in this study showed that the three consecutive replications for the formula produced varying results. The results obtained water content is more than 15%, which means that the soap does not meet the requirements for water content. The long storage factor causes the moisture content to decrease because the water in the soap evaporates (14).

The data obtained in the test were then statistically analyzed using the Annova test with the SPSS application. Based on the results of the ANOVA test, the p-value obtained was 0.055. Since this value is greater than the significance level of 0.05, it can be concluded that the variation in sucrose and glycerine concentrations does not have a statistically significant effect on the tested parameter. Although the p-value (0.055) is close to the threshold (0.05), it still exceeds the commonly accepted level of significance. Therefore, the observed differences among the groups are considered not statistically significant at the 5% level.

Stability Test with Cycling Test Method

Table 9. Stability Test Results with Cycling Test Method

Formula	Organoleptis	
	Before *Cycling test*	***After Cycling test***
1	Color: turmeric yellow Aroma: lemon Shape: round solid	Color: yellow orange Aroma : lemon Shape: round solid
2	Color: turmeric yellow Aroma: lemon Shape: round solid	Color: yellow Aroma : lemon Shape: round solid
3	Color: turmeric yellow Aroma: lemon Shape: round solid	Color: yellow Aroma : lemon Shape: round solid

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Replication	pH		
	Formula 1	Formula 2	Formula 3
1	10.11	9.93	10.05
2	10.16	9.98	10.08
3	10.06	9.92	10.12
Average	10.11 ± 0.05	9.94 ± 0.03	10.08 ± 0.04

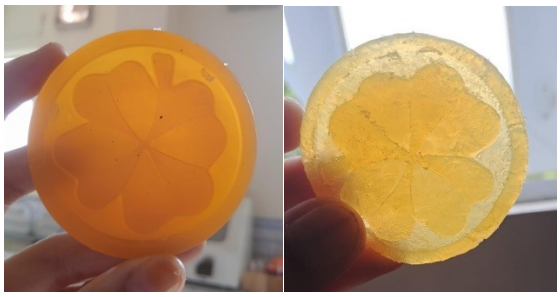

Figure 1: Solid Soap Before Cycling Test and After Cycling Test

Cycling test is a test carried out by storing a sample for 24 hours at 4°C and then transferring it to an oven with a temperature of 40°C. This experiment was carried out 1 cycle and repeated up to 6 cycles. The aim is to determine whether different temperatures and storage times can affect the stability of California Papaya fruit extract transparent solid soap. Observations were made with organoleptic and pH parameters.

The table above shows that stable after the cycling test on the three formulas of transparent solid soap preparations there is no change in shape and odor, but in color there is a change. The color of FI is orange yellow, while FII and FIII are yellow. Color changes can occur due to factors from the heat of the temperature during the cycling test (8). Product stability during temperature cycling tests is an important indicator to assess the resistance of the formulation to extreme temperature changes. Formulations with a balanced ratio of Cocamide DEA and glycerin tend to show better stability during these tests. The addition of Cocamide DEA can increase the viscosity and stability of the foam, while glycerin helps to maintain moisture and prevent drying of the product.

Based on the tests that have been carried out, it can be seen that the pH of the transparent soap ranges from 10–11.8, during the pH test before and after the cycling test. When used, soap with a strong alkaline pH value will increase the pH of the skin, but the skin is able to restore its normal pH within 15–30 minutes after rinsing. After the cycling test, there was a decrease in the pH of F1, F2, and F3. This may have been influenced by changes in temperature during storage and the presence of acidic compounds in the extract (Dwidayati et al., 2022). The pH of soap preparations with high acidity has the potential to cause skin irritation, while excessively alkaline soap may lead to dryness (Elmitra & Noviyanti, 2020).

In addition to pH, other parameters are also affected by cycling test conditions. Temperature fluctuations, especially between low (4°C) and high (40°C) storage temperatures, can induce physical and chemical instability in cosmetic formulations. These thermal stresses may accelerate degradation of thermolabile components such as vitamins, flavonoids, and phenolic compounds present in the

California papaya extract. As a result, the antioxidant properties and consistency of the soap may change over time.

Furthermore, the presence of natural extracts in the formulation may influence soap stability. Plant-based extracts, particularly those rich in phenolics, are known to be sensitive to oxidation and hydrolysis when exposed to fluctuating temperatures. These changes may affect not only the pH, but also the soap's color, aroma, and transparency. In this study, a slight discoloration was observed in all formulas after the cycling test, which may be attributed to the oxidative degradation of pigment compounds such as beta-carotene or polyphenols.

It is also important to note that ethanol, used as a solvent in the soap formulation, can volatilize more rapidly at elevated temperatures, which may affect the transparency and homogeneity of the final product. Therefore, maintaining an optimal balance of solvent, humectant, and antioxidant extract is critical in ensuring both physical and functional stability of transparent soap under temperature cycling conditions.

Based on the SPSS T Test, the sig. (2-tailed) value obtained was 0.591, which is greater than the standard significance level of 0.05. This indicates that there is no statistically significant difference in pH values before and after the cycling test. Therefore, it can be concluded that the transparent solid soap formulations maintained their chemical stability under thermal stress conditions, reflecting good overall stability.

This result supports the hypothesis that the formulations were resilient to temperature fluctuations between 4°C and 40°C during the cycling process. Although slight changes in color and pH were observed, particularly due to potential degradation of thermolabile compounds in the California papaya extract, these variations did not significantly alter the soap's core characteristics. The absence of statistical significance also suggests that the combination of stabilizing agents—such as stearic acid, glycerin, and Cocamide DEA—played a role in preserving the soap's structural and chemical integrity.

Moreover, the lack of drastic pH shifts indicates that the formulation effectively buffered the effects of organic acids from the extract, which are known to be sensitive to oxidation and hydrolysis. The use of ethanol as a co-solvent and the precise ratio of humectants may have also contributed to maintaining the homogeneity and transparency of the soap even under alternating storage temperatures.

CONCLUSION

The variation of sucrose and glycerine concentration in each formula is F1 = 10% and 12%, F2 = 15% and 14%, F3 = 20% and 16%. From the three transparent solid soap formulas that have been made, the results are homogeneous, transparent, have a yellow color, are round in shape and have a lemon scent with the pH value results respectively F1 = 11.07 ± 0.01, F2 = 10.42 ± 0.03, F3 = 10.73 ± 0.01; foam stability test F1=77.33% ± 23.67, F2=84.33% ± 7.02, F3=73.00% ± 12.12; moisture content test F1=28.36 ± 8.87, F2=25.87 ± 13.33, F3=25.69 ± 10.33. Based on the results of the SPSS Annova Test, it shows that there is an effect of variations in the concentration of sucrose and glycerine on the pH value. While the results of the SPSS T Test show that transparent solid soap has good stability.

REFERENCES

1. Vokasi J, Kurniasih E, Niaga JT, Lhokseumawe PN, Kimia JT, Lhokseumawe PN, et al. Sosialisasi bahaya radikal bebas dan fungsi antioksidan alami bagi kesehatan. 2019;3(1):1–7.
2. Pratama NR, Widarta RWI, Darmayanti TPL. Effect of the Solvent Type and Extraction Time with Soxhlet

Method of Antioxidant Activity of Avocado (Persea americana Mill.) Seed Oil. Media Ilm Teknol Pangan (Scientific J ofFoodTechnology). 2017;4(2):85–93.

3. Wayan N, Agustini S. TRANSPARAN YANG DIPERKAYA DENGAN EKSTRAK KASAR KAROTENOID Chlorella pyrenoidosa Characteristics and Antioxidant Activity from Transparent Solid Soap Enriched with Carotenoid Crude Extract of Chlorella pyrenoidosa. 2017;1–12.
4. Aravind G, Bhowmik D, Duraivel S, Harish G. Traditional and Medicinal Uses of Carica papaya. J Med Plants Stud. 2013;1(1):7–15.
5. Febriyanti R. PENGARUH KONSENTRASI ASAM STEARAT SEBAGAI BASIS TERHADAP SIFAT FISIK SABUN TRANSPARAN MINYAK JERUK PURUT (Oleum Citrus hystrixD. C.) DENGAN METODE DESTILASI. Parapemikir J Ilm Farm. 2015;3(1).
6. Yuliastuti D, Sari WY, Islamiyati D. SKRINING FITOKIMIA EKSTRAK DAN FRAKSI ETANOL 70% DAGING BUAH PEPAYA (Carica papaya L.). Media Inf. 2020;15(2):110–4.
7. Nissy A, Dhara TJ, Sinala S, Ratnah S, Farmasi J, Makassar K. Formulasi Sabun Padat Transparan dengan Sari Daging Buah Naga Merah (Hylocereus polyrhizus) sebagai Antioksidan. Orig Artic MFF. 2023;27(1):27–31.
8. Rusli N, Nurhikma E, Sari EP. Formulasi Sediaan Sabun Padat Ekstrak Daun Lamun (Thalassia hemprichii). War Farm. 2019;8(2):53–62.
9. Saputri RK, Al-Bari A. Karakteristik Dan Uji Antioksidan Sabun Transparan Ekstrak Kulit Salak Wedi. Forte J. 2023;3(2):183–91.
10. Nandani R, Arif MR, Purwati E, Safitri CINH. Formulasi dan Uji Mutu Fisik Sediaan Sabun Padat Herbal Ekstrak Daun Ubi Jalar Ungu (Ipomea batatas L) dengan Penambahan Madu. Pros SNPBS (Seminar Nas Pendidik Biol dan Saintek). 2021;453–9.
11. Leny, Fransiska E, Nababan H, Hafiz I, Iskandar B. Formulation and Characteristic Test of Solid Soap From Ethanol Extract of Papaya Seeds (Carica papaya L.). Media Kesehat Politek Kesehat Makassar. 2021;16(2):238–44.
12. Setiawati I, Ariani A. KAJIAN pH DAN KADAR AIR DALAM SNI SABUN MANDI PADAT DI JABEDEBOG. Pertem dan Present Ilm Stand. 2021;2020:293–300.
13. Nurrosyidah IH, Asri M, FM A. Physical Stability Test of Solid Soap of Temugiring (Curcuma heyneana Valeton & Zijp) Rhizomes Extract Iif. Pharm Pharm J Indones. 2019;16(2):209.
14. Sukawaty Y, Warnida H, Artha AV. Formulasi Sediaan Sabun Mandi Padat Ekstrak Etanol Umbi Bawang Tiwai (Eleutherine bulbosa (Mill.) Urb.). Media Farm J Ilmu Farm. 2016;13(1):14.