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Formulation And Physical Quality Test Of Lip Balm Preparations From Yellow Sweet Potato Skin Extract (*Ipomoea Batatas* L.)

Novia Dwi Ramadani[1*] ,Cikra Ikhda Nur Hamida Safitri[2]

[1,2)] Academy Pharmacy Mitra Sehat Mandiri Sidoarjo

e-mail:
[1)] **noviadwi0824@gmail.com**
[2)] **cikraikhda@gmail.com**

ABSTRACT

Formulation and testing of physical quality of lip balm preparation derived from sweet potato skin extract (Ipomoea batatas L). This study highlights the potential utilization of sweet potato skin, which is often discarded, as a valuable resource due to its high content of natural antioxidants and beneficial compounds. The extraction process was carried out to obtain skin extract, which was then formulated into a lip balm preparation at concentrations of 0.2% and 0.4%. This study was conducted using an experimental research method that aims to determine the activity of yellow sweet potato skin extract (Ipomoea batatas L.). The sampling technique in this study was purposive sampling. The skin used will meet the criteria of being clean, not moldy, not overgrown with fibers, the aroma remains fresh and distinctive, and does not smell bad. The results showed that the lip balm formulation with a concentration of 0.2% showed organoleptic test results, namely cacao aroma, semi-solid form, and brown color. The pH test results were 7 SNI standards, namely 4.5 - 8. The homogeneity test results were homogeneous preparations. The results of the spreadability test showed 4cm with a standard of 3-5 cm. So the conclusion from the concentration of 0.2% and 0.4% which showed good results was 0.2% because it met good physical quality standards.

Keywords: physical quality test, lip balm, Ipomoea batatas L.

Introduction

Lips are a part of the body that has no protection from sunlight, so they are very susceptible to damage due to the lack of protective function. Some problems that can occur on the skin of the lips include dry lips, chapped lips, and their color becoming dull. The main cause of this damage is exposure to ultraviolet (UV) rays from the sun (Dampati & Veronica, 2020).

Damage to the lips not only affects appearance, but can also cause pain and discomfort. Factors such as environmental conditions, health care products, and cosmetics used also play a role in causing this damage (Leana & Savitri, 2022). Therefore, it is important to have knowledge about lip care in order to maintain their health and enhance their appearance, one of which is by routinely using natural products (Latisa & Noveini, 2024).

Sweet potatoes are plants that contain high antioxidants. In addition to being used as a natural dye due to its anthocyanin pigment content, sweet potatoes also provide various health benefits, such as acting as an antioxidant, lowering high blood pressure, and helping prevent liver dysfunction, coronary heart disease, and cancer (Setyowati & Ika, 2020). Yellow sweet potatoes are a type of sweet potato whose flesh is yellow, light yellow, or yellowish white. The nutritional content of fresh yellow sweet potatoes includes starch of 24.47%, reducing sugar 0.11%, fat 0.68%, protein 0.49%, water content 68.78%, ash content 0.99%, fiber 2.79%, vitamin C as much as 25.00 mg per 100 grams, and vitamin A of 9,000 SI (Ginting in Saloko, S., Nofrida, R., & Triutami, R. A, 2022).

Natural antioxidants are generally found in the form of vitamins, minerals, and secondary metabolite compounds found in plants (Sinaga, 2019). Chemical compounds contained in natural antioxidants include polyphenols, bioflavonoids, beta-carotene, and catechins (Mauliddah, I., Fitrya, F., & Amriani, A , 2020). Both sweet potato tubers and skins contain anthocyanins that can be extracted and used as natural dyes. In addition, sweet potatoes are relatively easy to obtain and have a relatively affordable price. However, in general, people only consume the tubers, while the skin is thrown away due to lack of knowledge about the potential benefits contained in sweet potato skins (Hidayanti, 2021).

One form of cosmetic preparation intended for lip care is lip balm, which literally means lip ointment. This product is included in the category of lip skin care cosmetics or skin care cosmetics (Tampubolon, 2023). Lip balm functions as a moisturizer, decorative product, and lip protector from environmental influences. In addition, lip balm also helps prevent evaporation of the epithelial cells of the lip mucosa (Limanda, D., Anastasia, D. S., & Desnita, R, 2019).

Lip balm is generally formulated with transparent base ingredients such as beeswax which acts as an emollient or moisturizer. In addition to moisturizing content, lip balm is also usually enriched with antioxidants to protect the lips from

exposure to free radicals, which function to protect the lips from sunlight and pollution that can trigger pigmentation (Nazliniwaty et al ., 2019).

Methodology

This study was conducted through laboratory experiments by formulating and testing the physical quality of lip balm preparations. The dependent variable in this study was the physical quality of lip balm made from yellow sweet potato skin (Ipomoea batatas L.), which included organoleptic tests, pH, homogeneity, and spreadability. The independent variable was yellow sweet potato skin extract (Ipomoea batatas L.) formulated into lip balm with concentrations of 0.2% and 0.4%. The population studied was plants yellow sweet potato (Ipomoea batatas L.), while the sample used was lip balm made from yellow sweet potato skin extract (Ipomoea batatas L.). The sampling technique used was purposive sampling.

Making Simplicia

1. Collecting raw materials

Collection of yellow sweet potato skin (Ipomoea batatas L.) raw materials was obtained in the Petak,Pacet,Mojokerto which has been determined by Akfar Mitra Sehat Mandiri Sidoarjo.

2. Wet sorting

Wet sorting is carried out to remove soil and other foreign materials from the material. In the yellow sweet potato (Ipomoea batatas L.) skin, foreign objects such as soil and other contaminants must be cleaned by sorting and using a rag.

3. Washing of Simplisia

Washing is carried out by washing with running water until the soil that sticks to the skin disappears

4. Chopping

Chopping yellow sweet potato (Ipomoea batatas L.) skin waste aims to shrink the skin so that the drying process can be faster. The material is chopped using a stainless steel knife.

5. Drying

Drying using an oven at a temperature of 60o C (Sari *et al*., 2023) until the skin dries.

6. Dry Sorting

. Selection of plants that are already dry. By separating dry simplicia that is too burnt from not burnt.

7. Pollination

The dried simplicia is blended until smooth, then sieved to reduce the particles.

Making (Ipomoea batatas L.) skin extract

Extraction was carried out using the maceration method with 70% ethanol solvent with a ratio of 1:10 for 3 days (El, Daboor and Ghoniemy, 2007; Fajarullah, Irawan and Pratomo, 2014). Weighing 155 grams of yellow sweet potato (Ipomoea batatas L.) skin simplicia powder was put into a glass jar with 1.55 liters of 70%

ethanol solvent. Close the glass jar tightly and wrap the jar with aluminum foil until all parts are covered. Store in an airtight place and away from sunlight. After maceration for 3 days with occasional stirring, then filtered using filter paper. Put the filtrate into a rotary evaporator at a temperature of 60oC for 2 hours, then continued to be heated above the cup using a water bath at a temperature of 80oC until thick. The thick extract obtained was weighed and its yield was calculated.

Extract Standardization

1. Organoleptic Test

Organoleptic test in extract standardization by identifying aroma, color, and texture (Dewi et al., 2024).

2. Water Content Test

Tare an empty cup and put 1-2 grams of extract into the cup. Dry using an oven at a temperature of 105 degrees Celsius for 30 minutes. The extract is weighed until the resulting weight is the same. Then calculated in the following way.

$$\text{water content} = \frac{(\text{Wo} - Wt)}{Wt} \times 100\%$$

description:
Wo= initial weight (g)
Wt = final weight (g)

Phytochemical Screening

1. Flavonoids

The extract is weighed as much as 1 gram, then add 5 ml of ethanol, then shaken after shaking, heat using hot water, then shaken again and finally filtered. After that, add 0.2 g of Mg and 3 drops of HCl into the filtrate. If the color changes to orange to purple red, it indicates the presence of flavonoids, while orange yellow means there are flavones (Andasari et al., 2021).

2. Alkaloids

Weigh the extract weighing 0.5, then add 1 mL of 2N HCl and 9 mL of distilled water, then place it in a beaker glass that has been filled with boiling water for 2 minutes then cool. After cooling, filter using filter paper. Divide into three, add Mayer, Wagner, and Dragendorff reagents in each place. The presence of alkaloids can be indicated: the presence of white dregs when added with Mayer's reagent, blackish brown dregs in Wagner's reagent, and orange-yellow dregs in Dragendorff's reagent (Agustina et al in Nurlani and Situmorang, 2020).

3. Saponin.

Weigh 1 gram of extract then add 10 mL of auadest then shake in a test tube for 10 seconds. After that, let it stand for 10 seconds. If the results show a foam shape reaching a height of 1-10 cm and are stable for no less than 10 minutes, and the addition of 2N HCL the foam also does not disappear, then it contains saponin (Muthmainnah B, in Nurlani and Situmorang, 2020).

4. Tannin
Weigh the extract weighing 5 grams of sample then add 10 ml of distilled water, then filter using filter paper. Then add distilled water until the color is clear. Then take 2 ml of solution and add 1-2 drops of iron (III) chloride (FeCl) reagent. If there is a blue or blackish green color, it means there is tannin (Marjoni in Sulistyarini, Sari, and Wicaksono, 2020).

Lip Balm Formulation

Tools

The tools used in this study were digital scales, beaker glass, porcelain cup, stirring rod, wooden clamp, water bath, maceration vessel, filter paper, glass funnel, pH meter, lip balm stick**.**

Materials

The materials used in this study were skin (Ipomoea batatas L.), 70% ethanol, cera alba, vco, and oleum cacao.

Table 1. Lip balm formulation (%)

Materials	**F0**	**F1**	**F2**
Ekstrak skin(*Ipomoea batatas L)*	0	0,2%	0.4%
Cera alba	27%	27%	27%
Oleum cacao	50%	50%	50%
color	0,6%	0,6%	0,6%
Vco	Ad 100%	Ad 100%	Ad 100%

Making Lip Balm

All ingredients are weighed carefully. Cera alba and Oleum cacao are melted on a water bath until melted then stirred until homogeneous. VCO and skin extract (Ipomoea batatas L) are put into a beaker glass and stirred until homogeneous. Put VCO and skin extract (Ipomoea batatas L.) into a water bath and stir until homogeneous. Prepare a lip balm container, carefully put the preparation into the lip balm container. Let it solidify at room temperature.

Physical Quality Test of Lip Balm Preparations

Organoleptic Test

Lip balm is tested for physical quality, namely organoleptic tests by identifying aroma, texture, and color (Vuai et al., 2019).

pH Test

Lip balm is tested for pH using pH paper by applying it to a container, then adding a little water. The pH paper is dipped into the container and the color change on the paper is observed. A good pH for lip balm follows SNI, which is between 4.5 - 8 (Wijaya and Safitri, 2020).

Homogeneity Test

Lip balm is tested for homogeneity by taking 1 gram of the preparation then placing it on clear glass and stacking it with clear glass and then pressing it to observe the homogeneity of the lip balm sample (Fauziah et al., 2021).

Spreadability Test

Lip balm is tested for spreadability by taking 1 gram of the preparation then placing it on glass then stacking it on clear glass then being weighted and measuring its diameter. The standard spread of lip balm is between 3-5 cm (Lestari et al., 2020).

Result and Discussion

The extraction results in this study were calculated using the percentage yield.

Table 1. Percentage Yield

Wet weight	Dry weight	Weight extract	Simplicia weight	% Simplicia rendition	% Extract yield	% Yield (FHI)
996 gr	157 gr	23,98 gr	155 gr	15,7%	15,4%	No less from 11,6%

$$\% \text{ Yield of Simple Drugs} = \frac{157\ gram}{996\ gram} \text{ X } 100\% = 15{,}7\%$$

$$\% \text{ Extract Yield} = \frac{23{,}98\ gram}{155\ gram} \text{ X } 100\% = 15{,}4\%$$

Phytochemical Screening

Table 2. Phytochemical Screening Results

Secondary Metabolites	Extract
Alkaloids	+
Flavonoids	+
Saponin	+
Tanin	+

Phytochemical screening test of (Ipomoea batatas L) skin extract obtained positive results for flavonoids, alkaloids, saponins and tannins. Positive flavonoid results indicate the presence of orange-yellow color. Positive alkaloid results are shown on plate A, 2-3 drops of Mayer's reagent are added, a white precipitate is formed. Plate B is added with 2-3 drops of Wagner's reagent, a brown precipitate is formed. Plate C is added with 2-3 drops of Dragendroff's reagent, an orange precipitate is formed. Positive saponin results indicate a foam height that remains as high as 1 cm and does not decrease within 10 minutes even though 2N HCl has been added. Positive tannin test results when the color changes to greenish black.

Extract Standardization

After obtaining the thick extract, extract standardization is carried out. This extract standardization includes organoleptic tests and water content tests. This standardization is to ensure that the extract product has good parameter values. This is important to ensure the quality and consistency of the product in its use.

Table 3. Extract standardization results

Test	Results
Organoleptic	Semi-solid, dark brown color, distinctive aroma
Water content	4,31% (According to FHI no more than 9.1%)

$$\frac{0{,}532\ \text{gram} - 0{,}51\ \text{gram}}{0{,}51\ \text{gram}} \times 100\% = 4{,}31\%$$

Physical Quality Test of Lip Balm Preparation from Skin Extract (Ipomoea batatas L)

Organoleptic Test

Table 4. Organoleptic Test Results

Formulation	Color	Aroma	Textur
F0	Light btown	Distinctive aroma	Semo solid
F1	Light brown	Distinctive aroma	Semi solid
F2	Brown	Distinctive aroma	Semi solid

Lip balm is formulated into 2, namely F1 (0.2%) and F2 (0.4%). The lip balm preparation is tested for physical quality, one of which is organoleptic. The results of the organoleptic test of the lip balm preparation are semi-solid in all formulations, the distinctive smell of cacao in all formulations, and the color of the lip balm preparation at concentrations F1 and F2 has a color difference, namely in F1 the

color is light brown while F2 is brown because the amount of extract in formulation 1 is less than formulation 2.

pH Test

Table 5. pH Test Results

Formulation	pH value
F0	7
F1	7
F2	6

The pH test results showed that the lip balm preparation with a concentration of 0.2% had a pH value of 7 and a concentration of 0.4% had a pH value of 6. This is because the yellow sweet potato extract contains an acidic pH. This shows that the pH results are in accordance with the pH standard according to SNI, which is between 4.5-8.

Homogeneity Test

Table 6. Homogeneity Test Results

Formulation	Uji Homogeneity
F0	Less Homogeneous
F1	Homogeneous
F2	Less Homogeneous

The results of the homogeneity test on the base and formulation 2 are less homogeneous, because there is a striking color on one side when applied to transparent glass. While in formulation 1, there are no striking particles.

Spread Power Test

Table 7. Spread Power Test Results

Formulation	Standart	Spread Power Result (cm)
F0	3-5	4,5cm
F1	3-5	4cm
F2	3-5	4cm

Testing of the spreadability of the lip balm preparation showed that the results met the criteria for a semi-rigid topical preparation with high viscosity. The base preparation had a spreadability of 4.5 cm, while Formulations I and II each showed a spreadability of 4 cm. These findings indicate that the lip balm containing yellow sweet potato skin extract (Ipomoea batatas L.) meets the established spreadability standards, which are between 3 and 5 cm.

Conclusion

Based on the results of the research that has been conducted on the formulation and physical quality test of lip balm preparations from yellow sweet potato skin extract (Ipomoea batatas L), it can be concluded that yellow sweet

potato skin extract (Ipomoea batatas L) can be formulated in the form of lip balm preparations with concentrations of 0.2% and 0.4%. A good lip balm preparation is in formulation 1, namely a concentration of 0.2% because it has a physical quality that meets the standard. Suggestions need to be improved again for tests that have not been used, further research needs to be done for concentrations or physical quality tests that are not good.

Declaration of Competing Interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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