Physical Properties and Moisture test of Lip Balm Formulation with Rampai Fruit Juice (*Lycopersicon pimpinellifeloium*)

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Abstract : Lip balm being on of topical cosmetic that applies to the lips in preventing dryness and protecting against some environmental factors. This study aims to measuring the physical and moisture test of lip balm with rampai fruit juice in varying concentrations. Then this formulation is tested with physical properties tests in the form of organoleptic tests, homoegnity tests, pH tests, irritation tests, moisture tests and hedonic tests. All formulations had homogeneous results with organoleptic test results on F0 being solid with a white color and a distinctive odor. In F1, F2 and F3 the organoleptic results were solid, yellowish white in color and had a distinctive smell. The pH test results in F0 7, F1 5.77 F2 5.23 and F3 5. In the irritation test it does not occur on all formulations. In the moisture test, the results showed a significant difference in the moisture value before and after using lip balm (sig value <0.005). F1 became the best formulation in hedonic test. Rampai fruit juice lip balm formulation meets all the physical requirements and there is a significant difference in the moisture value.

1 INTRODUCTION

Lip balm being on of topical cosmetic that applies to the lips. This cosmetics has a benefit as a moisturizer. This benefits happens by making a layer of oil on the surface of the lips. This layer then protects the lips from external factors. (Ambari *et al,* 2020)

Rampai *(Lycopersicon pimpinelliefoium)* is a plant that has many nutrients, containing 18 types of amino acids and sugar. The largest amino acid in cooked potpourri is the amino acid glutamic acid. (Yusuf *et al,* 2018). Rampai *(Lycopersicon pimpinelliefoium)* is a horticultural product that is beneficial for the body. In 100 g of rampai fruit, contains 22 calories, 1 g protein, 0.2 g fat, 0.4 g fiber, 2000 mg vitamin A, 50 mg vitamin C, 0.05 mg vitamin B1, 0.04 mg vitamin B2, and 29 mg calcium. Compared to other types of tomatoes, rampai has a higher vitamin C content (Yeli *et al,* 2022)

The largest amino acid in cooked rampai is glutamic acid. Naturally, the content of sucrose is 4.79%/100g. Glutamic acid and sucrose can be used as lip moisture enhancers which can be formulated in the form of lip balm using rampai (*Lycopersicon pimpinelliefoium)* (Yusuf *et al,* 2018).

This research aims to measuring the physical and moisture properties of lip balm formulation with rampai fruit juice in varying concentrations.

2 METHODS

2.1. Tools and Material

This study using some tools, they are Beaker glass, Blender, Hot plate, Stirring rod, Dropper pipette, Scales, Spatula Skin Analyzer, pH meter.

The material in this research is rampai fruit juice, cetyl alcohol, adeps lanae, cera alba, propylene glycol, phenoxyetanol and liquid paraffin.

2.2. Sample Preparations

In this research we used rampai sample taken by purposive sampling, namely sampling based on the

researcher's own decision. Rampai used in this research in red color and fresh, not damaged or rotten. Making rampai fruit juice begins by separating it seeds from the fruit flesh and then grinding it using blender. The rampai fruit juice is filtered to get fruit juice that is ready to be used to make lip balm.

2.3 Lip Balm Formulation

Table. 1 Formulation of Lipbalm with Rampai Fruit Juice (Yusuf *et al,* 2019)

FORMULATION (g)					
No	Ingredients	F 0	F I	F II	F III
1.	Rampai Fruit Juice	0	1	3	5
2.	Cetyl Alcohol	8	8	8	8
3.	Adeps Lanae	10,5	10,5	10,5	10,5
4.	Cera Alba	16	16	16	16
5.	Propylenglycol	10	10	10	10
6.	Phenoxyetanol	0,5	0,5	0,5	0,5
7.	Liquid Parafin	Ad 100	Ad 100	Ad 100	Ad 100

2.4. Lip Balm Preparations

Cera alba is put into a 250 mL beaker glass and melted on a hot plate. Then add cetyl alcohol. Adeps lanae, propylene glycol, phenoxyethanol mix until homogeneous then add liquid paraffin.

Then stir until homogeneous and add rampai fruit juice, stir until homogeneous. Put it in the lip balm container (Yusuf *et al,* 2019).

2.5. Organoleptic Test

Using tools with the aid of the five senses, where respondent can determine the shape, aroma, color and texture. (Amalia *et al,* 2021). This test used to show differences between shape, aroma, color and texture in every lip balm formulations.

2.6 Homogenity Test

Small amount of lip balm places between two glass objects. This sampel were smeared on a glass object, covered and pressed with another glass object. Then the homogeneity of the lip balm samples was observed. (Suenna *et al*, 2022). Homogenity test is use to show the homogenous of every lip balm formulations

2.7 pH test

The sample was weighed 1 gram then dispersed in 10 ml aquadest , and heated. this test using pH meters to determine the result. The pH of the lip balm meets the requirements if it is in the lip pH range, 4.5 – 8.0 (Imani *et al,* 2022).

2.8. Irritation Test

The skin irritation test done in 10 panelists by applying the lip balm to the skin of the lower arm for 3 consecutive days. (Tranggono *et al*, 2007). This test is to show any irritation reactions that occurred in every lip balm formulations.

2.9. Moisture Test

This test uses 10 respondent with the criteria are women, healthy, aged 18-25 years, and does not have any history of skin disease. This test applies lip balm to the back of the hand ((Suenna *et al*, 2022). Then the observations were begin by observing the results of skin moisture before and after using lip balm. Skin analyzer were a tools to determine the moisture value in skin.

2.10. Hedonic Test

This test is intended to determine the level of respondents' preference for the rampai fruit juice lip balm which includes color, aroma and moisture. In this study, respondents were selected aged 18-25 years, had no history of allergies, and were willing to volunteer (Rasyadi, 2022).

2.11 Data Analysis

Data analysis on moisture test using SPSS (Statistical Product and Servive Solution)version 25.0, with normality test and paired t-test.

3 RESULT

Information :

\+ : irritation occur

\- : irritation does not occur

The organoleptic test showed that the F0 had a solid form, white color and a distinctive odor. Meanwhile, F1, F2, F3 have a solid texture with yellowish white and a distinctive odor. All formulations have good homogeneity.

In the pH test, it shows that the more rampai fruit juice concentration in the formulation, the pH of the lip balm has a decreasing pH value.

The irritation test was carried out on 10 respondent, which none was found any irritant reactions in the form of itching, redness and roughness of the skin. The panelists in this test were women, health, with an age range of 20-25 years and have never had any skin diseases before

3.1 Organoleptic test, Homogenity test, pH test, and Irritation Test

Table. 2 Result of Organoleptic Test, Homogenity test, pH test, and Irritation Test on Lip balm Formulation with Rampai Fruit Juce

Formulation				
Paramater	F0	F1	F2	F3
Texture	Solid	Solid	Solid	Solid
Colour	White	Yellowish white	Yellowish white	Yellowish white
Aroma	distinctive odor	distinctive odor	distinctive odor	distinctive odor
Homogenity	Homogen	Homogen	Homogen	Homogen
pH	7,0	5,77	5,23	5
Itchy	-	-	-	-
Redness	-	-	-	-
Roughness Of The Skin	-	-	-	-

3.3 Moisture Test

Table 3. Result of Moisture test on Lip balm Formulation with Rampai Fruit Juice

Formulation	Before	After	Δ Change	*p-value*
F0	34,9± 2,92	39,9 ± 3,31	5 ± 3,97	0,000
F1	40,1 ± 4,99	46,4 ± 3,53	6,3 ± 5,31	
F2	40,2 ± 4,10	48 ± 2,10	7,8 ± 5,10	
F3	34,5 ± 4,64	45,8 ± 3,67	11,3 ± 7,08	

The moisture test results of lip balm were reviewed before and after using lip balm. The results showed a significant difference (sig value < 0.000) in moisture values before and after using lip balm among respondents.

In the Δ changes data before and after using lip balm, F3 had the largest delta value 11.3 ± 7.08. Delta changes in moisture followed by F2 and F3. Formulation 0, which does not contain rampai fruit juice, has 5 ± 3.97 in delta changes on moisture.

3.4 Hedonic Test

Table 4. Result of Hedonic Test on Lip Balm Formulation with Rampai Fruit Juice

Formulation	Hedonic Test							
	Texture		Colour		Aroma		Moisture	
	Like	Dislike	Like	Dislike	Like	Dislike	Like	Dislike
F0	10,5%	89,5%	20%	80%	20%	80%	10%	90%
F1	90%	10%	80%	20%	85%	15%	90%	10%
F2	80%	20%	80%	20%	90%	10%	80%	20%
F3	90%	10%	90%	10%	90%	10%	80%	20%

This table showed the result of hedonic test including texture colours aroma and moisture. The percentage on the table divided into two options, like and dislike.

4 DISCUSSION

Rampai contains vitamins and chemical compounds that are good for health, especially lycopene. Lycopene is the red colour that is most abundant in tomatoes. Lycopene is useful as an antioxidant that can prevent free radicals that cause disease. But ramai also has acidic ph and consumption should be limited. Red rampai indicates that it contains high lycopene.

In this lip balm formulation, other additional ingredients are cetyl alcohol, adeps lanae cera alba, propylene glycol, liquid paraffin and phenoxyethanol. Research shows that increasing the concentration of cetyl alcohol in lip balm formulations can increase the adhesive power and viscosity of the preparation.

(rahayuningsih, 2019). Cera alba added as much as 16 g to this lip balm preparation can increase the consistency of the preparation. Cera alba can reduce the interfacial tension of oil and water and prevent coalescence from forming. ((suenna *et al*, 2022). Cera alba is also used as a base that can form a protective layer on the lips. (bhemama *et al,* 2022). Adeps lanae was chosen in this formulation as an emollient so that it can soften and increase lip moisture. Besides, adeps lanae can also increase the penetration of active substances from rampai fruit juice into the layers of the skin, providing longer-lasting moisture. ((bhemama *et al,* 2022). Propylene glycol functions as a humectant which can help reduce the incidence of chapped lips (putri, *et al* 2024). Phenoxyethanol is an antimicrobial agent that usually used with concentration of 0.5% - 1.0% . This anti microbial agent is in the form of a thick and colorless liquid (rowe, 2009).

lip balm formulation with rampai fruit juice is made in four different concentrations. F0 is a formulation that does not contain any rampai fruit juice. Rampai fruit juice concentration was respectively 1%, 3% and 5% in f1, f2 and f3.

Organoleptic tests results that there are color differences between f0 and f1, f2, and f3. F0 has a white color while the other three formulations had a yellowish white color. In terms of shape and aroma, the four formulations have similarty, they are solid and have a distinctive aroma.

Based on table 2, from the measurement of the ph value of each preparation, it shows that f0 has a ph of 7.0, f1 5.77, f2 5.23 and f3 5. The results showed that the higher rampai fruit juice concentrations, it given lower effect on the level the ph value of the lip balm. Varying the concentration of tomato fruit water extract in the lotion, given the result that the higher concentration of tomato fruit water extract, the lower in resulting ph value (karim *et al,* 2022). Based on sni 16-4399-1996 ph value that is safe for the skin is 4.5-8.0. Lip balm are safe to use if they are around the skin's ph (imani *et al,* 2022).

The irritation test results in table 2 show that this lip balm formulation does not cause any side effects to respondents. Irritation reactions do not occur with all formulations in all the respondent. The irritation parameters seen include redness, itching and roughness of the skin.

Table 4 presents the results regarding skin moisture before and after using rampai fruit juice lip balm. The skin moisture value is obtained using a skin analyzer. Measuring lip moisture with a skinanalyzer were also done in another research with tomato lipophilisate as lip balm. (Yusuf *et al,* 2018).

In F0, the moisture value before using lip balm was 34.9 ± 2.92 and after using was 39.9 ± 3.31, with a delta change in moisture value 5 ± 3.97. In F1, the moisture value before use and after use has a delta change of 6.3 ± 5.31. The delta change in moisture values at F2 and F3 increased from 7.8 ± 5.10 to 11.3 ± 7.08. This delta changes data in moisture come from the result of differences in moisture values after and before using lip balm with rampai fruit juice. The results of this delta changes, show that there is a change in the moisture value before and after using rampai fruit juice lip balm.

This moisture value was then subjected to statistical analysis using the normality test and paired t-test and the results that there was a significant difference in the moisture value before and after using rampai fruit juice lip balm. The significant difference can be seen from the p-value 0.000 (<0.05). These moisture results are in line with research that used tomato lipophilisate as a moisture enhancer in the skin, where a tomato lipophilisate concentration of 5% gave a moisture value of 39% (Yusuf *et al,* 2018).

The results of the hedonic test on texture, 90% respondents choose F1 and F3 as the best formulation. Then F3 is the most popular in terms of lip balm color with a score reaching 90%. In terms of aroma, panelists liked F2 and F3 with a liking score reaching 90%. This is because F1 still smells of adeps lanae. In terms of moisture, F1 get 90% and F2 and F3 are 80%. F0 value reaches 10.5% for texture, then for color 20%, for aroma 20% and for moisture 10%. F0 is a formulation that does not any rampai fruit juice.

5. CONCLUSION

This research provides results that the formulation of lip balm with rampai fruit juice which is divided into four formulations,F0, F1, F2, and F3. All of the formulation has met the physical test requirements.
The irritation test showed that all formulations were save, indicated by the absence of signs of irritation. In the moisture test, there was a significant difference in the moisture value before and after using rampai fruit

juice lip balm which was marked with a p-value of 0.000 (<0.005). In the hedonic test which was assessed from texture, aroma and shape, F1 was the formulation that respondents liked most.

5. SUGGESTION

For further researches additional tests such as anti-oxidants can be carried out with the aim of completing the information from the formulation of potpourri fruit juice lip balm preparations.

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