

Formulation and Physical Quality Evaluation of *LipTint* Preparation of Sweet Potato Extract (*Ipomoea batatas* (L.) Lamb) with Dragon Fruit Extract (*Hylocereus polyrhizus*) as Natural Lip Pigment

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ABSTRACT

Liptint is one of the cosmetic preparations that has a role in providing a decorative role in lip pigment colouring. The use of natural ingredients Sweet Potato (*Ipomoea batatas* (L.) Lamb) combined with Dragon Fruit (*Hylocereus polyrhizus*) can replace synthetic dyes in liptint preparation which may hamful to the lips. The aims of this research was to determined the different concentrations of sweet potato extract (*Ipomoea batatas* (L.) lamb) combined with dragon fruit extract (*hylocereus polyrhizus*) on physical quality evaluation. Experimental research on the formulation of liptint preparations using sweet potato concentrations of 10%, 20% and 30% combined with dragon fruit 6%. This studied shows that the preparation of sweet potato liptint concentrations of 10, 20 and 30% combined with dragon fruit 6%. Produced liptint that has good texture, colour, smell, as well as adhesion, spreadability, viscosity. pH of the preparation at a value of 8 but did not cause irritation to the skin. The results of data analysis showed that there was no significant difference in the spreadability test, adhesion test and viscosity test and there was a significant difference in pH and FIII was the most preferred by respondents. This study has concluded that the concentration of sweet potato extract and dragon fruit extract affects the results of the physical quality test of preparations. The results of the physical quality test showed that the liptint preparation with 30% sweet potato concentration (F III) gave the best results.

Keywords: Liptint, Sweet Potato, Dragon Fruit, Natural Pigment, Physical Quality Test

INTRODUCTION

Cosmetics is a basic need for most of the female population in line with the increasing population growth (Risnawati *et al.*, 2012). Cosmetics is materials or preparations intended for use on the outside of the human body, especially for cleaning, perfuming, changing appearance, and improving body odour or protecting or maintaining the body in good condition (BPOM, 2015). Lip colouring is one of the cosmetic preparations that has a role in providing a decorative role in lip pigment colouring (Saragi, 2018). There is a new innovation regarding lip colour in liquid formulations, now better known as liptint. Liptint formulations can produce colour on the lips to look *fresher*.

The aesthetics liptins on the market use synthetic dyes that can have adverse effects because they can be carcinogenic (Oktiaviani, 2019). In 2016, BPOM data showed that it had found 43 kinds of cosmetics that used harmful synthetic ingredients. The use of natural ingredients can be used as an alternative to synthetic dyes that are carcinogenic in *liptint* formulations. The natural ingredients that will be used in this study are sweet potato plants



(*Ipomoea batatas* (L.) Lamb) which contain carotenoids that give natural colours (Wahyuni, et al, 2005), a combination of dragon fruit (*Hylocereus polyrhizus*) which contains anthocyanins in the form of natural pigments that can produce colours such as red, and magenta (A Nizori, 2020).

Based on the description above, the researchers are interested in innovating and obtaining natural lip pigments from Sweet Potato (*Ipomoea batatas* (L.) Lamb) extract combined with Dragon Fruit (*Hylocereus polyrhizus*) extract and determining the best *liptint* preparation formulation based on physical quality tests.

METHODS

The method used in this research is laboratory experiments, this research was conducted at the Pharmaceutics Laboratory of the Faculty of Pharmacy, STRADA University of Indonesia Kediri for 1.5 months. This research stage starts from collecting materials, performing plant determination, making simplisia, making extracts, making liptint preparations, testing the physical quality of liptint preparations (organoleptic test, homogeneity test, adhesion test, spreadability test, viscosity test, pH test) and liking and irritation tests on 30 respondents and continued with data analysis using SPSS oneway ANOVA statistics.

A. Material Collection

The natural ingredients used were sweet potato and dragon fruit were collected from Jombang Regency, East Java. The sweet potato and dragon fruit were dry sorted to obtain suitable sweet potato and dragon fruit. The minimum sorted weight was > 300 grams for sweet potato and > 350 grams for dragon fruit.

B. Simplicia Preparation

1. Sweet Potato

The initial stage is wet sorted to separated contaminants that are still attached to the sweet potato. Reduced the size of sweet potatoes by cut small and thin to speed up dried. The dried stage was carried out for 6 days with the help of sunlight, then after dried, grinded was carried out to produced sweet potato flour. Sifted the sweet potato flour with a No 60 sieve and calculated the shrinkage of the finished sweet potato flour.

2. Dragon Fruit

The manufacture starts from washed the dragon fruit that has been collected with a flowing stream, conducted wet sortd to separate contaminants that are still attached to the dragon fruit. Reducted the size of sweet potatoes by cut small, after reduced the size, grinded until smooth and separated the dragon fruit juice from the seeds. Calculated the weight of dragon fruit juice

C. Extract Preparation

a. Sweet Potato

Sweet potato simplisia was extracted used ethanol solvent using the principle of maceration extract in a ratio of 1:10. Sweet potato simplisia as much as 400 grams was macerated with 70% ethanol as much as 4 litres for 5 days.

b. Dragon Fruit

The separated pulp was weighed as much as 400g and mashed using a blender, then macerated with 2800 ml of 70% ethanol then covered and left for 3 days protected from light while stirring frequently, after 3 days it was filtered and evaporated to get a thick extract.

c. Tools and Materials

The ingredients used in this study were sweet potato extract, dragon fruit extract, distilled water, olive oil, glycerin, TEA, *methyl paraben*, *propyl paraben*, and *orange essence*.

The tools used in this research are analytical scales, mortar, stemper, glassware, pH meter, dropper pipette, *object glass*, *deg glass*, *waterbath*, *hot plate*, *water bath* cup, stirring

rod.

D. Liptint Formulation

Table 1. Liptint dosage formulation

Material Name	F1 (%)	F2 (%)	F3 (%)
Sweet Potato Extract	10	20	30
Dragon Fruit Extract	6	6	6
Glycerin	30	30	30
Methyl paraben	0,1	0,1	0,1
Propyl paraben	0,02	0,02	0,02
TEA	5	5	5
Oleum Olivarum	15	15	15
Orange essence	0,1	0,1	0,1

E. Liptint Preparation Procedure

Baed on the Table 1 Liptint dosage formulatin, the first step taken in the proced of maked liptint preparation formulations of sweet potato extract and dragon fruit extract is to dissolved sweet potato extract and dragon fruit extract into the oil phase by poured *oleum olive* into a mortar based on different concentration variations. Then, glycerin was added and stirred until homogeneous. After that, added methyl paraben and propyl paraben and stirred until homogeneous. The next step was to add enough *tutty orange essence* to produce *orange essence* smell. The last step was to put the preparation into a container and close it tightly.

F. Physical Quality Test of liptint Preparation

a. Organoleptic Test

This test consists of examined the colour, shape, and smell of the resulted preparation. Organoleptic observations was based on the five senses.

b. Homogeneity Test

Homogeneity test was carried out by means of each preparation to be tested applied to a glass object, then with another glass object to observed it was homogeneity.

c. Adhesion Test

This test was carried out with the sample placed on one side of the glass object with the bottom side has been attached to a rope to tie the load. Then attached to another glass object. The load used is 50 g. Then observed the time it takes for the load to separate the two glasses.

d. Spreadability Test

This test was carried out using 2 glasses that were overwritten by a load of 150 grams for 1 minute and measured the diameter of the preparation formed.

e. Viscosity Test

The viscosity test of this liptint preparation was carried out used a *Brookfield Viscometer* at a speed of 6 rpm. Put the liptint preparation in a *glass beaker*. attach the spindle to the tool, then rotate the *revolver* to lower the spindle until it is completed submerged in the liquid.

f. pH test

The pH test on this liptint preparation was carried out used a pH meter, where the pH meter electrode was dipped into the preparation, the number on the pH meter was allowed to move until it showed a fixed number, then recorded.

g. Hedonik Test

This test was conducted by female respondents aged 12-25 years by filled out a questionnaire that the respondents had provided. Respondents assessed in terms of organoleptic.

h. Irritation Test

This test was carried out by female respondents aged 12-25 years by filled out a

questionnaire that the researcher had provided. Respondents were asked to filled in the presence of irritation or not when applying the preparation on the back of the hand.

G. Data Analysis

This research data analysis used SPSS. Data analysis management was carried out after the data obtained the results of normality and homogeneity. Normality test and homogeneity test to measure the data was normal or abnormal and normally distributed or not normally distributed. Data was normal and homogeneous if the significance value <0.05 and if the significance value > 0.05 then the data is not normal and not homogeneous. Normal and homogeneous data can be carried out *Oneway Anova* test to posthoc analysis, while for data that is not normal and homogeneous, *Kruskal-Wallis* test was carried out to posthoc analysis.

RESULTS AND DISCUSSION

Material Collection and Determination

Sweet potato and dragon fruit were collected from Jombang Regency, East Java. The next stage, determination of sweet potato (*Ipomoea batatas* L.) and dragon fruit (*Hylocereus polyrhizus*) plants carried out at the UPT Laboratorium Herbal Materia Medica Batu, where it is known that the natural ingredients used are sweet potato (*Ipomoea batatas* L.) which belongs to the family "*Convolvulaceae*" and dragon fruit (*Hylocereus polyrhizus*) which belongs to the family "*Cactaceae*".

Simplisia Preparation

Sweet potato that has been separated and peeled is cut into small pieces to be dried in the sun after dried it was reduced in size used a milling machine and sieved to become powder and ready for maceration. The initial weight was 3 kg and became 270 grams of simplisia. Dragon fruit that has been separated from its juice and ready for maceration is 800 grams.

Extract Preparation

Sweet potato powder used was 450 grams and produced 80 grams of extract and dragon fruit extract was made by maceration method with a ratio of 1:7 with 70% alcohol. The dragon fruit used was 800 grams and produced 75 grams of extract.

Physical Quality Test

1. Organoleptic Test

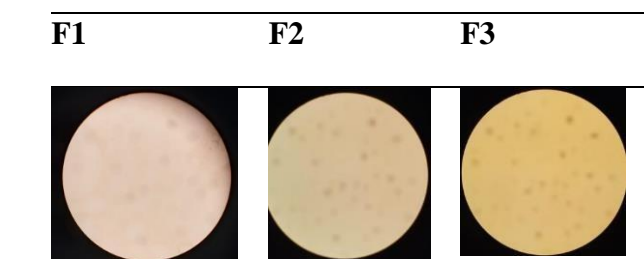


Figure 1. Organoleptic test

Figure 1 shows that preparations F1-F3 have a liquid texture, with varying colours, F1 yellow, F2 brown and F3 dark brown and have a distinctive aroma of *oleum citri* as a whole. The darker colour of the preparation is influenced by the high concentration of sweet potato extract in each preparation. The distinctive odour of *oleum citri* is obtained from the addition of orange essence to the preparation made.

2. Homogeneity Test

Table 2. Homogeneity Test Results



Based on the results of the homogeneity test data of lipint preparations in table 2. shows that F1-F3 preparations have less homogeneous mixed in each lipint preparation, and there are differences in the colour of each formulation, but there are still a few small particles. The colour difference in the homogeneity test results was influenced by the addition of sweet potato extract concentration in each formulation. Small particles that are visible as a result of ingredients that cannot be dissolved in the lipint base.

3. Adhesion Test

Table 3. Adhesion Test Results

	Repetition	Formulation			Unit
		F1	F2	F3	
1		11	11	11	Seconds
2		11	11	13	Seconds
3		12	13	13	Seconds
Mean \pm SD		11.33 \pm 0.57	11.67 \pm 1.15	12.33 \pm 1.15	Seconds

Based on the results of the adhesion test in Table 3, the test using a load of 50 grams for 5 minutes, shows that F2 and F3 had the greatest adhesion (13 seconds), while F1 has adhesion (12 seconds). The greater the value of the resulting adhesion response means that the time required by the lipint to adhere to the lips is increasing. And vice versa. The smaller the adhesion value, the less time it takes for the lipint preparation to adhere to the lips (Haqi, 2021).

4. Spreadability Test

Table 4. Spreadability Test

	Repetition	Formulation			Unit
		F1	F2	F3	
1		8.00	8.50	8.00	cm ²
2		8.60	8.50	8.50	cm ²
3		8.55	9.00	8.50	cm ²
Mean \pm SD		8.38 \pm 0.33	8.66 \pm 0.28	8.33 \pm 0.28	cm ²

Based on the results of the spreadability test in Table 4. which measures using a load of 100 grams for 2 minutes, shows that F2 has the largest spreadability (9.00 cm), while F1 has spreadability (8.60 cm) and F3 (8.50 cm). Lipint spreads easily if its diameter is about 5-7 cm. According to Garg (2002), lipint preparations that have good spreadability can be identified by the amount of colour attached when applying the preparation.

5. Viscosity Test

Table 5. Viscosity Test Results

Repetition	Formulation			Unit
	F1	F2	F3	
1	981.19	970.69	1.130.90	mPa.s
2	1.100.20	1.011.50	1.100.23	mPa.s
3	1.110.15	1.020.34	1.221.79	mPa.s
Mean \pm SD	1.064.03 7.20	\pm 1.027.67 \pm 2.28	1.147.60 \pm 6.50	mPa.s

Based on the results of the viscosity test in Table 5. obtained from the evaluation using a brokfield viscometer shows that F3 has the largest viscosity (1221.79 mPa.s), while F1 has a viscosity of (1,110.15 mPa.s) and F2 (1,020.34 mPa.s). Viscosity testing is done to assess the viscosity level of a preparation, which is important so that the application of the product becomes easier. The success of the formula depends on the appropriate viscosity, because preparations that are too thick can inhibit the release of active substances. A good viscosity value reflects the desired continuity between the accelerated release of the active substance and the ease of application of the preparation (Wasitatatmadja, 1997).

The correlation between the spreadability test, adhesion test and viscosity is that the higher the spreadability value, the higher the viscosity value of the preparation and the lower the adhesion value, but if the spreadability value is low, the lower the viscosity value of the preparation and the higher the adhesion value.

6. pH test

Table 6. pH Test Results

Repetition	Formulation		
	F1	F2	F3
1	8.13	8.18	8.16
2	8.12	8.19	8.16
3	8.15	8.20	8.18
Mean \pm SD	8.13 \pm 0.01	8.19 \pm 0.01	8.16 \pm 0.01

Based on the results of the pH evaluation Table 6. using a pH meter showed that F1, F2 and F3 have the same pH value of 8, which indicates that the lipint preparation was in an alkaline condition. The results of the pH test of the preparation show that the preparation made does not meet the requirements of the pH test of the lipint preparation. The pH test results of the preparation are said to be unqualified because the pH of the lipint preparation made exceeds the physiological pH of the skin, which is 4.5-6.5, this is due to the high alkaloids contained in the natural ingredients used.

7. Hedonik Test

Table 7. Hedonik Test Results

		Dislike (1)	Disliked (2)	Enough (3)	Likes Like (4)	Liked very much (5)	Number of Respondents
F1	Texture	6	14	5	5	0	30
	Colour	3	21	6	0	0	30
	Smell	2	12	10	6	0	30
F2	Texture	1	7	14	8	0	30
	Colour	2	11	11	6	0	30
	Smell	3	12	10	5	0	30
F3	Texture	0	2	17	10	1	30
	Colour	2	9	9	7	3	30
	Smell	3	16	6	5	0	30

Based on the results of the favourability test that has been carried out by 30 respondents with the provisions of age less than 25 years and female gender. Getting the results that the most preferred preparation in terms of texture and colour was F3 and in terms of smell were F1 and F2.

8. Irritation Test

Based on the results observed from 30 respondents, none of them showed any signs of irritation such as redness, itching, or swelling. The irritation test is said to be good if the preparation applied to the skin does not cause signs of irritation such as redness, itching, or swelling. Irritation tests are carried out to determine the presence of irritating effects on the skin and to assess and evaluate the characteristics of a substance when exposed to the skin. It can be concluded that the lipint preparations made with F1-F3 do not irritate the skin.

DATA ANALYSIS

Data analysis for the adhesion test has a normal value but does not have a homogeneity value so it was continued used *Kruskal Wallis* analysis and showed no significant difference. The spreadability test on F1 has a non-normal value and was continued with *Kruskal Wallis* analysis and showed no significant difference. The viscosity test has a value that has a non-normal value and was followed by *Kruskal Wallis* analysis and showed no significant difference. The pH test has a normality value but does not have a homogeneity value so it was continued with *Kruskal Wallis* analysis and there is a significant difference in F1 with F2. The liking test is divided into 3 namely colour, texture and smell. The colour liking test has normality and homogeneity values so that it can used *Oneway Anova* analysis and shows that there are significant difference in (F1 and F2) and (F1 and F3). The texture liking test has a normality value but does not have a homogeneous value and continued with the *Kruskal Wallis* analysis and showed that there are significant difference in (F1 and F2) and (F1 and F3). Aroma liking test has normality value but does not have homogeneity value and continued with *Kruskal Wallis* analysis showed no significant difference in each formulation.

CONCLUSIONS

Lipint preparations from sweet potato extract and dragon fruit extract as dyes with

concentrations of 10, 20 and 30% provide good physical quality results with varied colours, textures and aromas, and produce homogeneous preparations.

Liptint preparations from sweet potato extract at a concentration of 6% and dragon fruit extract as a colourant with concentrations of 10, 20 and 30% did not have a significant effect on adhesion, spreadability and viscosity but had a significant effect on pH. Formulation III is the preparation most preferred by respondents in terms of colour, texture and smell.

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