LIP CREAM PREPARATION FORMULATION FROM RED DRAGON FRUIT (*HYLOCEREUS POLYRHIZUS* L.) AS A NATURAL COLORING

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A B S T R A C T

Lip cream is the most commonly used type of lip makeup among women. A natural dye called anthocyanins is found in the red dragon fruit (Hylocereus polyrhizus).. Red dragon fruit has a striking red color that can be used as a safe and attractive natural coloring material for use in cosmetic products. This study aims to formulate red dragon fruit as a natural dye in lip cream preparations and test the evaluation of the preparation. This study is an experimental study that formulates red dragon fruit using 3 concentrations of red dragon fruit F1 (15%), F2 (20%) and F3 (25%) as natural dyes. The evaluation test methods for lip cream preparations are organoleptic test, homogeneity test, application power test and pH test. The results of the evaluation of the lip-cream organoleptic test with the concentration of red dragon fruit dye F1 (15%) were cream while the concentration of red dragon fruit F2 (20%) was light pink and the concentration of red dragon fruit F3 (25%) was dark pink. The homogeneity test of F1, F2 and F3 has an even color, no coarse grains. The applicability test on F1, F2 and F3 had a difference in color produced in the application of lip cream due to the difference in the concentration of red dragon fruit extract used. Finally, the pH test obtained FI (4.54), F2 (4.33) and F3 (4.03). The results of the evaluation test of preparations from F1, F2 and F3 that have a good formula are F3.

INTRODUCTION

Cosmetics have been known to people for centuries. In the 19th century, cosmetics began to attract attention not only for beauty but also for health. Cosmetics are derived from the Greek word "kosmetikos" which means decorating and organizing skills (Aisyah & Diana, 2018).

Cosmetics are considered a necessity for women in the millennial period, especially for adolescents (Lismayanti and Angga, 2020). Currently, lip cream is the most commonly used type of lip makeup among women. The texture is soft and semi-dense so that it is more attached to the lips than other lip dyes (Tranggono, 2007).

One way to avoid using harmful synthetic dyes in lip dye compositions is to utilize natural dyes instead. As the 'back to natural' movement uses natural dyes over synthetic dyes are becoming more and more common. A natural dye called anthocyanins is found in the red dragon fruit (*Hylocereus polyrhizus*).

Dragon fruit (*Hylocereus polyrhizus* L.) is one of the newly cultivated horticultural plants in Indonesia with a bright red fruit color and green scales. This fruit has a very unique shape and is quite alluring to look at (Cahyani *et al*, 2024).

Red dragon fruit, with its exotic name and striking red color (Adnan *et al*., 2022), has the potential as a safe and attractive natural dye ingredient for use in cosmetic products. This approach not only offers aesthetic benefits, but also takes advantage of the natural properties of dragon fruit that are rich in antioxidants and other nutrients, which can provide additional benefits to the skin of the lips.

Previous research on the use of red dragon fruit as a natural dye has been carried out (Amaliasari *et al*, 2021) on the formulation of blushing preparations to replace harmful substances in cosmetics with variations in formulations and the addition of dragon fruit peel extract.

In several scientific journals related to cosmetics and natural ingredient science. One of the studies (Tampubolon, 2023) with the title "FAloe Vera Extract Lip Balm ormulation *(Aloe Vera*) and Red Dragon Fruit (*Hylocereus Polyrhizus*) as a Lip Moisturizer Yang presented an experiment on lip cream formulations using natural ingredients, including red dragon fruit extract, to increase the attractiveness of cosmetic products and provide added value in terms of nutrition for the skin of the lips.

The journal highlights the importance of using natural dyes in cosmetic products to avoid the risk of allergies and skin irritation.

METHODOLOGY

The research was conducted in June-July 2024 and took place at the Baubau Polytechnic Pharmacy Laboratory. The tools used in this study are scales, droppers, porcelain cups, watch cups, parchment paper, stirring rods, horn spoons, spatulas, lumps and pestles, bunsen, tripods, spirtus, pH meters, measuring cups and lip cream preparation containers. The ingredients used in this study were red dragon fruit (*Hylocereus polyrhizus* L.), aquadest, *carnauba wax*, cera alba, kaolin, lanolin, cetyl alcohol, oleum ricini, tocopherol and methyl paraben.

Research Procedure

Table 1. Red Dragon Fruit Lip Cream Preparation Formula

No.	Material	F1(%)	F2(%)	F3(%)	Function
1.	Red dragon fruit	15%	20%	25%	Active substances
2.	Tocopherol	0,05%	0,05%	0.05%	Antioxidant
3.	Methyl paraben	0,15%	0,15%	0.15%	Preservatives
4.	Kaolin	3%	3%	3%	Emulsifier
5.	Lanolin	3%	3%	3%	Moisturizer
6.	Setil alcohol	2%	2%	2%	Thickener
7.	Oleum ricini	50%	50%	50%	Thickener
8.	*Carnauba wax*	6%	6%	6%	Basis
9.	Wax Sunrise	3%	3%	3%	Fastener

Preparation of red dragon fruit juice

The selected dragon fruit is washed until clean then the pulp is separated from the skin, after that the pulp is cut into pieces and then heated then waited until the flesh releases dragon fruit juice and then filtered until it gets red dragon fruit juice.

Lip Cream Making Procedure

All the necessary ingredients are weighed according to the weight in the formula in **table 1**. Then the wax phase (*carnauba wax* 0.24 grams and cera alba 0.12 grams) and the fat phase (oleum ricini 2 grams, lanolin 0.12 grams and cetyl alcohol 0.08 grams) are melted). After that, the wax phase is inserted into the hot mortar, grind strongly and add little by little the fat phase that has been melted, grind strongly. Then 0.002 grams of tocopherol, 0.12 grams of kaolin and 0.006 grams of methyl paraben were added, and they were scraped until homogeneous. Then 15%, 20%, 25% red dragon fruit is added to the ground until a homogeneous lip cream preparation is formed and tested for evaluation of the preparation.

Evaluation Of Lip Cream Preparations

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It is done by observing the change in color, texture and smell of the preparation.

Homogeneity Test

Each lip cream preparation with various concentrations is tested for homogeneity by applying a certain amount to the glass object. The preparation is called homogeneous when the preparation applied to the glass of the object does not contain coarse grains.

Apply power test

The application test is carried out visually by applying lip dye preparations to the skin. Poor dye release is indicated by the lack of color that sticks to the skin. Meanwhile, good color release is indicated by the amount of color that is released and adheres well to the skin.

pH Test

The pH determination is carried out using a pH meter that has been calibrated first, then the calibrated electrodes are washed with aquadest until clean and dried using a tissue. The preparation is weighed by 1 gram and dissolved in 100 ml of aquadest. Then the electrode is dipped in the solution until it shows a constant pH.

Data Analysis

The data obtained from the lipcream preparation evaluation test were analyzed qualitatively and quantitatively. The results of the analysis were used to identify lipcreams with active ingredients in the form of red dragon fruit as a natural dye on the lips.

RESULTS & DISCUSSION

Organoleptic Test

The organoleptic test aims to observe the color, smell and taste of lip cream preparations from red dragon fruit that have been made. Organoleptic results can be seen in the table below:

Table. 2 Organoleptic Test Results

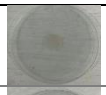
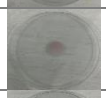
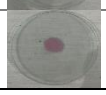
No.	Sample Name	Interpretation	Picture
1.	Formula I	Cream color, odorless, smooth texture and easy to apply	
2.	Formula II	Light pink color, odorless, smooth texture and easy to apply	
3.	Formula III	Deep pink color, odorless, smooth texture and easy to apply	

The formulation of red dragon fruit lip cream will be tested with 4 tests, namely organoleptic test, homogeneity test, spreadability test and pH test. The results of the organoleptic test on formula 1 are cream color, odorless, smooth texture and easy to apply. Formula 2 is light pink, odorless, smooth texture and easy to apply. Formula 3 is dark pink, odorless, smooth texture and easy to apply.

Homogeneity Test

The homogeneity test aims to find out whether the ingredients in the formulation are evenly mixed or not.

Table. 3 Homogeneity Test Results

No.	Sample Name	Homogeneity	Picture
1.	Formula I	Homogeneous	
2.	Formula I	Homogeneous	
3.	Formula III	Homogeneous	

The homogeneity test on the three lip cream formulas obtained homogeneous lip cream results, as evidenced by the absence of clumping granules in the lip cream preparation. Lip cream preparations are taken and applied to the watch glass, have an even color and if no clumpy grains or coarse grains are found then the preparation is eligible.

Apply power test

Figure 1. Application Power Test Results

Lip cream preparations produce good application if the preparation provides an even color and sticks a lot to the skin of the hands when applied. Based on the application test, the results were obtained that the preparation that produces excellent application is the F3 preparation, namely lip cream with a concentration of 25% red dragon fruit dye, this is characterized by two smears, the preparation has given an even dark pink color and the resulting color is lighter when applied to the skin of the back of the hand. The F2 preparation, namely lip cream with a concentration of 20% red dragon fruit dye, provides an even light pink color, and the F1 preparation, which is lip cream with 15% red dragon fruit dye, which gives a creamy color. The difference in color produced in applying lip cream is due to the difference in the concentration of red dragon fruit used, the greater the dye used, the easier it will be to apply lip cream.

pH Test

Lip cream test preparations are assessed by pH test to find out if there is an effect on the pH of the preparation.

Table 4. pH Test Results

No.	Sample Name	Ph	Picture
1.	Formula I	4,54	
2.	Formula II	4,33	
3.	Formula III	4,03	

The pH test aims to find out the preparation of red dragon fruit lip cream according to the pH of the skin so that it is safe to avoid skin irritation. Cosmetic products should be made according to the pH of the skin in the range of 4.0-6.5. In the preparation that has been carried out, the pH of lip cream at F1 is 4.54, the pH of F2 is 4.33 and the pH of F3 is 4.03. The pH test results of the three formulas show that the pH contained in the lip cream still meets the standard. Of the three formulas that show the lowest pH, namely formula 3, because the higher the concentration of red dragon fruit, the decrease in pH value.

CONCLUSION

Based on the results of the research on making lip cream preparations from red dragon fruit juice, it can be concluded that red dragon fruit can be used as a dye in the formulation of lip cream preparations. The variation in the concentration of red dragon fruit dye used in the formulation resulted in a difference in the color intensity of the lip cream preparation that was seen visually. Lip cream with a concentration of 15% red dragon fruit dye is cream while the concentration of red dragon fruit is 20% light pink and the concentration of red dragon fruit is 25% dark pink.

The results of each organoleptic test evaluation were cream colored F1, light pink F2 and dark pink F3, odorless, smooth texture and easy to apply. The homogeneity test of F1, F2 and F3 has an even color, no coarse grains. The applicability test on F1, F2 and F3 had a difference in color produced in applying lip cream due to the difference in the concentration of red dragon fruit used. Finally, the pH test obtained FI (4.54), F2 (4.33) and F3 (4.03). The results of the evaluation test of preparations from F1, F2 and F3 that have a good formula are F3.

In the process of conducting research, there are limitations that can affect the results of research, namely the limitation of tools and lack of understanding so that failure occurs during research in the laboratory.

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