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*Physical Characteristics of Lip Cream Preparations with Natural Coloring Beetroot Extract (*Beta Vulgaris L.*)*

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ABSTRACT

Introduction: Cosmetics are a primary need for women to help them appear more attractive, one of the lip coloring cosmetics that is currently in great demand among consumers is lip cream. Lip cream is a liquid lipstick preparation that can moisturize the lips for a long time compared to solid form and produces a more even color on the lips. Lip cream coloring ingredients can be obtained from synthetic dyes and natural dyes. The coloring (pigment) found in red beets is betalain which can be used as an antioxidant

Methods: The research method is experimental. This research was carried out to formulate beetroot (*Beta vulgaris L.*) extract as a natural coloring for lip cream preparations. The independent variable in this research is beetroot (*Beta vulgaris L.*) extract as a natural coloring and the dependent variable is the physical characteristics of lip cream including organoleptic (shape, color and odor), pH, homogeneity and spread ability. Data analysis is descriptive.

Results: The results of this research show that the lip cream preparation has the characteristics of being in a semi-solid form, with a purplish red color, and a distinctive rose smell. The color and smell did not change until day 7. The pH test showed a pH of 3.39 on day 1 and 5.49 on day 7. The homogeneity test showed it was homogeneous until day 7. The spreadability test showed that it could be spread with an average spreadability of 5 cm.

Conclusion: This research shows that the lip cream color is dark or thick red in the preparation, organoleptic test, pH test, spreadability is in accordance with the desired design.

Keywords: beetroot extract (*beta vulgaris l.*); physical characteristics of cosmetics; lip cream

INTRODUCTION

One of the lip dye cosmetics that is currently in great demand by consumers is lip cream (Jessica & Arifian, 2018). Lip cream is

a liquid lipstick preparation that can moisturize the lips for a long time compared to the solid form and produce a more even color on the lips (Asyifaa, et al., 2017).

Lip cream dyes can be obtained from synthetic dyes and natural dyes. Synthetic dyes can be obtained by chemical synthesis can cause allergies, dermatitis, skin discoloration and dry lips (Chaudari P., et al., 2018).

Lip cream formulations are generally derived from synthetic dyes, but they can cause side effects, so they can use natural dyes as alternative ingredients for lip cream dyes (Ermawati, et al., 2017). Beetroot (*Beta vulgaris* L.) is one of the food ingredients that can be used as a natural dye. Beetroot is often also known as the root of a plant with a root shape similar to a bulb. The dye (pigment) found in red beets is betalain, which is the most abundant content in Beetroot. The content of betacyanin (purple pigment) and betaxanthin (yellow pigment) is a natural dye that forms a purplish dark red color. The betacyanin compound in the image above is a phenol compound

In addition, there is a content of Betalain, which is a group of antioxidants, vitamins and minerals such as B vitamins, calcium, phosphorus, nutrients and iron. (Setiawan, et al., 2015).

Previous research by Septiani (2018) used beetroot thick extract with a concentration of 25% as a liquid lipstick preparation. The prevalent concentration of colorant is a synthetic dye that is usually used at a lower low concentration than natural dyes because it is easier to irritate at high concentrations and the resulting color is stronger (Septiani, 2018).

The formulation of the lip cream base refers to previous research by Indahsari (2019) which consists of carnauba wax, cetyl alcohol, dimethicone, titanium dioxide, tartaric acid, perfume, nipagin, nipasol, TEA, olive oil, and aquadestilata (Indahsari, 2019).

Based on the description above, the researcher wants to conduct research to see the influence of beetroot extract as a natural dye of lip cream on its physical characteristics, including organoleptic tests, pH tests, homogeneity tests, and dispersion tests so that

lip cream preparations with a stable and safe color are obtained when used.

METHODS

The research method is experimental which was carried out from May to July 2023 at the Laboratory of the University of Muhammadiyah Lamongan. This research was carried out to formulate beetroot extract (*Beta vulgaris* L.) as a natural dye for lip cream preparations.

The equipment used includes a water bath, analytical scale (Ohaus), horn spoon, thermometer, spoon, porcelain cup, watch glass, stirring rod, beaker glass (Pyrex), mortar, stamper, lip cream container, filter paper, diameter glass, and pH meter (Horiba Laqua-ph1100). The ingredients used include beetroot (*Beta vulgaris* L) 25% thick extract, carnauba wax, cetyl alcohol, dimethicone, titanium dioxide, tartaric acid, oleum rosae, nipagin (methylparaben), nipasol (propylparaben), TEA, olive oil (olive oil), aquades, ethanol, and citric acid.

The study was experimental to determine the effect of beetroot extract (*Beta vulgaris* L.) as a natural dye with the formulation in table 1 on the physical characteristics of lip cream including organoleptic tests (shape, color and smell), pH, homogeneity, and dispersion. In this study, the selection of the concentration of beetroot condensed extract refers to the prevalent concentration of colorant according to Barel et al. (2001) on solvent lipstick, which is 1-15% and in the previous study by Septiani (2018) using beetroot condensed extract with a concentration of 25% as a liquid lipstick preparation (Septiani, 2018).

Data analysis in the form of descriptive to conclude the characteristics of lip cream preparations with natural dyes derived from beetroot extract (*Beta vulgaris* L.) have met the physical characteristics requirements in the form of organoleptic tests, pH tests, homogeneity tests, and dispersion tests so that

lip cream preparations with stable and safe colors are obtained when used.

How to Make Lip Cream

Formulation in table 1. shows the oil phase consisting of olive oil, carnauba wax, cetyl alcohol and dimethicone and the water phase consisting of titanium dioxide, triethanolamine (TEA), nipagin, aquadest. The oil phase is melted at a temperature of 70°C and stirred until homogeneous (mixture 1). The water phase that has been mixed at a temperature of 40°C until homogeneous (mixture 2) is mixed into the oil phase (mixture 1) in a hot mortar, stirred until homogeneous and waited until it cools (mixture 3). Then add beetroot extract and oleum rosae to the mixture 3 stirred until homogeneous. The finished lip cream preparation is then checked for its physical characteristics (Indahsari, 2019).

Physical Characteristics of Lip Cream

Organoleptis Test

1. Observe the organoleptis including the shape, color and smell of the lip cream preparation
2. Observations are made using the five senses. It is done three times on lip cream.
3. Record the results of the research on the 1st and 7th days (Yulyuswarni, 2018).

pH Test

1. Weigh 1 g of lip cream preparation.
2. Melt in glass beaker with 100 ml of distilled water on a water bath.
3. After cooling, the electrode is dipped in the solution until it shows a constant pH price. The number shown by the pH meter is the pH of the preparation.
4. The pH of a good lip cream preparation follows the lip pH of 4.5-7 (Mulangsri, et al., 2017)
5. pH determination is done three times on lip cream. Record the results of the research on day 1 and day 7.

Homogeneity Test

1. Apply a sufficient amount of lip cream preparation on transparent glass.

2. It is observed that the preparation is homogeneous or not.
3. The preparation must show a homogeneous arrangement and no coarse grains are visible (Ermawati, et al., 2017).
4. Homogeneity determination is carried out three times on lip cream. Record the results of the study on day 1 and day 7

Spread Power Test

1. Weigh 1 gram of lip cream preparation.
2. It is carefully placed on a 20x20 cm glass, and weights of 50 grams, 100 grams, and 150 grams are placed on it, then the diameter formed after 1 minute is measured (Yati, et al., 2018).
3. It is said to spread easily when the area increases by around 5cm-7cm (Asyifaa, et al., 2017).
4. Determination of spreading power is done three times on lip cream. Record the results of the study on day 1 and day 7.

Table 1. Lip Cream preparation formulation

Formula	Function	Ingredient %
Consended Extracts Beetroot	Natural Dye Ingredient	25
Carnauba Wax	Thickening Agent	6
Cetyl Alcohol	Surfactants	5
Dimethicon	Emollient	5
Titanium dioxide	Pigment	1
Tartric acid	Antioxidant	0,1
Oleum Rosae	Deodirizer	0,04
Nipagin	Preservatives	0,18
Nipasol	Preservatives	0,02
TEA	Emulsifying agent	8
Oleum olive	Emollient	30
Aquadestilata ad	Solvent	100

RESULTS

In this study, the sample used was lip cream containing beetroot extract and the results were obtained as data in the form of physical characteristics including organoleptis tests (shape, color and smell), pH tests, homogeneity tests and dispersion tests).

Organoleptis Test

Organoleptis test of lip cream preparations with natural dyes of beetroot extract (*Beta vulgaris* L.) that were observed, namely shape, smell and color. The desired preparation result in the formulation is red, semi-solid, and has a rose scent. The following are the results of the organoleptis test of lip cream preparations.

In our study, showing the characteristics of lipcream preparations containing beatroot showed a semi-dense shape, purplish-red color, and a distinctive rose smell. These characteristics did not change for 7 days. So the results of the organoleptis test of lip cream preparations meet the requirements of the organoleptis test.

pH Test

The pH test uses a pH meter to show the pH value of the lip cream preparation for the safety of using the lip cream preparation so that irritation does not occur. The condition for a good lip cream preparation is if the pH of the preparation does not exceed the pH of the lips, which is between 4.5-7 (Mulangsri, et al., 2017). The optimization results of the pH test of beetroot lip cream preparations on day 1 were 5.1 and day 7 was 5.9. So the pH test results of lip cream preparations on day 1 and day 7 have met the requirements.

Homogeneity Test

A good homogeneity test is said to be homogeneous, without seeing coarse grains (Ermawati, et al., 2017). The optimization results of the homogeneity test of beetroot lip cream preparations did not show any coarse grains, so the homogeneity test results of lip

cream preparations met the requirements of the homogeneity test.

Spread Power Test

The spreadability test was carried out by adding loads (50 grams, 100 grams, and 150 grams) and each took 1 minute to measure its diameter. The diffusion test was carried out to find out how quickly the lip cream spreads when used so that the use of lip cream is easier to apply to the lips, lip cream is said to spread easily if the area increases by about 5-7 cm (Asyifaa, et al., 2017). Results the optimization of the spread test of the Beetroot lip cream preparation on the 1st day was 5.03 cm and the 7th day was 5.16 cm. So the results of the spread test of lip cream preparations are eligible for the spread test.

DISCUSSIONS

Beetroot (*Beta vulgaris* L.) is one of the natural coloring substances. The compound contained in beetroot is betalain, which is the most abundant content in Beetroot. Betalain is a group of antioxidants, so beetroot can be used as a source of natural dye used in lipcream. The formulation of the lip cream base refers to Indahsari (2019) which consists of carnauba wax, cetyl alcohol, dimethicone, titanium dioxide, tartaric acid, perfume, nipagin, nipasol, TEA, olive oil, and aquadstillata. The selection of beetroot concentration refers to a previous study by Septiani (2018) using beetroot thick extract with a concentration of 25% as a liquid lipstick preparation. This concentration was chosen because it produces the most attractive color and can be stable for 7 days



Figure 1. Results of the organoleptis test of beetroot lip cream preparation on the 1st day.



Figure 2. Results of the organoleptis test of beetroot lip cream preparation on the 7th day.

In this study, beetroot lipcream preparations were obtained as expected, namely having a semi-dense consistency, red in color, and having a rose scent. The results of organoleptic observation in this study showed that there was a difference on the 1st and 7th days, namely the color that changed to become brighter. This can happen because the results of the organoleptis test show that the lip cream preparation meets the requirements of the organoleptis test. Color change can occur because betacyanin compounds have a functional group that can interact with the dapar so that it is able to produce color change (Setiawan M. A., 2015).

The purpose of testing the pH of lip cream preparations is to find out whether lip cream preparations that have met the lip pH requirements are between 4.5-7 (Mulangsri, et al., 2017). Too acidic and alkaline conditions can cause irritation to the lips. The results showed that the lipcream preparation had met the pH requirements, shown on day 1 it was 5.1 and on day 7 it was 5.9. Changes in pH can occur due to the influence of poor storage of preparations (Mayasari, Rusdiana, Kania, & Abdasah, 2018).

The homogeneity test of lip cream preparations is carried out to find out whether the lip cream preparation has been homogeneously mixed or not by looking at the presence or absence of insoluble particles in the formulation. A good condition if it is said to be homogeneous does not show coarse grains (Ermawati, et al., 2017). The results of the optimization of the homogeneity test of the

beetroot lip cream preparation did not show any coarse grains, so the results of the homogeneity test of the lip cream preparation met the homogeneity test requirements so that it showed that the active substances had been perfectly mixed in the preparation.

The diffusion test is carried out to find out whether lipcream is easy to apply to the lips or not. This study shows that the spread on the 1st day is 5.03 cm and the 7th day is 5.16 cm. So the results of the spread test of lip cream preparations are eligible for the spread test. This aims to increase the acceptability of using lip cream when applied to the lips. The longer

the storage time, the greater the spread, this is because the lip cream preparation interacts with the air (Mahdalin, et al., 2017).

CONCLUSIONS

Based on the results of the research that has been carried out, it can be concluded that beetroot extract (*Beta vulgaris* L.) can be formulated in lip cream preparations as a natural coloring ingredient with the characteristics of the dosage form that meets the requirements of organoleptic tests, pH, homogeneity and dispersibility.

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