

THE UTILIZATION OF RED DRAGON FRUIT (*Hylocereus polyrhizus*) PEEL AS A NATURAL DYE FOR LIPSTICK

Sarah Adhinigtias

SMA Lazuardi GIS, Depok/Indonesia, sarahadhh@gmail.com

Presented in Beihang Internasional Science Fair (BHISF) 2016

1. Introduction

Women today are very pleased to beautify themselves in many different ways. Using cosmetics is one of the ways to beautify, this is also done by teenagers. Teens today are very happy to use a variety of cosmetics such as lipstick. Lipstick is a cosmetic made from wax, pigments, oils, etc. Lipstick commonly used to give color to the lips.

But often we found lipstick products on the market that contain hazardous chemicals, for example, the red dye K.3, K.10 red and orange K.1. This substances is usually used for textile dyes, dye paper, and ink. Besides these substances, it can cause cancer (carcinogenic) and Rodhamin B (Red substance K.10) may cause liver damage. To reduce the risk of damage to the body organs, such as those mentioned above. Natural dyes can be used instead of chemicals or synthetic dyes. Various alternative of natural dyes can be found easily in nature, such as plants or waste fruits. One waste fruits that contain dyes are dragon fruit skin waste. Waste dragon fruit skin, judging from the color, the benefits, and its contents, can be used for various things. Besides having many benefits, dragon fruit peel can be found at home.

2. Problem Statement

Some of lipstick products on the market still contain hazardous chemicals, such as textile dyes, dye paper, and ink. These substances can

cause damage to our body. Therefore solutions to overcome this problem is necessary.

3. The Purpose of The Investigation

This study aims to make dragon fruit as an alternative natural dyes in lipstick, and safe for the user.

4. Research Method

This research was conducted by processing the dragon fruit skin to be the color of lipstick. The dragon fruit skin processing in this study was conducted through two processes, namely the extraction of dragon fruit skin, and the process of making lipstick. The goal of this study is for adult women and teenagers, who use lipstick.

Research tools:

1. Erlenmeyer
2. Knives
3. Blender
4. Stirrer
5. Brass
6. Filter paper
7. Funnel
8. Oven
9. Beaker glass
10. Stir jar
11. Spatula
12. Lipstick container
13. Spoon
14. Bowl
15. Vaporizer cup
16. Hotplate

Materials:

1. Dragon fruit skin
2. Cera alba
3. Oleum ricini
4. Carnauba wax
5. Vaseline
6. Cetyl alcohol
7. Oleum rosae
8. BHT
9. Propyl paraben
10. Propylene glycol
11. Distilled water

The process is described as follows.

The extraction of dragon fruit skin procedure:

1. Cut dragon fruit skin into small pieces.
2. Dry the dragon fruit skin in the oven at a temperature of $40\text{ }^{\circ}\text{C}$
3. Blend until smooth.
4. Soak the dragon fruit skin in penyari solution (ethanol 95% - 3% acetic acid), protect it from direct sunlight for five days.
5. The extract was concentrated with a rotary evaporator at a temperature of $\pm 40\text{ }^{\circ}\text{C}$ to obtain a thick extract.

The procedure of making lipstick:

1. Nipazol dissolved in propilenglikol. Added dragon fruit skin extracts stirred until homogeneous (Massa A).
2. Butyl hidroksitoluen dissolved in oleum ricini (Massa B),
3. Mixed Massa A and Massa B to obtain a first mixture.
4. Made a second mixture which contains cera alba, carnauba wax, cetil alcohol, vaseline, weighed and enter in the vaporizer cup, then melted over a water bath.
5. Mixed mixture 1 and mixture 2, after the temperature drops add perfume, and mix until homogeneous.
6. Print while the liquid is removed from the mold and put it in a container.

The observations conducted by distributing questionnaires to 10 students in class 11 of SMA Lazuardi GIS (14 generation), who have tried and used the dragon fruit lipstick and then recorded on observation sheets in the table.

Color: pale/light.

Aroma: fragrance/no.

Durability: resistant/no.

Humidity: moist/no.

Table 1. Physical assessment of lipstick that uses dragon fruit skins as natural dyes.

Red dragon fruit peel: water	Physical Appearance of Lipstick			
	Color	Aroma	Endurance	Humidity
Concentration 1 : 5				
Concentration 1: 1				

5. Results and Analysis

The dragon fruit skin that mixed with water at concentration 1:5 which has been blended, are being stand for one full day and filtered with filter paper for a full day as well. After it was put in the oven to vaporize the water at a temperature of 40 degrees Celsius for 12 hours in order to obtain extracts more leverage. When it was mixed with the lipstick formulations like the tables above, the colors do not blend, and it show the drops of dragon fruit peel extract.

The materials used in lipstick has its own function. BHT as an antioxidant, oleum rosae as a fragrance or perfume, propyl parabens as preservatives, cera propylene glycol as a solvent, and vaseline as a moisturizer.

On testing the dragon fruit skin that is mixed with water at concentration of 1:1 which has been blended, are being stand and filtered for one day to extract the

dye from the skin of the dragon fruit over the maximum of the first experiment. The results are more concentrated and less, rather than the first trial which is more fluid and contains more water. Once the dragon fruit was filtered, it was being filtered again in the oven as well as the first experiment for the water to evaporate. It will produce maximum extract in 12 hours at a temperature 40 degrees Celsius, so the extract of dragon fruit skin is not going to be oxidized, the substances there inside is not dead, and the color does not change. In the previous trials the dragon fruit extract was put in the oven at temperature 50 degrees Celsius and the result of it was the extracts are being oxidized and the color changed into brown. In the temperatures of 40 degrees Celsius for 12 hours, the extracted dragon fruit skin was very concentrated and when it is mixed with the lipstick formulation, with the masses that have been listed in the table, the dyes and the ingredients of the lipstick does not fused.

At both concentrations, the dyes of dragon fruit skin does not converge because the anthocyanin substances that contained in the skin of dragon fruit has the role of color pigments and antioxidants soluble in water, so its polar. While the base of lipstick is oil, which is non-polar. Therefore, the dye will not merge or dissolve, because polar and non-polar can not be fused, only polar to polar or non-polar to non-polar which can be fused. If there is a substance that can bridge between the dyes with base oils in lipstick, the possibility of the dyes with base oils can be mixed.

For the assessment of lipstick physically, there have been questionnaires to 10 high school student

of SMA Lazuardi GIS (14 generation) who have tried and used the lipstick that has been created using natural dyes of dragon fruit peel extract. The results of questionnaires of lipstick formulations that use comparative appeal dragon fruit skin with water 1:5, is presented in the following table.

Table 1. Results of the physical assessment questionnaire lipstick uses natural dyes from the skin of the dragon fruit.

Red dragon fruit peel: water	Physical Appearance of Lipstick			
	Color	Aroma	Endurance	Humidity
Concentration 1 : 5	7 approve	10 approve	7 approve	10 approve
Concentration 1 : 1	9 approve	10 approve	7 approve	10 approve

In terms of durability, based on the questionnaire that have been passed 7 out of 10 student said that the lipstick was quite resistant, and 3 other students said that lipstick was not durable.

In terms of humidity, based on the questionnaire that have been passed 10 students or all the respondents said that the lipstick was moist enough. In terms of aroma, based on the answered questionnaire which 10 students or all the respondents said that the lipstick was fragrant enough.

In terms of color, based on the answered questionnaire 4 students said that the color was pale, 2 students said the color was natural, and 4 others said that the color was ordinary. Some of the respondents suggested that this product can be used as a lip balm, this assessment was based on observing the appearance of the lipstick, not when applied to the lips.

Discussion of the results from the questionnaire lipstick formulations that

use comparative appeal dragon fruit skin water 1:1 that have been presented in the table above.

In terms of durability, based on the answered questionnaire 10 students said that lipstick was quite resistant, and 3 students said that lipstick was not durable. In terms of humidity, based on the answered questionnaire 10 students or all the respondents said that the lipstick was moist enough. In terms of aroma, based the answered questionnaire 10 students or all the respondents said that the smell of lipstick was fragrant enough. In terms of color, based on the answered questionnaire 5 students said that the color was good (pink) and 3 female students said that the color was natural, this assessment was based on observing the appearance of the lipstick, not when it was applied to the lips.

Compared to the synthetic dyes that were found in the product at the market, for example lipstick red dye K.3, K.10 red, and orange K.1 it was normally used for textile dyes, dye paper, and ink that may cause cancer (carcinogenic), there is also Rodhamin B that can cause liver damage, the natural dyes from dragon fruit skin was more secure, besides containing anthocyanin that are the pigments and antioxidants, according to the literature of anthocyanin (in Chapter II) the anthocyanin has fulfilled the requirements as a dye, if its is not a toxic substance to the body so that it has been permitted as a dye internationally (Tri Hidayah).

6. Conclusion

Based on the research utilization dragon fruit skin as a natural dye in the lipstick, it can be extracted from the skin of dragon fruit and can not be used as a natural dye lipstick because the solvent water, while the base of lipstick is oil. So

dye water-soluble anthocyanin can not merge or dissolve in the ingredients of lipstick which is oil-based.

References

1. Prasetio Bambang. 2015. Budi Daya Buah Dalam Pot. Yogyakarta : Lily Publisher.
2. RachelMargareth. 2009. Formulasi Lipstik Menggunakan Liposom Magnesium Askorbil Fosfat Dengan Metode Lapis Tipis. Depok : FMIPA UI Departemen Farmasi.
3. R Christina O. 2008. Isolasi Pigmen Merah Angkak Secara Kromatografi Kolom Dan Pengaruh Faktor Fisika Dan Kimia Terhadap Stabilitas Pigmen Merah Angkak Sebagai Zat Pewarna Alami Makanan. Depok : FMIPA UI Departemen Farmasi Program Ekstensi.
4. <https://adelaidefairy.wordpress.com/2014/06/23/cara-buat-liptint-atau-lipbalm-alami-sendiri-dan-sesuka-hati/>
5. <http://darsatop.lecture.ub.ac.id/2015/06/buah-naga-merah-hylocereus-polyrhizus/>
6. <http://id.wikihow.com/Membuat-Lipstick>
7. <http://nurkosmetikunpacti.blogspot.co.id/2011/02/kosmetik-dan-penggolongannya.html>
8. <http://ruh4dian.blogspot.co.id/2013/08/zat-pewarna-alami-dan-buatan.html>
9. <https://shofipunya.wordpress.com/2011/12/10/formulasi-sediaan-lipstik/>
10. <http://www.andasehat.com/manfaat-kulit-buah-naga-untuk-kesehatan-dan-kecantikan/>
11. <http://www.facetofeet.com/makeup/433/diy-cara-membuat-lipstick-dari-bahan-alami>
12. <http://www.shoeshow.com.au/content/page/how-to-choose-lipstik.html>
13. <http://www.vemale.com/kesehatan/26913-9-jenis-emicu-kanker.html>
14. <http://www.koranmuria.com/2015/09/13/16608/buah-naga-pembawa-hoki-masyarakat-tionghoa.html>