


## The Effect Of Natural Dye Extract From Beetroot (*Beta Vulgaris L.*) On The Quality Of Lip Tint Cosmetic Products

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| Article Info   | ABSTRACT  |
|--|---|
| <p><b>Keywords:</b><br/>Beetroot,<br/>Beta vulgaris L,<br/>Lip tint,<br/>Natural dye extract,<br/>Cosmetic products.</p>   | <p>The use of lip tint is highly popular among women. However, lip tints that are popular for their aesthetics often contain ingredients that pose health risks such as Tartrazine, Methylparaben, Propylparaben, and Rhodamine B. To address this issue, the use of fruits as alternative cosmetic ingredients becomes an interesting solution. By utilizing beetroot (<i>Beta vulgaris L.</i>) extract as an option to replace dyes in lip tint, the same effective color can be obtained as with synthetic or conventional ingredients but with more natural properties. Beetroots are fruits rich in vitamin E and have red flesh. The vitamin and pigment content can help lips achieve a natural red color and prevent dryness. Therefore, research on beetroot extract processing is needed to increase public awareness of the potential for safer and higher-quality cosmetic ingredients for consumers.</p> |
| <p>This is an open access article under the <a href="https://creativecommons.org/licenses/by-nc/4.0/">CC BY-NC</a> license</p>  | <p><b>Corresponding Author:</b><br/>Dinnisa Haura Zhafira Hidayat<br/>Universitas Islam Negeri Syarif Hidayatullah Jakarta<br/>Ir H. Juanda St., South Tangerang, Indonesia<br/><a href="mailto:dinnisa.haura@gmail.com">dinnisa.haura@gmail.com</a></p>  |

### INTRODUCTION

The use of lip tint is highly popular among women as it not only enhances aesthetics but also provides protection for the lips of the users. Lip tint can be used to shape and add color to the lips, enhancing women's attractiveness. However, lip tints that are popular for their aesthetics often contain ingredients that pose health risks such as Tartrazine, Methylparaben, Propylparaben, and Rhodamine B. Continuous use of lip tint with these ingredients can lead to undesirable reactions such as allergies, dry lips, and even lip damage. Therefore, it is important to seek safer and more natural alternative ingredients for lip tint production to reduce the risk of negative impacts on lip users' health (Alitalia & Astuti, 2024; Putri et al., 2022; USFDA, 2019).

The government has banned the use of Rhodamine B in food and cosmetics based on the Regulation of the Minister of Health of the Republic of Indonesia Number 239/Menkes/Per/V/1985 regarding certain colorants deemed dangerous. This ban is based on the accumulative toxic effects that can be caused by this chemical, which can adversely affect human health. The use of the Rhodamine B dye in lip tints repeatedly will cause significant effects on the tissue of various organs including the heart, kidneys, liver, small

intestine, large intestine, stomach, and brain. Specifically, it has been found that Rhodamine B affects the tissue of the heart organs by increasing fibrosis and causing damage to heart muscles. Meanwhile, in the tissue of the small and large intestines, Rhodamine B causes erosion of the ileum mucosa and inflammation of the colon mucosa. On the other hand, kidney organ tissue experiences narrowing of Bowman's space in the glomerulus, hypertrophy, necrosis, and tubular serosis. Additionally, Rhodamine B also shows effects on liver organ tissue by causing necrosis damage to hepatocyte cells characterized by karyorrhexis in cell nuclei. Damage to other organ tissues includes gastritis and peptic ulcers in the stomach, as well as increased BAX expression affecting cerebellum BCL-2 and brainstem (Adlina & Rahmawati, 2021; Pujiati et al., 2023).

To address this issue, the use of fruits as alternative cosmetic ingredients becomes an interesting solution (Putri et al., 2022). Beetroots containing betalain pigments provide a safer alternative to synthetic or conventional dyes. By utilizing beetroot (*Beta vulgaris L.*) extract as an option to replace dyes in lip tint, the same effective color can be obtained as with synthetic or conventional ingredients but with more natural properties. Beetroots are fruits rich in vitamin E and have red flesh. The vitamin and pigment content can help lips achieve a natural red color and prevent dryness. Therefore, research on beetroot extract processing is needed to increase public awareness of the potential for safer and higher-quality cosmetic ingredients for consumers (Alitalia & Astuti, 2024; Pratiwi & Fauziah, 2023; Putri et al., 2022; Saputri et al., 2023; Sukma Ade Aulia, 2018).

## METHODS

The study uses a cross-sectional research design with a quantitative approach. Each subject is observed only once and is measured at a certain time, meaning the independent and dependent variables are collected at the same period or time. The purpose of this cross-sectional study is to innovate an alternative natural ingredient for lip tint cosmetic products using beetroot (*Beta vulgaris L.*) extract. This research method will be used to determine the effect of natural dye extraction from beetroot (*Beta vulgaris L.*) on the quality of lip tint cosmetic products in South Tangerang, Indonesia.

This research was conducted in MA Pembangunan UIN Jakarta which is located at Ibnu Taimia IV, South Tangerang, Banten 15419. The population of this study were 20 students of MA Pembangunan UIN Jakarta. The inclusion criteria were women, aged 15 years and over, not having sensitive skin or allergies. The sampling technique used in this study is simple random sampling. The independent variable in this study is beetroot extract, while the dependent variable of this study is natural dye of lip tint.

Data collection procedures include processing of beetroot extract, lip tint making, pH test, likeability test, and ANOVA test. The beetroots are peeled and cut into small pieces. The pieces of beetroot were weighed on a digital scale until they showed exactly 65 grams. Next, the pieces of beetroot that have been weighed are put into a beaker (250 ml). Then, 3 times the mass of beetroot, the distilled water (195 ml) is poured into a beaker containing 65 grams of beetroot. It is heated for  $\pm$  5 minutes using spiritus (supported by a tripod/tripod and wire mesh on top) with the aim of extracting the extract from the beetroot

pieces. The extract is then reheated in the same way. The beetroot extract will decrease over time and its density will increase depending on how long the extract is boiled. Note the time required for the extract level to decrease to a certain number of ml. the temperature when the extract has reached a certain number of mL and record it as data. Turn off spiritus. When the beetroot extract has turned to room temperature, a teaspoon of honey was added and stirred until mixed. The beetroot extract mixture with honey was added into the lip tint container. The steps above were repeated for the control, F2 and F3 by varying the number of mL of beetroot extract.

pH is the degree of acidity which is used to express the level of acidity or alkalinity of a solution. In this research, a pH test was carried out on the extract of beetroot (*Beta vulgaris L.*) which had gone through processing and manufacturing to the final stage before being put into a lip tint container. Through the pH test, the acidity or alkalinity level of the lip tint product produced can be determined.

This test was carried out to determine the respondent's level of preference towards the lip tint formulas. This likeability test was carried out on 20 respondents with the criteria of being a woman, aged 15 years and over, not having sensitive skin or allergies. Each respondent was asked to apply lip tint made with beetroot extract to the surface of their lips or the skin of their palms. Then are expected to make observations and fill out the questionnaire paper that has been provided. After trying the lip tint, the respondent is expected to clean the lips or the back of the hand using wet tissue. Each will fill in an assessment of 5: Strongly Agree, 4: Agree, 3: Neutral, 2: Disagree, and 1: Strongly Disagree. In this research, the analysis method used is one-way ANOVA, namely experimental or reveal facto research which consists of one independent variable (beet root extract) with one dependent variable (natural dye of lip tint).

## RESULTS AND DISCUSSION

**Table 1.** Data Analysis

| No. | 10g |                 | 15g |                 | 20g |                 | Total |
|-----|-----|-----------------|-----|-----------------|-----|-----------------|-------|
|     | x1  | x1 <sup>2</sup> | x2  | x2 <sup>2</sup> | x3  | x3 <sup>2</sup> |       |
| 1   | 40  | 1600            | 40  | 1600            | 40  | 1600            |       |
| 2   | 37  | 1369            | 42  | 1764            | 40  | 1600            |       |
| 3   | 29  | 841             | 41  | 1681            | 41  | 1681            |       |
| 4   | 39  | 1521            | 45  | 2025            | 41  | 1681            |       |
| 5   | 41  | 1681            | 40  | 1600            | 39  | 1521            |       |
| 6   | 35  | 1225            | 33  | 1089            | 37  | 1369            |       |
| 7   | 49  | 2401            | 46  | 2116            | 46  | 2116            |       |
| 8   | 47  | 2209            | 37  | 1369            | 39  | 1521            |       |
| 9   | 36  | 1296            | 38  | 1444            | 36  | 1296            |       |
| 10  | 51  | 2601            | 36  | 1296            | 43  | 1849            |       |
| 11  | 38  | 1444            | 41  | 1681            | 42  | 1764            |       |
| 12  | 45  | 2025            | 46  | 2116            | 33  | 1089            |       |
| 13  | 48  | 2304            | 42  | 1764            | 50  | 2500            |       |

|                             | 10g           |      | 15g           |      | 20g           |      | Total              |
|-----------------------------|---------------|------|---------------|------|---------------|------|--------------------|
| 14                          | 35            | 1225 | 41            | 1681 | 44            | 1936 |                    |
| 15                          | 41            | 1681 | 49            | 2401 | 50            | 2500 |                    |
| 16                          | 42            | 1764 | 47            | 2209 | 47            | 2209 |                    |
| 17                          | 45            | 2025 | 46            | 2116 | 49            | 2401 |                    |
| 18                          | 39            | 1521 | 41            | 1681 | 46            | 2116 |                    |
| 19                          | 36            | 1296 | 49            | 2401 | 42            | 1764 |                    |
| 20                          | 32            | 1024 | 38            | 1444 | 53            | 2809 |                    |
| <b>n</b>                    | <b>20</b>     |      | <b>20</b>     |      | <b>20</b>     |      | <b>60</b>          |
| <b>Σ Y</b>                  | <b>805</b>    |      | <b>838</b>    |      | <b>858</b>    |      | <b>2501</b>        |
| <b>Σ Y<sup>2</sup></b>      | <b>648025</b> |      | <b>702244</b> |      | <b>736164</b> |      | <b>2086433</b>     |
| <b><math>\bar{y}</math></b> | <b>40.25</b>  |      | <b>41.9</b>   |      | <b>42.9</b>   |      | <b>41.68333333</b> |

Table 2. ANOVA Test Result

| Source of Variance | d.f. | JK          | Sum of Squares | F <sub>calculated</sub> | F <sub>tabulated</sub> |
|--------------------|------|-------------|----------------|-------------------------|------------------------|
| Treatments         | 2    | 71.63333333 | 35.81666667    | 0.001029987543          | 3.158842719            |
| Residual           | 57   | 1982111.35  | 34773.88333    | -                       | -                      |
| Total              | 59   | 1982182.983 | -              | -                       | -                      |

H0 = There is no effect of natural dye extract from beetroot (*Beta vulgaris L.*) on the quality of lip tint cosmetic products.

H1 = There is an effect of natural dye extract from beetroot (*Beta vulgaris L.*) on the quality of lip tint cosmetic products.

If  $F_{\text{calculated}} < F_{\text{tabulated}}$ , then H0 is accepted.

If  $F_{\text{calculated}} > F_{\text{tabulated}}$ , then H0 is rejected.

From the calculation of the research results that have been carried out, at a significance level of 5%, the value obtained is  $F_{\text{calculated}} = 0,00103$  and  $F_{\text{tabulated}} = 3.158842719$ . Therefore,  $F_{\text{calculated}} < F_{\text{tabulated}}$ . These data show that H0 is accepted and H1 is rejected, so it can be concluded that there is no effect of natural dye extract from beetroot (*Beta vulgaris L.*) on the quality of lip tint cosmetic products.

## CONCLUSION

From the results of the discussion on 'The Effect of Natural Dye Extract From Beetroot (*Beta vulgaris L.*) on The Quality of Lip Tint Cosmetic Products', it can be concluded that: Quality of lip tint cosmetic products, based on research results,  $F_{\text{calculated}} < F_{\text{tabulated}}$  then Ho is accepted. This means that There is no effect of natural dye extract from beetroot (*Beta vulgaris, L.*) on the quality of lip tint cosmetic products. Therefore, beetroot cannot be used as an alternative ingredient for making lip tint. While beetroot has several benefits as a cosmetic ingredient, its use in lip tints may not provide much advantage over synthetic

colorants. Beetroot extracts may affect the color, longevity, texture and usability of lip tints. In addition, beetroot extracts may also cause irritation and allergies in sensitive people.

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