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Submission date: 08-May-2023 03:11PM (UTC+0700)
Submission ID: 2087357247
File name: JURNAL_VIT_C_BKD_2022_GENAP.pdf (462.81K)
Word count: 2140
Character count: 10897

International Journal of Research Publication and Reviews, Vol 3, no 6, pp 769-772, June 2022

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

VITAMIN C LEVELS IN SKIN AND FLESH OF RED DRAGON FRUIT (*HYLOCEREUS LEMAIREI* (HOOK) BRITTON & ROSE) BY UV-VIS SPECTROPHOTOMETRY

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ABSTRACT

Indonesia is a country rich in plants due to its fertile soil and tropical climate. This provides an opportunity to cultivate a wide range of plants, including fruits. Pitaya, commonly known as dragon fruit, is one of the fruits that grow in Indonesia. Vitamin C is an important antioxidant that has health and cosmetic benefits. The level of vitamin C in dragon fruit varies depending on the type, environment, and where it grows. This study aims to determine the comparison of vitamin C levels in skin and flesh of red dragon fruit growing in Salimpaung District, Tanah Datar Regency, West Sumatra Province by UV-Vis Spectrophotometry. This research was conducted at the Pharmacy Laboratory of Abdurrab University in January 2022. The maximum wavelength of vitamin C obtained was 265 nm with an absorbance of 0.497. The linear regression equation was y = 0.061x + 0.121. The results show the red dragon fruit skin contains 41, 579 mg of vitamin C per 100 g, whereas red dragon fruit flesh has 202.593 mg of vitamin C per 100 g.

Keywords: *Vitamin C, skin and flesh of red dragon fruit, UV-Vis spectrophotometry*

1. INTRODUCTION

Indonesia is a country rich in plants that allows a wide variety of plants to grow such as fruits. One of the fruits that grows in Indonesia is pitaya or commonly called dragon fruit. Dragon fruit is consumed in the form of fresh fruit as a thirst quencher. This is due to the fruit's high water content reaching 90% of the fruit fiber. Red dragon fruit also contains vitamin C, beta-carotene, calcium, and carbs [1]. The skin is quite healthy, however most people might consider the red dragon fruit peel to be agricultural waste that hasn't been properly utilized. Throwing away dragon fruit skin can cause environmental issues, especially water contamination [2]. As a result, dragon fruit skin could be used as a natural food colorant as well as an ingredient to enhance a product's nutritional value. Furthermore, dragon fruit skin is beneficial to facial skin and can help you stay youthful [3].

Dragon fruit can lower cholesterol, normalize blood sugar, prevent colon cancer, strengthen kidney and bone function, enhance visual acuity, and act as a beauty ingredient [4]. Vitamin C is one of the vitamins found in dragon fruit, and it is extremely important to the body. Vitamin C is an antioxidant that protects cells and tissues from oxidative damage generated by radiation [5]. Age, gender, daily vitamin C intake, absorption and excretion capacities, and the existence of certain disorders each have a role in a person's vitamin C status. Because fiber-rich foods and fruits are also sources of vitamin C, a low fiber consumption can affect vitamin C intake [6].

The iodometric method was used [7] and found that the levels of red dragon fruit were 5.28 mg/100 grams and the white dragon fruit was 7.29 mg/100 grams [8]. According to Aminah's research [2], vitamin C levels in red dragon fruit flesh were 0.05888 mg/mL, whereas vitamin C levels in red dragon fruit skin were 0. 0.02533 mg/mL, as determined by the UV-vis spectrophotometric. This study aims to determine the levels of vitamin C in skin and flesh of red dragon fruit

2. MATERIAL AND METHODS

This study uses UV-Vis spectrophotometry to investigate variances in vitamin C levels in the skin and flesh of red dragon fruit throughout three replicates. The skin and flesh of a red dragon fruit grown in Salimpaung District, Tanah Datar Regency, West Sumatra Province, were used in this study.

2.1. Sample preparation

The flesh and skin of red dragon fruit were washed and drained, roughly chopped, mashed with a blender, filtered, and weighed as much as 5 g in a 100 mL volumetric flask, then homogenized.

2.2. Vitamin C standard solution preparation

50 mg ascorbic acid was diluted in aquadest in a glass beaker and transferred to a 500 mL volumetric flask, where it was homogenized to a concentration of 100 ppm [9].

2.3. Determination of the maximum absorption wavelength of vitamin C

5 mL of 100 ppm vitamin C solution was pipetted put into a 50 mL volumetric flask (10 ppm concentration) then added with distilled water to the mark and homogenized. The maximum absorption was measured at a wavelength of 200-400 nm using a distilled water blank [9].

2.4. Preparation of calibration curves

2 4 mL, 6 mL, 8 mL, and 10 mL of vitamin C standard solution were pipette into a 100 mL volumetric flask of 2 mL, 4 mL, 6 mL, 8 mL, and 10 (4 ppm, 6 ppm, 8 ppm, 10 ppm). Then added distilled water to the mark and homogenized. It is then placed into the cuvette and measured at a wavelength of 200-400 nm using distilled water as a blank [9].

2.5. Determination of vitamin C levels

5 g sample was mashed and then homogenized in a 900 mL volumetric flask with distilled water added to the mark. After filtering the sample, the maximum wavelength of vitamin C was measured (265 nm).

2.6. Data analysis

The data for this study was analyzed by inputting and measuring the sample's absorbance into the linear regression equation derived from the calibration curve, and then determining the vitamin C levels.

3. RESULTS AND DISCUSSION

3.1. Results

The follow results were obtained from a study conducted at Abdurrab University's Laboratory of Pharmacy and Food Analysis (Anafarma) on the comparison of vitamin C levels in the skin and flesh of red dragon fruit using the UV-Vis spectrophotometry method:

1. Maximum wavelength (λ maximum) of vitamin C standard solution is 265 nm with an absorbance value of 0.497
2. The linear regression equation is y = 0.061x + 0.121 with a correlation coefficient (r) of 0.9976 with an average level of 41,597 mg/100 g
3. Vitamin C levels in red dragon fruit skin with three replicates obtained 52.7876; 36,385 and 35,567 mg/100 g respectively with an average content of 202,953 mg/100g
4. The levels of vitamin C in red dragon fruit flesh with three replicates obtained were 180.34; 214.17 and 213.268 mg/100 g.

3.2. Discussion

UV-Vis spectrophotometry is an analytical method for measuring the concentration of a compound based on the ability of the compound to absorb light or light. The advantage of this method is to analyze the analyte in very small quantities [10] resulting in excellent and accurate measurement findings. Vitamin C could be measured using a spectrophotometer in the range of 200-400 nm due to its chromophore group that can absorb UV light [6].

The determination of the maximum wavelength is carried out in this study. The maximum wavelength is the wavelength at which a substance gives the highest absorption. The reasons for using the maximum wavelength are that the sensitivity is highest because the change in absorbance for each unit of concentration is highest at that wavelength, the absorbance curve is flat around the maximum wavelength and the Lamber-Beer law will be fulfilled at that concentration, and if repeated measurements are made, the error caused by the re-installation of the wavelength will be very small [10]. The maximum wavelength can also be used to define the calibration curve. The calibration curve is a graph that connects the concentration (x) and absorbance (y) to form a line line. Determination of the calibration curve of the series 2 ppm, 4 ppm, 6 ppm, 8 ppm, and 10 ppm. The purpose of making this series is to obtain a linear regression equation.

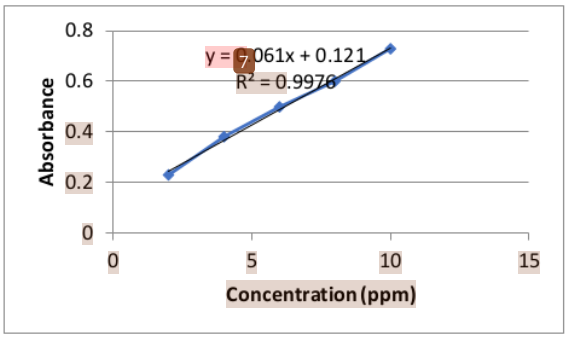

Figure 1. Calibration curve

The equation is y = 0.061x + 0.121, with a correlation coefficient (r) of 0.9976. The acceptance requirement for the correlation coefficient (r) of r > 0.99 denotes excellent linearity. The correlation coefficient (r) has a maximum value of 1, indicating that concentration and absorbance are perfectly correlated [11]. This means that the higher the linearity, the closer the correlation coefficient is to 1 or equal to 1.

Material preparation was done before to the study by grinding the sample and then dissolving it with aquadest. The reason for using distilled water is that vitamin C is easily soluble in water [12] and the reason for filtering is to remove all non-dissolved contaminants from the sample so that they would not interfere with the sample's measurement.

The study shows that the levels of vitamin C in red dragon fruit skin were 41,579 mg/100g while in red fruit flesh it was 202.593 mg/100g. Vitamin C levels in the samples decreased and increased due to several storage factors and differences in research time. Poor storage will cause a decrease in vitamin C levels. Vitamin C is unstable and easily oxidized, especially by heat, alkali, air and light. Accelerated oxidation in the presence of copper and iron can result in a decrease in vitamin C levels [13]. Furthermore, differences in where a natural ingredient grows can also affect vitamin C levels. The decrease in vitamin C levels in red dragon fruit in this study may be influenced by growth factors, temperature, soil conditions, rainfall, sunlight and plant hormones.Meanwhile, to limit vitamin C loss, avoid slicing, crushing, and excessive processing [14].

Vitamin C is a daily requirement of the human body, according to Almatsier the nutritional adequacy rate of vitamin C is 100 mg/day. To meet the daily intake of vitamin C, it is recommended to consume natural ingredients that contain vitamin C, such as red dragon fruit. According to this study, you could have enough vitamin C by consuming 50 g of fresh red dragon fruit per day.

4. CONCLUSION

The study's findings suggest that the skin of the red dragon fruit has less vitamin C than the flesh. The skin of the red dragon fruit has 41,579 mg of vitamin C per 100g, while the flesh contains 202,593 mg of vitamin C per 100g.

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