



Qualitative Test of Papaya Leaves, Cassava Leaves, and Melinjo Leaves as Alternative Ingredients for Foods Rich in Vitamin C for the Community

Ariska Septiyani Susanti, Rina Rahayu

Universitas Tidar, Indonesia

Abstrak

One of the roles of vitamin C in the body is as an antioxidant compound that can counteract free radicals, besides that vitamin C also acts as an immunomodulator that stimulates neutrophil migration, forms oxidants, kills microbes and increases phagocytosis. In addition, vitamin C can reduce the risk of complications in patients who have been exposed to COVID-19, reduce the risk of contracting it, prevent symptoms from appearing and can increase the body's resistance or immunity. The purpose of this study was to determine the presence of vitamin C in papaya leaves (*Carica papaya*), cassava leaves (*Manihot Esculenta*), and melinjo leaves (*Gnetum gnemon*) which can be used as alternative foods rich in vitamin C for the community. This research was conducted with a qualitative method. From the results of observations, the three samples showed positive results for vitamin C. With the results of this study, it is hoped that it can be used as an alternative food ingredient for the community to meet their daily vitamin C needs, especially during the Covid-19 Pandemic like now vitamin C is needed to increase the body's resistance so that it does not susceptible to various diseases.

Kata kunci : Vitamin C, Papaya Leaves, Cassava Leaves, Melinjo Leaves

INTRODUCTION

Reported from the official page Covid19.go.id that on November 19, 2021, Indonesia's positive cases of COVID-19 reached 4,252,705 cases. With the increasing number of positive cases that continue to grow daily, and the indications of various types of new variants of the COVID-19 virus, people should consider to always maintain their health, endurance and always follow health protocols whenever and wherever. Based on the research of Heni Setyoningsih et. Its stated that vitamin C is able to reduce the risk of complications in patients who had been exposed to COVID-19, reduce the risk of contracting it, prevent the appearance of symptoms and be able to increase endurance or body immunity (Setyoningsih, Pratiwi, Rahmawati, & et.al, 2021). One of the roles of vitamin C in the body is as an antioxidant compound that can ward off free radicals acts as an immunomodulator that stimulates neutrophil migration, forms oxidants, kills microbes and increases phagocytosis (Cheng RZ., 2020).

A person exposed to COVID-19 will experience a decrease in vitamin C in their body due thus, patients exposed to COVID-19 should increase their consumption of vitamin C as it contains somatic cells that increase immunity to fight the COVID-19 virus and inflation of cytokinins (Susilo A et.al., 2020). Therefore, COVID-19 patients who have mild, moderate, or severe symptoms should be given vitamin C intake, which acts as a pro-oxidant in the body's immune cells and as an antioxidant in lung epithelial cells. Vitamin C can protect the immune system or innate immunity by inhibiting lactate secretion (Kashiouris MG, L'heureux M, Cable CA, Fisher BJ, Leichtle SW, Fowler AA, 2020). So vitamin C can help COVID-19 patients by increasing the body's immune response and reducing damage to body cells due to infections caused by viruses (Hasan,

Levani, & Afrita Amalia Laitupa, 2021). However, consuming foods and drinks that contain lots of vitamin C should only be consumed only for people who are exposed to the COVID-19 virus, consuming vitamin C is also highly recommended to prevent infection with various diseases because vitamin C has a role as an antioxidant that can prevent free radicals in the body.

Sources of vitamin C can not only be obtained from vitamin C supplements and or fruits that are yellow or have a sour taste (Poedjiadi & Supriyanti, 2009), but vitamin C can also be obtained from a variety of very easy food ingredients. found in our environment. Examples of the local produce that are available in our environment are papaya leaves (*Carica papaya*), cassava leaves (*Manihot Esculenta*), and melinjo leaves (*Gnetum gnemon*). These three ingredients are very easy to find and is yet to be known by people about their high vitamin C content. Usually people consume these ingredients only as side dish or complementary ingredients for cooking or as alternative medicine because indeed all three, namely papaya leaves (*Carica papaya*), cassava leaves (*Manihot Esculenta*), and melinjo leaves (*Gnetum gnemon*) are very easy to find.

This study was used to test and prove the presence of vitamin C in papaya leaves (*Carica papaya*), cassava leaves (*Manihot Esculenta*), and melinjo leaves (*Gnetum gnemon*) qualitatively by using an iodine solution of betadine as an indicator. The research results obtained later is expected to increase knowledge for researchers in particular and the public that foods rich in vitamin C can be found easily in papaya leaves (*Carica papaya*), cassava leaves (*Manihot Esculenta*), and melinjo leaves (*Gnetum gnemon*).

Vitamin C

Vitamin C or also known as ascorbic acid has a chemical structure as shown in the following figure:

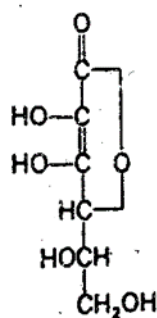


Figure 1: Structure of Ascorbic Acid
(Source: Poedjiadi & Supriyanti, 2009)

If a vitamin C is dissolved or dissolved in water, then vitamin C will be easily oxidized, especially if the water has a higher temperature than room temperature (warm), then vitamin C will oxidize more easily and quickly. However, if the vitamin C undergoes a drying, processing, and direct contact with light, the vitamin C content in it will disappear (Poedjiadi & Supriyanti, 2009).

The role of vitamin C in the body's metabolic system is to play a role in forming intracellular substances and collagen. Vitamin C in the body can be found in skeletal tissue, connective tissue, matrix and so on. In addition to forming intercellular substances and collagen, vitamin C is also very important in the hydroxylation process of lysine and proline into hydroxyline and hydroxypoline which are one of the ingredients to form collagen (Poedjiadi & Supriyanti, 2009).

Other important roles of vitamin C (Poedjiadi & Supriyanti, 2009) include:

- a) Oxidizes phenylalanine to tyrosine
- b) Reducing ferrous to ferrous in respiration
- c) Activate folic acid from folic acid
- d) Synthesize steroid hormones from cholesterol

Vitamin C can also be used as a strong reducing agent. The following is the chemical formula for the oxidation reaction of vitamin C or ascorbic acid to dehydroascorbic acid (Poedjiadi & Supriyanti, 2009):

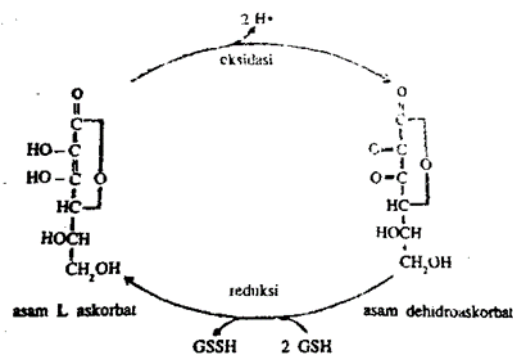


Figure 2: Dehydroascorbic Acid Oxidation Reaction
(Source: Poedjiadi & Supriyanti, 2009)

Vitamin C also has antioxidant properties because vitamin C is able to inhibit or act as an inhibitor in oxidation reactions that occur in the body (Poedjiadi & Supriyanti, 2009). If a person experiences a deficiency or lack of vitamin C, several symptoms will arise (Poedjiadi & Supriyanti, 2009), including:

- 1) Bleeding in the gums (scorbute)
- 2) The body will be easily infected and injured, and the healing process will take longer
- 3) Inhibits growth in toddlers and children
- 4) Inhibits the normal growth of bones in toddlers and children
- 5) Dry skin and easy to pee

To overcome and prevent the occurrence of symptoms of vitamin C deficiency can be prevented by consuming foods high in vitamin C such as sour fruits and green vegetables.

METHODS

The research method used in this research is qualitative. Qualitative research method is a method used in research that places more emphasis on in-depth understanding of a problem than looking at problems for generalized research (Cresswell, 2016). According to Wahyu et al. (2016) the purpose of this qualitative research is an understanding of a problem that occurs. Research with this method by describing a condition or social situation that makes the researcher see from the point of view of every thing that happens in fact.

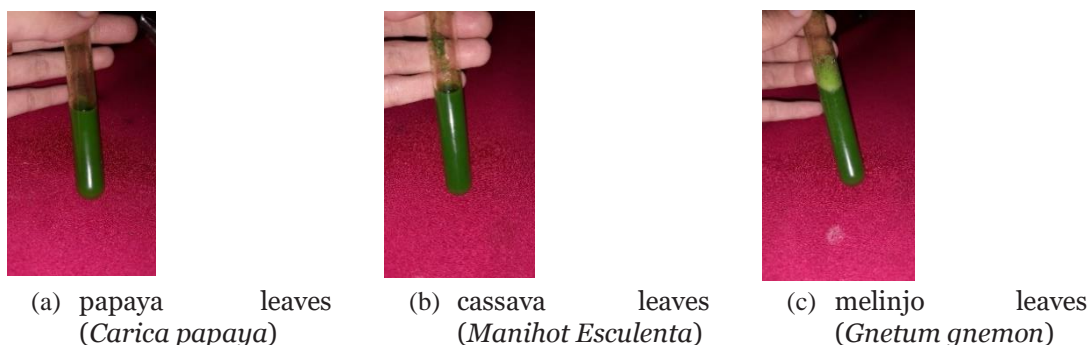
The data obtained and the analysis of this research were also obtained from the literature test which was accessed through google scholar. By studying various literatures and various writings obtained from various sources related to this research, namely about vitamin C in papaya leaves (*Carica papaya*), cassava leaves (*Manihot Esculenta*), and melinjo leaves (*Gnetum gnemon*).

Tools and materials used to qualitatively test the vitamin C present in papaya leaves (*Carica papaya*), cassava leaves (*Manihot Esculenta*), and melinjo leaves (*Gnetum gnemon*) namely test tube, dropper, blender, filter, container, betadine (indicator) and water. Test work steps:

- 1) Prepare tools and materials
- 2) Clean papaya leaves (*Carica papaya*)
- 3) Blend by adding a little water
- 4) Strain and take the extract
- 5) Mark the test tubes so they don't get confused
- 6) Enter the papaya leaf extract in a test tube as much as 2 mL
- 7) Add 3-5 drops of betadine to the test tube
- 8) Observe the reaction that occurs in the test tube
- 9) Perform steps 2 – 8 on cassava leaves (*Manihot Esculenta*), and melinjo leaves (*Gnetum gnemon*)

RESULTS AND DISCUSSION

From the qualitative test carried out by taking the filtrate from papaya leaves (*Carica papaya*), cassava leaves (*Manihot Esculenta*), and melinjo leaves (*Gnetum gnemon*), then each filtrate sample was put into a test tube that had been labeled as a marker. Then to each sample test tube added 5-7 drops of betadine liquid which is used as an indicator to determine the presence of Vitamin C in each sample tested. From these experiments, the following results were obtained:



From the data obtained from the experiments carried out, it is known that the three samples were proven to contain Vitamin C. This was indicated by the disappearance of the brownish color in betadine which was used as an indicator. Betadine which is used as an indicator basically contains 10% providone iodine which is equivalent to 1% iodine (Aina & Suprayogi, 2013). With the betadine indicator mixed in the 3 samples provided, it was found that the brown color of betadine disappeared, with this reaction it can also be seen that the sample contained positive vitamin C (Jurwita, Nasir, & Gani, 2020) (Aina & Suprayogi, 2013). In Basics Biochemistry by Poedjiadi (2009), that in 100 grams of papaya leaves (*Carica papaya*) contain as much as 140 mg, in cassava leaves (*Manihot Esculenta*) contain as much as 275 mg, and in melinjo leaves (*Gnetum gnemon*) contain as much as 182 mg of Vitamin C (Poedjiadi & Supriyanti, 2009).

The following is the chemical formula that occurs in the reaction of betadine and vitamin C:

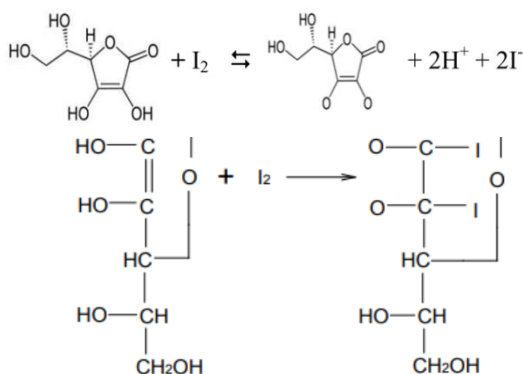


Figure 4: Structure of the Reaction of Vitamin C with Betadine (Source: Tembusai, Banoeari, & Siahaan, 2021)

Vitamin C or ascorbic acid has many benefits for the body, both in terms of body health and beauty. One of the benefits of vitamin C is as an antioxidant, according to Yimcharoen in 2019 if vitamin C is consumed in the right amount it can effectively block free radical reactions that are able to react with some of these free radicals and oxidants in the body. Thus, vitamin C can be used as an antioxidant for the body (Wibawa, Arifin, & Hermawati, 2020).

In the current pandemic mass consumption of Vitamin C is highly recommended, this is because

Vitamin C is indeed able to act as an antidote to free radicals so that by consuming foods and drinks that contain enough Vitamin C can make our bodies more immune from exposure to viruses and bacteria and can also increase the body's immune power so that it is not susceptible to various diseases. Vitamin C is also able to regenerate Vitamin E which can make Vitamin C inhibit lipid peroxidation (Mandi J et al., 2009).

Even in the treatment of positive Covid-19 patients, they can use therapy with high doses of Vitamin C to increase pro-oxidants for the patient's immune cells and act as antioxidants for epithelial cells in the patient's lungs (Erol, 2020). With Vitamin C nuclear factor kappa-B (NFκB) can be inhibited and can increase immunity which also includes inhibiting apoptosis, inflammatory mediators, adhesion molecules, and regulation. Chemokines and cytokines. With high doses of Vitamin C, it is able to regulate proliferation originating from T cells, B cells to cells natural killer (NK) which inhibits the development of cytokine storm (Hemilia H., 2003). So that by giving Vitamin C to Covid-19 patients, it can reduce or cure Covid-19 cases caused by inflammatory cytokines due to an increase in consumption of Vitamin C in somatic cells (Susilo A et.al., 2020),

CONCLUSION

Based on the above discussion, it can be concluded that in leaves (*Carica papaya*), cassava leaves (*Manihot Esculenta*), and melinjo leaves (*Gnetum gnemon*) contains a lot of Vitamin C which is useful as a natural antioxidant that can ward off free radicals, increase immunity and can be used as therapy for Covid-19 positive patients. With this, people take advantage of leaves (*Carica papaya*), cassava leaves (*Manihot Esculenta*), and melinjo leaves (*Gnetum gnemon*) as an alternative to foods that contain lots of natural Vitamin C to increase the body's resistance so that it is not easily exposed to various diseases.

REFERENCES

- Aina, M., & Suprayogi, D. (2013). Uji Kualitatif Vitamin C pada Berbagai Makanan dan Pengaruhnya terhadap Pemanasan. *Acadedia (Accelerating the world's research)*, 61 - 67.
- Cheng RZ. Can early and high intravenous dose of vitamin C prevent and treat coronavirus disease 2019 (COVID-19)? 2020; (January).
- Cresswell, J. W. (2016) Research design: Pendekatan Metode Kualitatif, Kuantitatif dan Campuran. (4th ed.). Pustaka Belajar.
- Erol A. High-dose intravenous vitamin C treatment for COVID19. *OsfIo/Preprints [Internet]*. 2020;19(February). Available from: https://osf.io/p7ex8/?fbclid=IwAR2b67345SBs9r2QfJ23xH_oGEM771Qwww6EPpOSTSpQ7_x2BUu7-5CZEHo
- Hasan, M., Levani, Y., & Afrita Amalia Laitupa, e. (2021). *Pemberian Terapi Vitamin C pada COVID-19*. Pandu Husada, 74 - 83.
- Hemilä H. Vitamin C and SARS coronavirus [6]. *J Antimicrob Chemother.* 2003;52(6):1049– 50.
- Ismawati, R. (2021). *Modul Praktikum Biokimia*. Magelang: Universitas Tidar.
- Jurwita, M., Nasir, & Gani, A. (2020). Analisis Kadar Vitamin C Bawang Putih dan Hitam dengan Menggunakan Spektrofotometri UV-Vis. *KOVALEN: Jurnal Riset Kimia*, 1 - 10.
- Kashiouris MG, L'heureux M, Cable CA, Fisher BJ, Leightle SW, Fowler AA. The emerging role of vitamin C as a treatment for sepsis. *Nutrients.* 2020;12(2):1–16.
- Mandl J, Szarka A, Bánhegyi G. Vitamin C: Update on physiology and pharmacology. *Br J Pharmacol.* 2009;157(7):1097– 110
- Poedjiadi, A., & Supriyanti, T. (2009). *Dasar-Dasar Biokimia*. Jakarta: UI-Press.
- Setyoningsih, H., Pratiwi, Y., Rahmawati, A., & et.al. (2021). PENGGUNAAN VITAMIN C UNTUK MENINGKATKAN IMUNITAS TUBUH DI MASA PANDEMI. *Jurnal Pengabdian Kesehatan, Vol. 4, No. 2*, 136 - 150.
- Susilo A, Rumende CM, Pitoyo CW, Santoso WD, Yulianti M, Sinto R, et al. Coronavirus Disease 2019: Tinjauan Literatur Terkini Coronavirus Disease 2019: Review of Current Literatures. *J Penyakit Dalam Indones.* 2020;7(1):45–67.
- Techinamuti, N., & Pratiwi, R. (2017). Review: Metode Analisis Kadar Vitamin C. *FARMAKA*, 309 - 315.
- Wahyu, F. P., Nugraha, I. I., Pebrinsyah, M. I., & Permadi, R. (2020). Dampak Covid-19 dalam Dunia

Pendidikan. Journal Uinsgd, Khanzanah Pendidikan Islam, 2 (3), 100 - 106.
<http://doi.org/10.15575/kp.v213>.

Wibawa, J. C., Arifin, M. Z., & Hermawati, L. (2020). Mekanisme Vitamin C Menurunkan Stres Oksidatif Setelah Aktivitas Fisik. *JOSSAE*, 1 - 7.