

IDENTIFICATION OF VITAMIN C CONTENT IN RED GUAVA (*Psidium guajava L*) JUICE FOR TREATMENT OF ANEMIA IN PREGNANT WOMEN

Dian Soekmawaty Riezqy Ariendha^{1*}, Hardaniyati², Irni Setyawati³, Loli Hartika⁴

^{1,2,3,4}Program Studi Kebidanan Program Sarjana, STIKES Yarsi Mataram

*Email Correspondensi: diansoekmawaty.ra@gmail.com

ABSTRAK: IDENTIFIKASI KANDUNGAN VITAMIN C DALAM JUS JAMBU MERAH (*Psidium guajava L*) UNTUK MENGATASI ANEMIA PADA IBU HAMIL

Latar Belakang: Organisasi Kesehatan Dunia WHO (Organisasi Kesehatan Dunia) 40% melaporkan kematian ibu di negara berkembang berhubungan dengan anemia pada kehamilan. Prevalensi anemia pada ibu hamil adalah 33-75% di negara berkembang. Kekurangan zat besi adalah penyebab umum anemia. Penyerapan zat besi dapat dicapai dengan memperbanyak kandungan makanan yang mengandung vitamin C seperti pada sayur dan buah salah satunya buah jambu biji merah.

Tujuan: identifikasi kandungan vitamin C pada jus *psidium guajava l* untuk pengobatan anemia pada ibu hamil

Metode: Jenis penelitian yang digunakan dalam penelitian ini adalah kuantitatif, penelitian ini hanya didasarkan pada fakta-fakta positif yang diperoleh di lapangan penelitian. Data berupa angka-angka yang telah dirumuskan digunakan sebagai informasi yang akurat dalam penelitian. Pembuatan dan identifikasi zat besi pada jus jambu biji dilakukan dalam 2 tahap. Pembuatan pertama, daun jambu biji dibuat jus dengan di blender dan disaring. Tahap kedua adalah identifikasi vitamin C dengan titrasi.

Hasil: Hasil penelitian menunjukkan bahwa jus jambu biji merah mengandung vitamin C yang ditunjukkan dari hasil uji laboratorium terbentuk larutan berwarna coklat kemerahan.

Kesimpulan: Identifikasi vitamin C pada sampel 100 ml jus jambu biji merah untuk mengatasi anemia pada ibu hamil. Diketahui sampel jus jambu biji merah mengandung 13,4% vitamin C.

Saran ibu hamil dapat menggunakan jus jambu biji merah dapat meningkatkan hemoglobin karena mengandung FE dan vitamin C

Kata Kunci : Anemia, ibu hamil, Jambu biji merah, vitamin C

ABSTRACT

Background: World Health Organization WHO (WHO) 40% of maternal deaths in developing countries are related to anemia in pregnancy. The prevalence of anemia among pregnant women is 33-75% in developing countries. Iron deficiency is a common cause of anemia. Absorption of iron can be achieved by increasing the content of diets containing vitamin C such as those in vegetables and fruit one of them is red guava fruit.

Objective: identification of vitamin C content in *psidium guajava l* juice for treatment of anemia in pregnant women

Method: The type of research used in this research is quantitative, this research is only based on positive facts obtained in the research field. Data in the form of numbers that have been formulated are used as accurate information in research. The manufacture and identification of iron in guava juice is carried out in 2 stages. The first manufacture, leaves make guava juice with in a blender and filtered. The second stage is identification of vitamin C with titrasi.

Results: The research results showed that red guava juice contained vitamin C, which was indicated by the results of laboratory tests which formed a reddish brown colored solution

Conclusion: Identification of vitamin C in a 100 ml sample of red guava juice for treating anemia in pregnant women. It was found that the sample of red guava juice contained 13.4% vitamin C. Suggestions for pregnant women to use red guava juice can increase hemoglobin because it contains FE and vitamin C

Keywords: Anemia , pregnant, Red guava, Vitamin C

INTRODUCTION

The success of the efforts made for Pregnancy is an exciting time that every woman looks forward to. Every pregnancy is a major event in life's meaning. This is a time of great awareness and change. Parents begin to see themselves, their partners, and the world differently. It takes nine months for a baby to grow and develop so that one year later the parents' lives remain almost the same as before pregnancy ((Abd Elhakeem Aboud, Abd Elwahab El Sayed, and Abdel-Fatah Ibrahim 2019). The 2018 Riskesdas results show that 68.9% of pregnant women in Indonesia suffer from anemia, the 2013 Riskesdas results were 37.1%, this shows that the incidence of anemia has increased over the five year period, between 2013 and 2018(Riskesdas 2018).

Anemia during pregnancy is one of the main causes of maternal and infant death (Uta et al. 2022). Pregnant women usually suffer from iron deficiency, thus providing only a small amount of iron to the fetus that is necessary for normal iron metabolism(Garzon et al. 2020)

Iron is necessary for the formation of hemoglobin and during pregnancy blood volume increases due to changes in the mother's body and the blood supply to the baby. Iron deficiency can cause developmental disorders and obstacles in the fetus and body and brain cells, fetal death in the womb, miscarriage, congenital defects, low birth weight (LBW) and anemia in babies.(Abu-Ouf and Jan 2015). Factors associated with the incidence of anemia in pregnant women are parity, age, antenatal care (ANC) visits, and iron (Fe) intake.(Abd Elhakeem Aboud, Abd Elwahab El Sayed, and Abdel-Fatah Ibrahim 2019).

One effort to prevent and treat anemia in pregnant women is to increase knowledge, change attitudes, and become positive through education about nutritional needs during pregnancy(Riezqy Ariendha, Pratiwi, and Hardaniyati 2019). Check pregnancy during pregnancy, give 90 iron tablets, check HB in semesters I and III, and immediately check Pregnancy If there are abnormal complaints (Hardaniyati, Ariendha, and Ulya 2021), get food according to the needs of pregnant women, increase knowledge and behavior of pregnant women and their families, process and provide food, and improve quality of Health and Nutrition Services (Bhadra and Deb 2020).

Complementary therapies are chosen to support conventional medical treatments or as alternative medicine(Lyndall Mollart, Virginia Stulz 2021). Beyond conventional medical treatment, it is chosen as a way to cure disease(Naghme Yazdi a

et al 2019). Nutrition in pregnancy is very important in ensuring the quality of the pregnancy and the baby to be born. The nutritional needs of pregnant women, including folic acid, vitamin B, and zinc, have been shown to influence fetal development early in life, even before women realize that they are pregnant (Nguyen et al. 2016).

Providing micronutrients during pregnancy is one of the prevention measures to reduce iron deficiency during pregnancy (Lassi et al. 2014). One step that can be taken to prevent anemia is by giving Fe tablets, improving the food menu that will be consumed. Such as increasing consumption of foods that contain lots of iron such as eggs, milk, liver, fish, meat, nuts, dark green vegetables, and fruits. Apart from that, you can add substances that facilitate the absorption of iron, such as vitamin C, orange juice and types of fruit such as red guava and beets. On the other hand, substances that inhibit iron absorption such as tea and coffee should be avoided(Simanullang 2022).

Non-pharmacological ways to treat anemia in pregnant women include giving boiled chicken eggs(Suheni, Indrayani, and Carolin 2020). As well as those from plants such as giving Moringa leaf juice and green beans which can increase the hemoglobin levels of pregnant women (Thenmozhi, Nirmala, and Subalakshmi 2020). There are also those who use orange extract, where consuming orange extract together with iron tablets can increase hemoglobin levels in pregnant women who suffer from anemia (Novelia et al. 2020). Consuming tomato juice and spinach juice can also affect hemoglobin levels in pregnant women in the third trimester(Carolin et al. 2023). Apart from that, there is also red guava fruit (*Psidium Guajava* Linn) which is a type of fruit that is rich in vitamin C and is good for helping the absorption of iron in the body. Apart from that, red guava fruit contains vitamins A, E, K, and contains phosphorus, calcium, potassium, protein and iron which are useful for maintaining immunity, preventing infection, helping relaxation and preventing anemia, while beets (*Beta Vulgaris*) contain vitamins A, B, C, carbohydrates, protein, fat and minerals such as iron, calcium and phosphorus (Yati et al. 2020). Where this fruit can help the process of iron absorption and help reduce the problem of anemia. *Beta Vulgaris* is an alternative treatment that contains iron so it can increase HB levels in the blood. Guava has a high vitamin C content, which is twice as much as sweet orange, only 49 mg per 100 g(Dahlan, Aulya, and Fetrisia 2023).

Ristica research analysis of differences in hemoglobin levels for anemic pregnant women before (pre -test) and after (posttest) administration

of Fe tablets and guava juice therapy, the highest intensity of hemoglobin levels in pregnant women with anemia in the pre- test data before administration of Fe tablet and guava juice therapy is highest Hb levels of 8.8 which belonged to the moderate anemia group, amounting to 5 people (14.3%), and in the post- test data after giving Fe Tablets and Guava Juice 100 grams per day processed in the form of juice, and consumed 2 times a day in the morning and evening for 14 consecutive days the highest was with an Hb level of 9.7 which was classified into the mild anemia group, amounting to 5 people (14.3%)(Ristica and Afni 2021)

The purpose of this study was to identify the vitamin C content in red guava juice as a treatment of anemia of pregnant women

RESEARCH METHODS

This research consists of two stages, namely making red guava juice and testing guava juice products made using 100 grams of ripe red guava, 100 cc cold water, juicer. Procedure to made is Clean the guava, Cut into several pieces., Put it in the juicer, add 100 cc of water, then blend, After that, strain to separate the fruit juice from the seeds, Guava juice is ready to be served and Put it in a glass/glass bottle then divide it into 2 parts (Noormindhawati, 2016) to be submitted to the Food Technology Laboratory of Mataram University. The manufacture of red guava

juice was carried out at the Mekar Permai, Mataram, West Nusa Tenggara Province, while phytochemical screening was carried out at the Food Technology Laboratory of Mataram University.

Laboratory tests are used to obtain data on the presence/absence of vitamin C contained in red guava juice for treating anemia in pregnant women. Research Tools and Materials Vitamin C : Research tools Glassware, analytical balance (Ohaus P224), funnel, filter paper burette, and cuvette. Research materials Ascorbic acid (Merck), KIO3 (Merck), Na2S2O3 (Merck), I2 (Merck), H2SO4 (Merck), starch (Merck), distilled water and red guava juice drink samples. Samples in packaged drinks are determined with a standardized iodine solution, namely by pipetting 10 mL of the sample solution and then placing it in an Erlenmeyer. Add 1.2 mL of 10% H2SO4 solution to the solution, add a few drops of 1% starch solution and titrate with standard I2 solution until it turns blue, repeating 15 times. Then observe the color change in the test tube, if the reaction is positive a reddish brown color forms.

RESEARCH RESULTS

The results of research identifying the content of Vitamin C and Iron in Red Guava Juice for Treating Anemia in Pregnant Women can be seen in the following table: Table Testing the Vitamin C content in guava juice.

Tabel 1
Results of Identification of Iron Content in 100 ml of Red Guava Juice

Material	Logam	Reaktor	Observations	Conclusion	%
Red Guava Juice	Vitamin C	Titiasi	Reddish brown	+ 13,4	

Based on the data from the table above, it was found that 100 g of red guava fruit that was processed into juice apparently contained vitamin C using the titration method by observing that the color formed was reddish brown and the positive result (+) was 13.4%.

DISCUSSIONS

Based on the data from the table above, it was found that 100 g of red guava fruit that was processed into juice apparently contained vitamin C using the titration method by observing that the color formed was reddish brown and the positive result (+) was 13.4%. Vitamin C plays a role in iron absorption by reducing Ferric becomes ferrous in the small intestine so it is easy absorbed. Vitamin C also improves the

absorption of substances iron from plant foods (non-heme)(Rista Andaruni and Nurbaety 2018). The large vitamin C content in Psidium guajava is very beneficial for the absorption of iron in the body so that it can increase hemoglobin (Indriyani et al. 2020). Where vitamin C functions to reduce ferrous iron (Fe3+) into ferrous (Fe2+) in the small intestine so that it is easily absorbed, the high vitamin C content in psidium guajava fruit juice accelerates the process of reducing ferric iron into ferrous(Fitriani, Panggayuh, and Tarsikah 2017). This is related to the pharmacokinetics of iron which states that Fe in the body is more easily absorbed in ferrous form. One of the substances that helps the process of absorbing Fe in the body is vitamin C contained

in red guava juice. This is because vitamin C can reduce ferric ions to ferrous ions so that the iron contained in them can be absorbed optimally by the body.

Red guava (*Psidium guajava* L.) is a fruit that is widely available and easy to find on the market and is often planted alone in the yard because the price is cheap, has superior content compared to other fruits, especially apples, with nutritional value in every part of the plant which is useful and multipurpose for humans (Widowati 2023). Red guava fruit contains fiber and important antioxidant capacity such as polyphenols, carotene and vitamin C. Red guava fruit is high in vitamin C, with a vitamin C content higher than papaya and 2 times more than orange fruit.

Red guava fruit also contains iron, vitamin A, calcium, and secondary metabolites such as anthocyanin, quercetin, carotenoids, polyphenols, flavonoids, lycopene, saponins, catechins, guajaverin, and guavin (Rachmaniar, Kartamihardja, and - 2018). Red guava is useful as anti-anemia, antioxidant, anti-inflammatory, maintaining the cardiovascular system and digestive tract (Bello et al. 2018). Red guava juice is used to increase hemoglobin levels because it contains AA which can form (Azizah, Dahlan, and Azzahroh 2024). Red blood cells in bone structures as well can also maintain hemoglobin. Previous research shows that giving guava juice to children with anemia every day up to 300 ml contains about 200 AA has increased Hb levels significantly. (Rahmadani, Puspita, and Wulandari 2020)

Research showed that giving red guava juice was proven to increase hemoglobin levels in pregnant women with anemia, where there was an increase of 3.1 g/dl (Wigati and Firdaus 2018). Based on the results of the food technology laboratory at the University of Mataram, it was found that red guava juice contains Vitamin C, which is indicated by observing that the color formed is reddish brown and the Fe content is indicated by the rotation of the red color.

Vitamin C is related to the pharmacokinetics of iron, as a promoter that helps the absorption of non-heme iron in the small intestine through the process of reducing ferric iron (Fe^{3+}) to ferrous (Fe^{2+}) so that it is easily absorbed and helps the release of iron from transferrin into body tissues and inhibits the formation of hemosiderin (blood proteins) which are difficult to mobilize in the liberation of iron and increase blood formation.

CONCLUSION

Based on the data from the table above, it was

found that 100 g of red guava fruit that was processed into juice apparently contained vitamin C using the titration method by observing that the color formed was reddish brown and the positive result (+) was 13.4%.

SUGESTIONS

It is recommended for the public, especially pregnant women, to prefer to consume 100 mg of red guava juice as an alternative choice in increasing hemoglobin levels during pregnancy.

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