

IDENTIFICATION OF IRON CONTENT IN RED GUAVA JUICE AS A TREATMENT OF ANEMIA IN PREGNANT WOMEN

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ABSTRAK; IDENTIFIKASI KANDUNGAN ZAT BESI PADA JUS JAMBU BIJI MERAH SEBAGAI PENANGANAN ANEMIA PADA IBU HAMIL

Latar belakang: Anemia merupakan kondisi ibu hamil dengan kadar hemoglobin (Hb) dalam darah kurang dari 11 g/dl. Presentase anemia pada ibu hamil di NTB tahun 2022 diestimasikan sebesar 1,481 di Kabupaten Lombok Barat, 1,248 di Kabupaten Lombok Timur, 1,129 di Kota Mataram, 1,034 Tingginya angka anemia disebabkan oleh rendahnya pengetahuan dan kesadaran akan bahaya anemia. Pencegahan dan pengendalian anemia gizi besi melalui pendekatan nonfarmakologis dengan memperbaiki pola makan dan mengonsumsi makanan kaya zat besi dan zat gizi seperti jambu biji merah yang diolah menjadi jus jambu yang mengandung Fe yang membantu meningkatkan penyerapan zat besi dalam tubuh dan membantu meningkatkan kadar Hb.

Tujuan: Tujuan penelitian ini untuk mengidentifikasi kandungan zat besi pada jus jambu biji merah sebagai penanganan anemia ibu hamil.

Metode: Pembuatan dan identifikasi zat besi pada jus jambu dilakukan dengan 2 tahapan. Pembuatan pertama, daun pembuatan jus jambu biji dengan di blender dan di saring. Tahap kedua Identifikasi zat besi dengan pembuatan larutan induk Fe dengan di encerkan larutan satandar Fe 1000mg/L sebanyak 10 ml kedalam labu ukur dengan menggunakan metode KSCN 2M.

Hasil: Berdasarkan hasil penelitian, dalam 100 ml jus jambu merah mengandung Fe yang di tandai dengan terbentuknya larutan warna merah dengan kadar fe 0,25%. Sehingga jus jambu merah bisa dikonsumsi ibu hamil anemia sebagai salah satu penanganan anemia.

Kesimpulan: Dalam 100 grm Jus jambu merah yang dibuat dengan cara diblender terdapat kandungan zat besi yang berperan dalam meningkatkan kadar Hb ibu hamil anemia. Oleh karena itu, disarankan bagi ibu hamil untuk tetap mengonsumsi jus jambu merah untuk meningkatkan kadar hemoglobin ibu hamil yang mengalami anemia.

Kata Kunci: Anemia, ibu hamil, Jambu biji merah.

ABSTRACT

Background: Anemia is a condition of pregnant women with hemoglobin (Hb) levels in the blood less than 11 g / dl. The percentage of anemia in pregnant women in NTB in 2022 is estimated at 1,481 in West Lombok Regency, 1,248 in East Lombok Regency, 1,129 in Mataram City, 1,034 The high rate of anemia is caused by low knowledge and awareness of the dangers of anemia. Prevention and control of iron nutrition anemia through a nonpharmacological approach by improving diet and eating food.

Objective: The purpose of this study was to identify the iron content in red guava juice as a treatment of anemia for pregnant women.

Method: 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 iron by making Fe mother solution by diluting 1000mg/L Fe satandar solution as much as 10 ml into a measuring flask using the KSCN 2M method.

Results: Based on the results of the study, in 100 ml of red guava juice contains Fe which is characterized by the formation of a red color solution with a fe content of 0.25%. So that red guava juice can be consumed by anemic pregnant women as one of the treatments for anemia

Conclusion: In 100 grams of red guava juice made by blending there is iron content which plays a role in increasing Hb levels of anemic pregnant women. Therefore, it is recommended for pregnant women to keep consuming red guava juice to increase hemoglobin levels of pregnant women who have anemia.

Keywords: Anemia, pregnant women, Red guava.

INTRODUCTION

World Health Organization (WHO, 2019). The Maternal Mortality Rate (MMR) in the world is 303,000 people. The maternal mortality rate (MMR) in ASEAN is 235 per 100,000 live births. Based on the Indonesian Health Demographic (SDKI, 2017), The maternal mortality rate (MMR) in Indonesia is still quite high, namely, 305/100,000 live births. The Maternal Mortality Rate (MMR) is still quite high when compared to neighboring countries. The number of maternal death cases in NTB Province during 2021 was 144 cases, an increase compared to 2020 with 122 maternal (*Profil dinas kesehatan provinsi NTB*, 2022)

According to data from Basic Health Research (Riskesdes, 2018), that there are 48.9% of pregnant women who have anemia. In Indonesia, it is estimated that every day there are 41 cases of anemia, and 20 women die from the condition. This high number is due to the low knowledge and awareness of the dangers of anemia in pregnancy tends to appear in the 1st and III trimester of pregnancy (Astriningrum, 2017). The causes of maternal death in Indonesia are caused by other causes by 34.2%, bleeding by 28.7%, hypertension in pregnancy by 23.9%, and infection by 4.6% (Kementrian RI, 2020)

Anemia is a condition of pregnant women with hemoglobin (Hb) levels in the blood less than 11 g / d. (Manuaba, 2010). Anemia is one of the conditions for malnutrition and poor health associated with maternal and infant morbidity and mortality including the risk of miscarriage, prematurity, low birth weight babies, anemia in pregnant women increases the frequency of complications in pregnancy and childbirth. (Andewa, 2020)

Prevention and control of iron nutrition anemia not only through pharmacological approaches by supplementing Fe tablets, but also through nonpharmacological approaches by improving diet and eating iron-rich foods. Iron is important in hemoglobin synthesis and red blood cell maturation so as to prevent anemia (Bah et al., 2020). according to (Mirwanti et al., 2018). Hemoglobin levels will increase in line with adequate iron intake so that the number of anemia will decrease. Vitamins and minerals sourced from fruits and vegetables which also have antioxidant compounds that are important for the body. Foods that have the potential to prevent and control iron nutrition anemia include red guava, red guava fruit contains iron, vitamin A, calcium, and meta substances (Laili Perdani, 2019)). Red guava is useful as an antianemia, antioxidant, anti-

inflammatory, maintain the cardiovascular system and digestive tract (Yurista, 2015)).

The mineral content in red guava can overcome people with anemia (lack of red blood) because red guava contains minerals that can facilitate the process of forming red blood cell (Gening, 2018). Anemia is mostly caused by iron deficiency factors characterized by low hemoglobin levels. Iron absorption is greatly influenced by the presence of vitamin C in the body. Vitamin C can help reduce ferric iron (Fe³⁺) to ferrous (Fe²⁺) in the small intestine so that it is easily absorbed by the body, the reduction process will be greater if the pH in the stomach is increasingly acidic (Jambu et al., 2023). Vitamin C can increase the pH in the stomach so that it can increase the process of iron absorption up to 30%. (Marlina Hutasuht, 2022)

Penelitian (Mellisa et al., 2021) Stated that after being given guava juice as much as 100 grams per day which is processed in the form of juice, and consumed 2 times a day in the morning and evening for 14 consecutive days to increase Hb levels in anemic pregnant women, experienced an increase in Hb levels in pregnant women.

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

RESEARCH METHODS

Making red guava juice and identifying the iron content of red guava juice is done by blending The first manufacture, by weighing red guava with the type of analytical balance (Ohaus P224). Then in a blender for 5 minutes and measured using a measuring cup then put into a glass glass / bottle and then divided into 2 parts to be submitted to the Food Technology Laboratory of Mataram University. The manufacture of red guava juice was carried out at the Islamic Housing Pondok Asri Block C Number 3, Bajur Village, Labuapi District, West Lombok Regency, West Nusa Tenggara Province, while phytochemical screening was carried out at the Food Technology Laboratory of Mataram University.

The ingredients for making red guava juice are 100 cc cold water, 100 grams of boiled red guava, and a juicer. Red guava fruit is obtained from the Bajur Garden Environment, Bajur Village, Labuapi District, West Lombok Regency. Tools used for making red guava juice are food scales, food filters, glass glasses/bottles, funnels, knives, blenders. Red guava juice is made by: a) Choose a ripe yellow guava fruit, then the guava is washed thoroughly, b) the guava is weighed first, then cut into several parts, c) put it in the juicer blended for less than 2 minutes, d) put water as much as 100 cc then in the blender.

d) After that it is filtered to separate the juice from the seeds then the guava juice is put in a glass glass / bottle and divided into 2 parts.

Materials for iron identification are red guava juice, Aquadest HCl 37%, HNO₃ 0.05M, HCl 4M, KSCN 2M. The initial stage in making a standard Fe curve is to make a 100 mg / L Fe mother solution by diluting a standard Fe 1000 mg / L solution as much as 10 ml into a 100 mL measuring flask, then adding a diluent solution HNO₃ 0.05 M to the tera limit and then the solution is homogenized. Fe mother solution 100 mg/L is pipettes as much as 0.2; 0,5; 1; 1,5; 2; 2,5; 3; 4; 6; and 10 mL and added diluent solution to tera limit to create a series of Fe solutions with a concentration of 0.2; 0,5; 1; 1,5; 2; 2,5; 3; 4; 6; and

10 mg/L. The next step is to determine the maximum wavelength by using 5 mL of standard Fe 10 mg/L solution pipettes into a test tube then added 2 mL of 4M HCl then added back 5 mL of 2M KSCN solution homecleaned and allowed to stand for 15 minutes until the reaction conditions stabilized before measuring the absorbance at wavelengths of 400-600 nm (Asmorowati, 2020)

RESULTS AND DISCUSSION

Manufacture Iron checking in red guava juice. The first preparation was done on red guava juice by blended (Figure 1) and iron checking on red guava juice seen in tables 1 and 2.



Figure 1. Guava juice manufacturing process

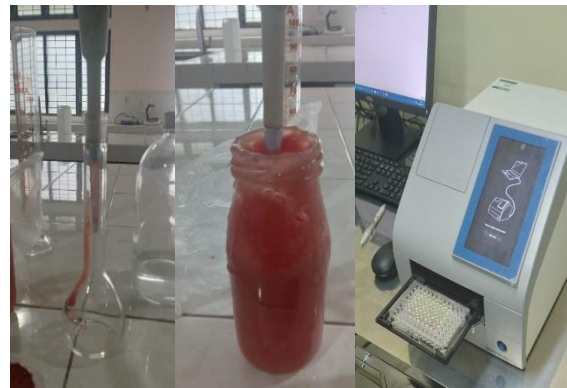


Figure 2. Iron content scraping process

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

Material	Logam	Reaktor	Observations	Conclusion %
Red Guava Juice	Fe	KSCN	The formation of a solution of red color	+ 0,25

Table 1. Based on the table above shows red guava juice contains iron + 0.25%.

DISCUSSIONS

Based on the results of checks carried out on red guava fruit which is processed into juice it turns out to contain Fe using the KSCN method with the observation that the color formed is a red solution and a positive result (+) which is 0.25%.

Hemoglobin is a protein rich in iron. Iron is needed for hemoglobin production and also plays a role in the synthesis of hemoglobin in red blood cells and myoglobin in muscle cells. Iron is needed by the mother and fetus as a reserve for blood loss during pregnancy. (Holmes D & Phillip N.B, 2017)

According to (Ruri Yuni Astari et al., 2019) In order for iron absorption to be maximized, it is

recommended to take iron tablets between meals and use fruits that contain vitamin C because it can help the absorption process (Andewa, 2020). Giving Fe tablets with the addition of vitamin C can help increase hemoglobin levels in pregnant women. Iron (Fe) is an essential micronutrient needed by the body in the formation of hemoglobin (Astriningrum, 2017) Iron is important in hemoglobin synthesis and maturation of red blood cells so that it can (Auliana, 2016).

Red guava (*Psidium guajava* L.) Is a fruit that is many and easy to find in the market and grown alone in the yard because the price is cheap, red guava has a superior content than other fruits

(Anggeriani & Yatiliu, 2020). Red guava fruit contains fiber as well as important antioxidant capacity such as polyphenols, carotene and vitamin C (Mellisa et al., 2021). Red guava fruit is high in vitamin C, with a higher vitamin C content than papaya and 2 times more than citrus fruits. Red guava fruit also contains iron, vitamin A, calcium, and secondary metabolites such as anthocyanins, quercetin, carotenoids, polyphenols, flavonoids, lycopene, saponins, catechins, guajaverin, and guavin (Mellisa et al., 2021). Red guava is useful as an antianemia, antioxidant, anti-inflammatory, maintain the cardiovascular system and digestive tract (Utami & Farida, 2022)

In line with research conducted by (Octa et al., 2022) It is known that the iron content in red guava per 100 g based on the Indonesian Food Composition Table in 2017 is 1.1 mg (Kemenkes RI, 2018). Known iron content in red guava in per 100 g is 0.26 mg (Syamsuryanita & Ikawati, 2022), in red guava there are 42.9 mg / 100 g of vitamin C, Tools and Materials used: Tools used are in the form of glass tools and burettes. (Ruri Yuni Astari et al., 2019). While the ingredients used are ascorbic acid, glacial acetic acid, metaphosphoric acid, oxalic acid 0.4% w/v, iron (II) sulfate 2 N, red guava fruit, sodium hydroxide, Na-2,6 dichlorophenol indophenol (DCIP) and copper (II) sulfate 5% w/v. Sample solution preparation Guava fruit samples are cleaned, then weighed as much as 20 grams, cut into small pieces and then blended and diluted with 50 ml of oxalic acid then filtered into a glass funnel using filter paper. Each pipette of 2 ml of solution obtained into the test tube (Tubes I, II, and III, the antioxidant activity of guava fruit of 17.12 ppm is very strong. The results of Yulia's research explained that fruit in the form of juice is quickly absorbed by the digestive system within 20 minutes, while fruit in non-juice form takes about 18 hours (Mei Winarni et al., 2020)

According to research (Syamsuryanita & Ikawati, 2022) Regarding red guava (*psidium guajava*) on hemoglobin levels of pregnant women, in 15 respondents of pregnant women anemia III trimester. (Febriyanti et al., 2022). Stated that after being given herbal seed juice as much as 150 mg which was processed in the form of juice with the addition of cold boiled water 100 ml and 1 spoon of granulated sugar and packaged in plastic cup containers as much as 250 cc and distributed to the treatment group for routine consumption for 14 days experienced an increase in hemoglobin levels with average values before and after 8.4 g / dl to 11.5 g / dl.

Results of research conducted, (Mustika & Octaviani Iqmy, 2021). Guava can overcome anemia

because in the red guava fruit contains macro and micronutrients, one of the micronutrients is vitamin C which can facilitate the process of forming red blood cell hemoglobin. One substance that greatly helps the absorption of iron is vitamin C (ascorbic acid). The acid will reduce ferric ions to ferrous and inhibit the formation of Fe complexes with insoluble food. Vitamin C can increase the absorption of non-heme iron by four times (Anggeriani & Yatiliu, 2020).

According to the researchers' assumptions, the consumption of Fe tablets, a combination of red guava given in the form of juice is very helpful in the absorption process because the absorption is faster than the consumption of Fe singly in addition to the Fe content in red guava juice, the content of vitamin C can also help the absorption of iron which is greatly influenced by the availability of vitamin C in the mother's body (Mayasari et al., 2023). The role of vitamin C can help reduce iron (Fe^{3+}) to (Fe^{2+}) in the small intestine so that it is easily absorbed, the reduction process will be greater if the pH in the stomach is more acidic. Vitamin C can add similarity so that it can help increase iron absorption by up to 30% (Ditamy, 2019; Octa et al., 2022).

This research is in line with (Dewi retno fandy et al., 2023), Regarding the effectiveness of Fe tablets and accompanied by guava juice on hemoglobin levels of pregnant women in 15 anemic pregnant women III trimester at Pratama Rahma Clinic. Stating that after being given red guava juice as much as 100 grams which is processed in the form of juice with the addition of cold boiled water 100 cc and packaged in glass glasses / bottles and, distributed to the treatment group for routine consumption 2 times in the morning and evening, Pregnant women who regularly consume red guava juice experience an increase in hemoglobin levels with the average distribution of changes in hemoglobin levels before and after in the Fe Tablet and Guava Juice groups, namely before the intervention (10.04 mg / dL) and after the intervention to (10.48 mg / dL).

CONCLUSIONS

Based on the results of the study, Identification of Fe in red guava juice samples for the treatment of anemia in pregnant women, it was obtained that red guava juice samples contain Fe, which is 0.25%.

SUGGESTION

It is recommended for the public, especially pregnant women, to prefer to consume 100 mg of red

guava juice which is consumed regularly 2 times in the morning and evening for 14 consecutive days as an alternative choice in increasing hemoglobin levels during pregnancy.

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