
Analysis of Vitamin A, C and Iron (Fe) Levels in Moringa Leaf-Based Pudding

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ABSTRACT

Moringa Oleifera is a tropical plant that is easy to grow in tropical areas such as Indonesia. Moringa plant are shrubs with a height of 7-11 meters and thrive from lowlands to an altitude of 700m above sea level. Moringa plants can be used as a whole from the roots, leaves, fruit, flowers and seeds. The high nutritional value in moringa leaves can be used to meet the nutritional needs of nursing mothers and toddlers in their infancy. Moringa leaves contain high carbohydrates, protein, iron, calcium, vitamin C, Vitamin A, and potassium Moringa leaves can be consumed directly as a vegetable or as a food fortification. This research was conducted at the Chemistry Laboratory, Faculty Of Mathematics and natural sciences, Tadulako university. This type of research is a laboratory experimental using a completely randomized design (CRD) which is based on the analysis of levels of vitamins A C and iron (fe) in Moringa leaves pudding with 2 formulations. The results of the analysis of the laboratory tast of the content: analysis of levels of vitamin A vitamin C, iron (fe) with the Spectrophotometric Method. The results of the research show that moringa leaf pudding without sugar and using sugar obtained levels of vitamin A without sugar (7,7890mg / 100g), levels of vitamin A using sugar (8,120mg / 100g), levels of vitamin C without sugar (26,827mg / 100g), levels of vitamin C using sugar (28,270mg / 100g) levels of iron (fe) without sugar (0.568mg / 100g), levels of iron (fe) use sugar (0.693mg / 100g). This research suggests that people can consume Moriga leaves/ Moriga Leaf pudding, because vitamin A, vitamin C and iron (fe) are quite high and good for health.

INTRODUCTION

Moringa plant (*Moringa oleifera*) is a type of tropical plant that is easy to grow in tropical areas such as Indonesia. Moringa is a shrub with a height of 7-11 meters and thrives from the lowlands to an altitude of 700 m above sea level. Moringa can grow in tropical and subtropical areas on all types of soil and is resistant to dry seasons with a drought tolerance of up to 6 months (1).

Moringa plants are widely known in Indonesia, especially in rural areas, but have not been used optimally in life. Moringa plants are also known as efficacious medicinal plants by utilizing all parts of the Moringa plant from leaves, bark, seeds, to roots. The nutrients contained in Moringa leaves include protein, -carotene, vitamin C, minerals, especially iron and calcium (2).

Utilization of Moringa leaves is still not optimal, especially in some areas of Indonesia. Based on a survey conducted on the existence and use of Moringa leaves in Batu, Tumpang, Dampit Junrejo and Karangploso, Malang, it was stated that only a few people use Moringa leaves as a vegetable. The use of Moringa leaves is mostly used to bathe corpses, shed talismans, as animal feed (3).

Besides being consumed directly in fresh form, Moringa can also be processed into flour or powder which can be used as an ingredient for fortification to provide nutrients for various food products, such as pudding, cakes, nuggets, biscuits, crackers and other preparations. One of the most popular dessert products and easy to make is pudding (4).

Pudding is a food preparation made from a mixture of gelatin powder, sugar, and water. In processing, pudding can be combined with various other ingredients such as fruit, vegetables, milk, nuts, and so on. Pudding has a sweet taste with a soft texture so that it is liked by all people from children to adults (5).

Based on the results of research (fitriyanti farida, 2012), said that giving Moringa leaf pudding also has an influence on a person's body weight (BB) (6). Based on the results of the paired t test, it was found that in the treatment group there was a change in pre and post weight (BB) after giving Moringa leaf pudding.

METHODOLOGY

The type of research used in this research is a laboratory experiment using a completely randomized design (CRD) which is based on knowing the content of micronutrients namely vitamins A, C and iron (Fe) in Moringa leaf-based pudding. The research was carried out on the campus of the Faculty of Public Health, Unismuh Palu for the manufacture of pudding, then research at the Chemistry Laboratory of the Faculty of Mathematics and Natural Sciences, Tadulako University for the analysis of levels of Vitamin A, C and iron (Fe). Time The research will be conducted from July 2020 to August 2020. The samples in this study were Moringa leaf pudding without sugar and Moringa leaf pudding with sugar.

The data analysis method used for this research was directly carried out at the Chemistry Laboratory, Faculty of Mathematics and Natural Sciences, Tadulako University. The data in this study are presented in the form of tables and narratives.

RESULTS

Vitamin A

Moringa leaf pudding without sugar and Moringa leaf pudding using sugar obtained the following data:

Table 1. Results of Analysis of Vitamin A . Levels

No	Sample	Vitamin A (β-carotene) levels (mg/100g)			Average (mg/100g)
		Repetition 1	Repetition 2	Repetition 3	
1	Moringa pudding without sugar	7.787	7.813	7.798	7.799
2	Moringa pudding with sugar	8.103	8.333	8.120	8.185

In the table above, the results of treatment I analysis of vitamin A levels of Moringa leaf pudding without sugar for the first test was 7.787 mg/100g, the second test was 7.813 mg/100g, and the third test was 7.798mg/100g. After being averaged by adding up the results of the analysis divided by three repetitions, the results obtained for the vitamin A content of Moringa leaf pudding without sugar were 7.799mg/100g.

In the table of results of treatment II, the analysis of vitamin A levels of Moringa leaf pudding using sugar for the first test was 8,103 mg/100g, the second test was 8,333 mg/100g and the third test was 8,120mg/100g. After being averaged by adding up the results of the analysis divided by three repetitions, the results obtained for the Apudding vitamin content of Moringa leaves using sugar are 8,185mg/100g.

Vitamin C

Table 2. Results of Analysis of Vitamin C. Levels

No	Sample	Vitamin C levels (mg/100g)			Average (mg/100g)
		Repetition 1	Repetition 2	Repetition 3	
1	Moringa pudding without sugar	26.949	27.014	26.518	

					26,827
2	Moringa pudding with sugar	27.911	28.180	28.720	28.270

In the table above, the results of treatment I analysis of vitamin C levels. Moringa leaf pudding without sugar for the first test was 26.949mg/100g, the second test was 27,014mg/100g, and the third test was 26.518 mg/100g. After being averaged by adding up the analysis results divided by three repetitions, the results obtained for the vitamin C content of Moringa leaf pudding without sugar is 26.827mg/100g.

In the table of analysis results in treatment II, the vitamin C content of Moringa leaf pudding using sugar for the first test was 27,911 mg/100g, the second test was 28,180mg/100g, and the third test was 28,720mg/100g. After being averaged by adding up the results of the analysis divided by three repetitions, the results obtained for the vitamin C content of Moringa leaf pudding with sugar were 28,270 mg/100g.

Iron (fe)

Moringa leaf pudding without sugar and Moringa leaf pudding using sugar obtained the following data:

Table 3. Results of Iron Fe. Analysis

No	Sample	Iron Fe (mg/100g)			Average (mg/100g)
		Repetition 1	Repetition 2	Repetition 3	
1	Moringa pudding without sugar	0.563	0.575	0.568	0.568
2	Moringa pudding with sugar	0.688	0.692	0.701	0.693

In the table above, the results of the analysis of treatment I iron Fe Pudding Moringa leaves without sugar for replication I is 0.563 mg/100g, replication II is 0.575 mg/100g, and replication III is 0.568 mg/100g. After being averaged by adding up the analysis results divided by three repetitions, the results obtained for iron Fe pudding from Moringa leaves without sugar are 0.568mg/100g.

In the table of analysis results in treatment II, the metal content of Fe in Moringa leaf pudding using sugar for the first test was 0.688 mg/100g, the second test was 0.692 mg/100g, and the third test was 0.701 mg/100g. After being averaged by adding up the analysis results divided by three repetitions, the results obtained for the metal content of Moringa leaf pudding with sugar were 0.693mg/100g.

DISCUSSION

Each food ingredient has a different chemical composition and contains various nutrients, both in type and amount. It is clear that the body needs nutrients or nutrients, among the various types of food available in nature, some are rich in one type of nutrient, some are poor in nutrients. An arrangement of food dishes will have a nutritional value or content of the food ingredients that compose it, so that the body's need for adequate or insufficient nutrients depends on the food consumed.

The addition of sugar to Moringa leaf pudding has a good texture, color and taste, while without sugar, Moringa leaf pudding has a texture, pale color, and a bland taste. If people with diabetes are advised to pudding without sugar.

Vitamin A levels

Based on the results of laboratory analysis, it can be seen that the difference in vitamin A content produced by Moringa leaf pudding without sugar is 7.799mg/100g. While the Moringa leaf pudding using sugar is 8.185mg/100g. From the laboratory results, it can be seen that samples with added sugar in Moringa leaf pudding have a very high vitamin A content compared to samples without added sugar in Moringa leaf pudding.

Table of nutritional adequacy rates (RDA) for children aged 1-3 years who need 400 mcg of vitamin A every day equals 0.4 mg, children aged 4-6 years who need 450 mcg of vitamin A equals 0.45 mg and in children Ages 7-9 years, daily intake of 500 mcg of vitamin A is equal to 0.5 mg. So it is recommended to consume Moringa leaf pudding without sugar every day which has a vitamin A level of 7.799mg/100g for additional feeding (PMT) because it meets the nutritional adequacy rate for children.

Vitamins provide benefits for reducing mortality and morbidity, are very useful for human growth and development, play a role in the immune system, defend the body against infections such as measles, diarrhea, and ARI. Vitamin A deficiency can cause disorders such as xerophthalmia, corneal damage, night blindness, and blindness in children, increasing the severity of infectious diseases, and the risk of death. (7).

Nugrohowati (2010) research on vitamin A supplementation in children aged 2-5 years in Surakarta stated that the addition of Fe to Vitamin A supplementation in children aged 2-5 years with poor nutritional status could increase ferritin levels higher than children who only received vitamin supplementation only (8).

Toddlers really need vitamin A for their health. Children who are deficient in vitamin A will be susceptible to infection and are threatened with blindness. Lack of vitamin A makes the eyes dry. This is because the mucous membranes and the clear membranes of the eyes experience dryness. If prolonged, it will cause thickening of the mucous membranes, folds, and wrinkles, without white spots like soap foam (painted with muscle). Furthermore, the clear membrane of the eye will be injured and eventually can result in irreversible permanent needs.

Vitamin C levels

Based on the results of laboratory analysis, it can be seen that the difference in vitamin C content produced by Moringa leaf pudding without sugar is 26,827 mg/100g. While the moringa leaf pudding with sugar is 28.270mg/100g. From the laboratory results, it can be seen that samples with added sugar in Moringa leaf pudding have a very high vitamin C content compared to samples without added sugar in Moringa leaf pudding.

Table of nutritional adequacy figures (RDA) for children aged 1-3 years who need 40 mg of vitamin C every day, children aged 4-6 years who need 45 mg of vitamin C every day and for children aged 7-9 years they need vitamin C every day C as much as 45 mg. So it is recommended to consume Moringa leaf pudding with sugar every day which has a vitamin C content of 28,270mg/100g. Because it does not reach the nutritional adequacy rate, it is recommended to consume Moringa pudding twice a day for additional feeding (PMT). To meet the number of nutritional adequacy in children.

Vitamin C is one of the complex compounds found in fruits and vegetables that have water soluble properties. According to (Tahir et al, 2017), vitamin C is a compound or nutrient needed by the body with its precursor being carbohydrates (9).

Vitamin C is also known as ascorbic acid, in the human body this compound functions as a catalyst in chemical reactions. Therefore, if this type of catalyst is not present in the body, the normal functioning of the body will be disturbed (10). The human body cannot produce vitamin C, so the need for vitamin C in the body is met through food intake. Foodstuffs such as fresh vegetables and fruits are good sources of vitamin C.

Vitamin C is easily soluble in water and easily oxidized. Ascorbic acid or vitamin C in fruits and vegetables will be damaged or reduced due to the oxidation process in the form of exposure to air, cooking and slicing, and improper storage. One form of action so that the vitamin C content in vegetables and fruits is maintained is the process of packing fruits and vegetables at low temperatures (in the refrigerator).

According to (Aina & Suprayogi2011), the benefits of vitamin C for the body are as an antioxidant, collagen synthesis, and anti-cancer (11). The need for vitamin C by each body is different, this depends on age, gender, metabolic characteristics, and certain diseases. Adults are advised to consume 100-150 mg of vitamin C (12).

Iron (Fe)

Based on the results of laboratory analysis, it can be seen that the difference in Fe content produced by Moringa leaf pudding without sugar is 0.568mg/100g. While the moringa leaf pudding using sugar is 0.693mg/100g. From the laboratory results, it can be seen that samples with added sugar in Moringa leaf pudding have a very high iron content compared to samples without added sugar in Moringa leaf pudding.

Table of nutritional adequacy rates (RDA) for children aged 1-3 years who need 8 mg of iron (Fe) every day, children aged 4-6 years who need 9 mg of iron (Fe) every day and for children aged 7-9 year required daily iron (Fe) as much as 10 mg. So it is recommended to consume Moringa leaf pudding with sugar every day which has 0.693mg/100g of bresi (Fe) substance. Because it does not reach the nutritional adequacy rate, it is recommended to consume Moringa pudding every day for additional feeding (PMT). To meet the number of nutritional adequacy in children.

CONCLUSION

This study concluded that the level of vitamin A in Moringa leaf pudding without sugar was 7.799mg/100g. The level of vitamin C in Moringa leaf pudding without sugar is 26,827 mg/100g. Iron (Fe) in Moringa leaf pudding without sugar is 0.568mg/100g. The level of vitamin A in Moringa leaf pudding using sugar is 8.185mg/100g. The level of vitamin C in Moringa leaf pudding using sugar is 28.270mg/100g. Iron (Fe) in Moringa leaf pudding using sugar is 0.693mg/100g.

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