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Analysis of Potassium and Iron (Fe) Contents of Red Salak Fruit (*Salacca edulis* Reinw) Seram Regency, Western Part of Maluku Province

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Abstract. The snake fruit plant called red snake fruit can be found throughout Maluku, especially in Taniwel District in West Seram Regency (SBB). The flesh of the fruit is thick and dark yellow with a red tinge. The cultivation centers of red snake fruit in Riring Village and Buria Village are at different altitudes, which allows for differences in the content of primary metabolites, especially potassium content, in red snake fruit plants. The focus of the study was the potassium and iron (Fe) content of red snake fruit in the highlands (Riring Village) and lowlands (Buria Village). The first step in conducting potassium content analysis is the process of preparing red snake fruit, where the skin and flesh are peeled and separated. After that, the grass is dried for six times twenty-four hours in an oven. After that, the grass is ground into powder. The potassium content test stage uses the atomic absorption spectrophotometry (AAS) technique. Here, this step produces a solution that is used to calculate the levels of potassium and iron (Fe). The results showed that red snake fruit was positive for potassium in two different locations at different altitudes. Negeri Buria has the highest potassium content of 2.21715% and Negeri Riring has the lowest potassium content of 1.9121%. Riring Village has an iron (Fe) content of 0.0143mg/L, while Buria Village has an iron content of 0.0157mg/L. Negeri Riring has the highest potassium content of 2.21715% and Negeri Riring has the lowest potassium content of 1.9121%.

Keywords: Potassium; Iron (Fe); *Salacca edulis* Reinw

INTRODUCTION

Salak is a species of palm tree that grows in clusters (Herawati et al., 2018). Salacca edulis is a plant in the family Palmae (Arecaceae) (Bagus et al., 2023). Salak is one of the tropical fruit plants that grows fertile in Indonesia, which causes the harvest of salak is very abundant. In Maluku, the cultivation centers of salak are in the island of Ambon, soya villages, Hatalai, Wakal, Amahusu, and Hative Big,and also in the islands of Seram, the villages of Piru, Taniwel, and Riring. The salak that is in the district of the Seram of the West, especially in the State of Riring is one of the cultivars of native salak in Maluku that has specific advantages, among them the appearance of red fruit meat and a sweet taste of acid. Red shrimp also has nutrient content, namely vitamin C, which acts as an antioxidant. (Nanuayo et al., 2023).

Salak fruit has many phytoconstituents, nutrients, dietary fiber, and minerals and vitamins. Minerals are responsible for the processes of energy metabolism, growth and maintenance of the body, while vitamins are responsible for the processes of growth, regulation and repair of body functions (Mandei et al., 2021) Salak contains various minerals and vitamins, such as phosphorus, potassium, calcium, magnesium, sodium, iron, manganese, ascorbic acid, carotene, thiamine, niacin, riboflavin and folate. (Sembiring & Maghfoer, 2018). The overall phenolic content of salak fruit was found to be at a significant level (257.17 µL/mL). Salak fruit may be a promising source of functional food bioactives, according to the data obtained (Čepková et al., 2021).

Iron (Fe) is very important for all living creatures, both animals and humans, especially for carrying out the body's metabolic processes and playing an important role in transporting oxygen in the blood. (Kelishadi et al., 2014). The average amount of iron in adults is around 4 grams, of which 50% of the total iron is in hemoglobin and some of the remainder is stored in the liver. (Kelishadi et al., 2014). Malnutrition, resulting from a lack of iron in the body, can cause health problems (Kelishadi et al., 2014).

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MATERIALS AND METHODS

Study site

Samples were collected from four locations in West Seram District, Maluku (Moluccas), Indonesia, i.e., the villages of riring and villages of buria, at coordinates 2°59'06.4"S 128°30'49.1"E in villages of buria and 2°59'14.1"S 128°25'17.2" in villages of riring (Figure 1). These locations were determined as research locations based on the results of initial observations of the existence of red snake fruit (Salacca edulis Reinw) in Maluku Province which is only found in West Seram Regency.

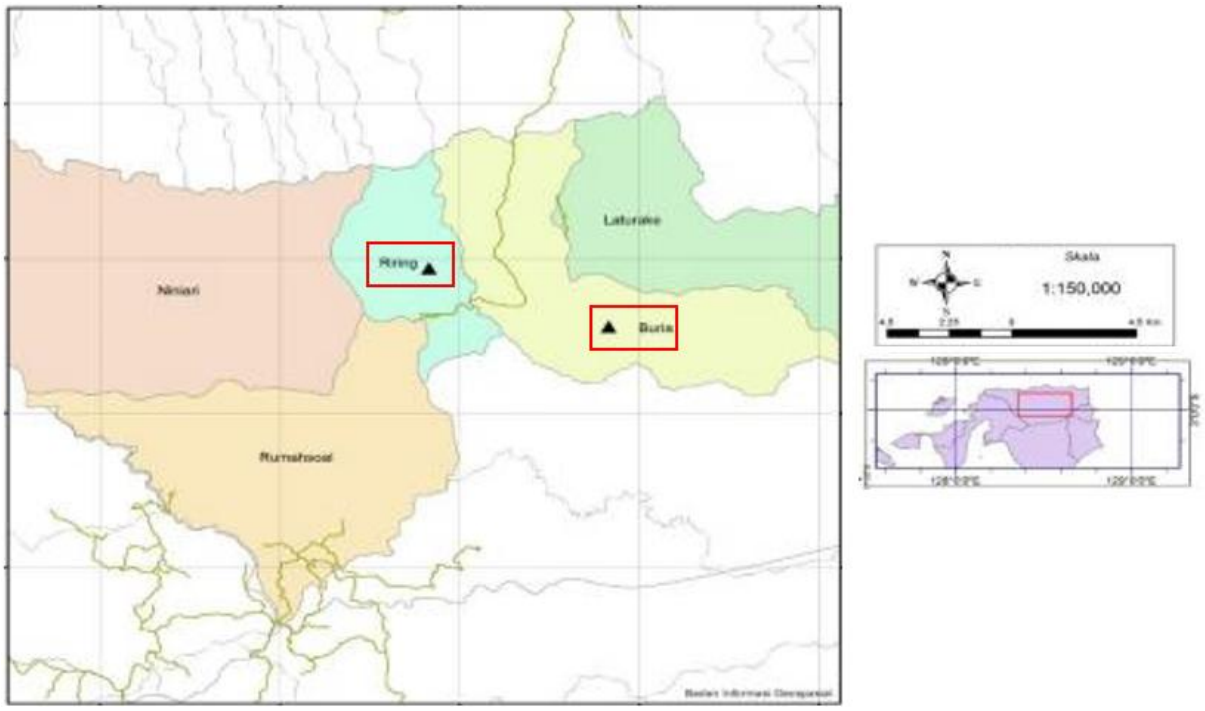

Figure 1. Study sites of Red Snake Fruit (*Salacca edulis* Reinw) is on West Seram, Maluku Province

Materials and tools

The materials used in this research were red snake fruit, nitric acid (HNO_3), hydrochloric acid, sulfuric acid, distilled water, HCL solution, nitric acid. The tools used in testing potassium levels and iron (Fe) levels are trays, blenders, cutting boards, knives, scales, Erlenmeyer, analytical balances, measuring flasks, Atomic Absorption Spectrophotometry (SSA).

Testing Potassium and Iron (Fe) Levels

1. Homogenize the test sample, pipette 50.0 mL of potassium test into a 100 mL beaker
2. Add 5 mL of concentrated HNO3, if using a beaker, cover with a watch glass and if using an Erlenmeyer funnel, use a funnel as a lid. Heat slowly until the remaining volume is 15 mL - 12 mL.
3. If the digestion is not complete (not clear), then add another 5 mL of concentrated HNO3, then cover the beaker with a watch glass or Erlenmeyer lid with a funnel and heat again (not boiling). Do this process repeatedly until all the metal is dissolved, the color of the precipitate in the potassium test is slightly white or becomes clear.
4. Put water into a beaker and rinse the watch glass.
5. Place the test sample into a beaker, transfer the potassium level sample to a 50.0 mL volumetric flask, and add mineral-free water until there is a mark.

Sample Testing

The SSA-flame instrument was used to analyze the test sample mixture, and the absorbance was measured at a wavelength of 248.3 nm.

Data analysis

Data analysis in this research is quantitative descriptive. Quantitative descriptives are used to calculate average potassium and iron (Fe) levels. The results of measuring the compound content were calculated using SSA spectophotometry.

RESULTS AND DISCUSSION

The research samples were red snake fruit collected in two places: Buria Village and Riring Village. Blackish brown skin and red lines on the flesh are signs of red salak being used. After the red snake fruit sample was prepared, the potassium content test in the red snake fruit was tested using an atomic absorption spectrophotometer. Table 1 shows the location of content data for clearer testing of potassium levels.

Table 1. Results of environmental factor measurements

Location	Height Place (masl)	Soil Ph	Air Humidity (%)	Temprature (^{0}C)	Light intensity (cd)
Buria Village	308	7	50	23	2000
Riring Village	660	7	80	19	1000

The table above shows that Buria State has a higher light intensity and air temperature than Riring State. Riring Country also has a higher altitude and air humidity, and the soil pH in both locations is 7 (neutral).

Potassium levels

Fat content data for both locations is shown in Table 2, which shows the results of testing potassium levels.

Table 2. Results of Analysis of Potassium Levels of Red Salak Fruit in Riring State and Buria State Average Mg/L

Sample Code	Yield (mg/L)	Rata – rata Mg/L
1	*2*	*3*
A 1	1,3512	1,9121 Mg/L
A 2	2,4730	
B 1	2,374	
B 2	2,0603	2,21715 Mg/L

The results of the research show that the factor that influences the presence of potassium in red salak fruit in Riring Village and Buria Village is soil. Fertile soil is usually rich in organic matter, the regulating particles are balanced, so it is easy to form a structure with a soil pH (7 neutral). Riring Village and Buria Village have the same pH, namely 7. The soil in Buria Village has characteristics of sand grain clay, good drainage and aerase, while in Riring Village it has characteristics of clay soil, poor drainage and aerase. Fertility can be seen from the ability of the soil to produce fruit from the harvested plants and the mineral content of the fruit and from a number of essential nutrients, one of which is absorbed most by plants is the nutrient potassium (K). So in this research, the high mineral content value obtained was potassium (K).

Plants absorb potassium in the form of K+ ions, the third nutrient after nitrogen and phosphorus. Feldspar minerals (orthoclase and sanidine) are the main source of K in the soil, so the presence of these minerals indicates that there is a source of K in the soil.

Phosphorus and potassium along with nitrogen resulted in a maximum increase in nutrient uptake due to increased photosynthesis, resulting in an increased leaf area (Akhir, 2017)

Based on the research results, it shows that potassium in red salak fruit in Riring Country and Buria Country turns out to be higher in Buria village (2.21715 Mg/L) compared to Riring Village (1.9121 Mg/L). Potassium levels in red salak fruit from Buria State are higher than Riring State.

Soil pH is a parameter that can be used to measure the level of acidity and alkalinity of soil. (Kimia et al., 2019) stated that soil pH is one of the chemical properties of soil which shows the reactions that occur in it. One of the soil limiting factors controlled by soil colloids is soil reaction. (Rahmah et al., 2014). Soil pH also affects

how easily nutrients are absorbed by plants. At neutral pH, plants can usually absorb nutrients well. (Wijayanto & Wilarso Budi, 2019) The soil pH at both locations, namely in Riring Village and Buria Village, is 7 (neutral), this means that at a neutral pH, biochemical reactions can take place more optimally.

Bezi levels (Fe)

Table 3 shows the results of testing iron (Fe) levels, as well as data obtained on iron levels at both locations.

Table 3. Results of Analysis of Iron (Fe) Content of Red Salak Fruit In Riring Country and Buria Country

Sample Code	Results (mg/L)	Method	Average (mg/L)
A1	0,0140		0,0143mg/L
A2	0,0146	AAS	
B1	0,0151		0,0157mg/L
B2	0,0163		

Information:
AI : Riring village salak meat
A2 : Riring village salak meat
B1: Buria village salak meat
B2: Buria village salak meat

Based on the results of research on total iron levels in red salak fruit in Riring Village and Buria Village, it turns out that the iron levels are higher in Buria Village (0.0157%) compared to Riring Village (0.0143%). This is because the higher the growing area can reduce the air temperature and increase rainfall, (Kurnia Sari et al., 2019; Van Beusekom et al., 2015).

According to several studies, red salak has a high carbohydrate content, including iron (Fe), vitamin C, calcium, phosphorus and antioxidants, with 4.2 mg of iron per 100 grams of fruit flesh. Studies show that iron plays an important role in the formation of hemoglobin.

CONCLUSION

According to the research results, red salak fruit was positive for potassium in two places and at two different altitude levels. Riring Village has iron (Fe) levels of 0.0143 mg/L, while Buria Village has iron levels of 0.0157 mg/L. Buria State has the highest potassium levels, namely 2.21715% and Riring State has the lowest potassium levels, namely 1.9121%.

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