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Nutritional Content Of Fresh Seed, Pith, Pulp And Red Fruit Paste (*Pandanus conoidus lamk*) Type Of Mbarugum Origin Papua

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Abstract

Red fruit is an endemic plant of Papua which is rich in bioactive compounds both antioxidants and antimicrobials, the form or fraction of red fruit that is often used is red fruit oil and red fruit paste. Several other red fruit fractions are wasted and have not been utilized because information about their nutritional composition does not yet exist. This study aims to determine the comparison of the nutritional composition of each red fruit fraction starting from fresh seeds, pith, pulp and paste. This study uses laboratory analysis of the proximate value of each fraction, FFA value and carotene value. The results showed that the nutritional value of each red fruit fraction was different, for the value of protein, fat, carbohydrates and crude fiber the highest nutritional value was found in fresh seeds while the lowest value for all compositions except for water content was in the pith fraction. The FFA and carotene values were highest in fresh seeds, then in the pasta and pulp fractions, while FFA and carotene pith were not detected.

Keywords: Proximate Analysis, FFA, Carotene, Red Fruit Fraction

INTRODUCTION

Papua is one of the big islands in Indonesia which has many endemic plants. One of them is the red fruit plant (*Pandanus conoidus* Lamk).Red fruit plants are widely distributed in Papua including the Baliem Valley, Baliem Wamena, Tolikara, Bintang Mountains, Yahukimo, Jayapura, the area around the bird's head (Sorong and Manokwari) and several remote areas (Limbongan & Afrizal, 2009). Red fruit is a pandanus plant with a tree shape like pandanus with a plant height of up to 16 m, a branch-free stem height of 5 to 8 m and strengthened by supporting roots on the lower stem. Fruit cultivars are oval in shape with buds covered with fruit leaves (Inti & Martanto, 2009). According exploration research by Hadad et,al (2006) there are several accessions of red fruit which are named according to the ethnicity and customs of the people in the area. The accessions were divided into four types based on the shape, size and color of the fruit, namely long red type, short red type, brownish red type and yellow fruit type. The main commercial product of red fruit is red fruit oil. According Surono, et.al (2006)

The main product of red fruit is red fruit oil. Based on research Surono, et.al (2006) It was found that red fruit oil is rich in bioactive compounds that can act as antioxidants. Antioxidants are needed by the body as an antidote to free radicals, The nutritional content of red fruit oil based on laboratory analysis in Japan, red fruit oil has

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a carbohydrate content of 5.10 mg, lipids 94.20 mg, sodium 3 mg, but no protein content was found.

Red fruit in addition to containing bioactive compounds as antioxidants also contain fatty acids that can act as natural antimicrobials. Tharukliling, *et.al* (2021) stated that red fruit paste contains saturated and unsaturated fatty acids which not only have the potential as fat substitutes in burger patties but are able to inhibit the rate of microbial growth in the patty on the use of pasta with a level of 10% to 15% observed on day 3, day 7 and day. day 14. where the higher the fruit paste content in the patty, the lower the total microbial value found on each day of observation.

The red fruit plant is believed by the Papuan people to be very efficacious for treating myopic eyes, itching, scratches, aches and fatigue, nourishing hair, treating cancer and other degenerative diseases such as heart disease, cholesterol, diabetes and high blood pressure (Limbongan, *et.al*, 2005). The people of Papua consume red fruit by mixing it with other food ingredients, especially in the traditional "burning stone" event. Where all food ingredients, both vegetables, meat and tubers are mixed together and then seasoned with red fruit, because red fruit contains oil so the food will become more savory. Red fruit is generally processed traditionally into red fruit oil by using a ratio of water (1:2) with a boiling time of 1 to 2 hours. The processing stage to get red fruit oil will go through 2 boiling processes, in the first boiling stage red fruit seed pulp and red fruit paste will be obtained, usually the pulp in the form of squeezed seeds will be discarded and become animal feed while the paste obtained in extortion will be processed. Boil again to get red fruit oil. Red fruit paste is a precipitate that occurs when the oil is formed. This pasta can be made into jam, pudding, ice cream, or added to sausage as a red color.

Research on the nutritional content of red fruit oil and its utilization has been carried out both in vitro and in vivo, but on red fruit pulp and paste there are several studies on its use, for example research Usman (2007) which mixed red fruit paste in broiler chicken feed as much as 3% was able to increase the weight of native chickens from 111.80 dram to 137.90 grams/head/week and could reduce chick mortality from 12.50% to 0% during the study.

Emafitriani (2017) Using red fruit paste in beef sausage at a certain level, the results showed that red fruit paste significantly affected water content, protein content, brightness intensity, and the presence of antioxidant activity and effectively increased the red color of beef sausage. Research on the use of oil, pulp and red fruit paste has been carried out but there is no research that specifically raises the nutritional content of each red fruit fraction such as red fruit seeds, pith, pulp and red fruit paste so that this study was conducted aiming to determine

The use of this research is as an initial information material about the chemical composition of red fruit in the form of fresh seeds, pith, pulp and red fruit paste which is the residue or waste obtained from the processing of red fruit into red fruit oil. Knowing

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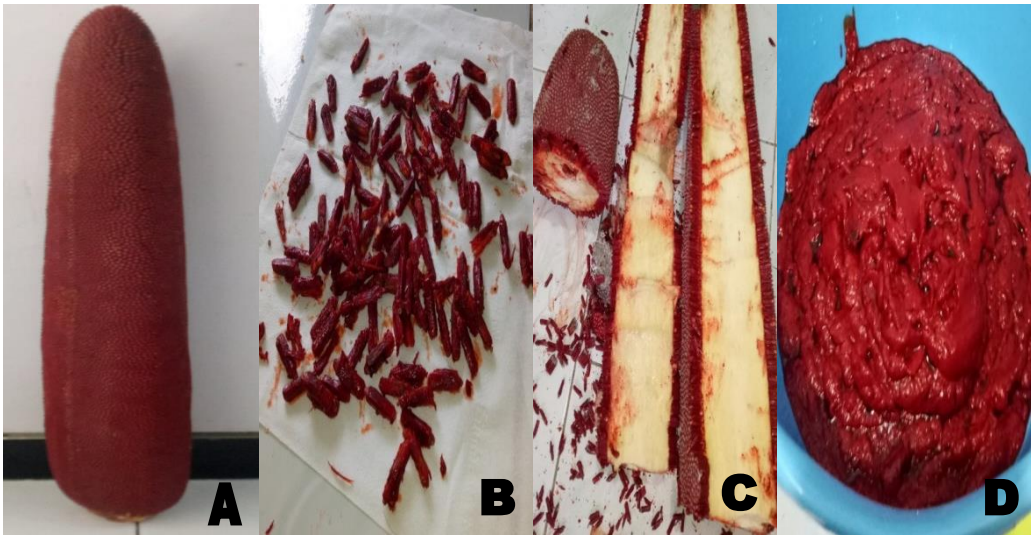
the chemical composition of each fraction of red fruit can be used as a basis for determining the direction of future research related to red fruit plants.

RESEARCH METHODS

This study uses laboratory analysis by performing duplicates on each sample. Standard analytical methods were used (AOAC, 2005), including high performance liquid chromatography (HPLC) for carotenoids and acid base titration methods for FFA. The research was conducted in the Laboratory of Food Quality and Safety Testing, Faculty of Agricultural Technology, Brawijaya University.

The main ingredient used is fresh red fruit, the type of mbarugum (determination based on accession character description according to Hadad, et.al 2006), The red fruit is taken in the people's garden in Keerom district, Papua Province. Processing of red fruit into paste using the wet rendering method. The test material in this research is:

1 fresh red fruit, namely red fruit seeds that have been separated from the pith
2 Pith is the center of the stem, white in color as a place for the attachment of red fruit seeds (drupa)
3 The red fruit pulp is the seeds obtained as a result of filtering in the first stage of boiling, the red color has come out, what is left is the cream colored seeds.
4 The red fruit paste is the residue from the separation from the oil in the second stage of boiling.



Picture 1. A. Mbarugum type red fruit, B. Seed (Drupa), C. Pith (white part in picture), D. Red Fruit Paste

The tools used in this study include tools for proximate analysis (exicator, weighing bottle, oven, filter paper, cotton, rope, soxhlet (Memmert type 350), kjeldahl flask (Buchi Auto Kjeldahl unit K 370), spectrophotometer FTIR, Prestige 21 Shimadzu brand. The variables in this study were protein content (%) fat content (%), water content (%), ash content (%), carbohydrates, (%), crude fiber (%), total carotene (µg/g) and FFA (%)

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RESULT AND DISCUSSION

a) Comparison of the Nutrient Value of Red Fruit for each Fraction based on Proximate Analysis

Red fruit plants produce commercial products in the form of red fruit oil, during the processing into oil there are many fractions that are discarded, not utilized and the nutritional content is unknown. All parts of one plant should contain different percentages of nutrients. The nutritional composition of each red fruit fraction can be seen in table 1 as follows:

Table 1. The results of the Proximate analysis of the Nutrient Value of each Fraction

Nutritional content(%)	Fresh seed	Pith	Pulp	Pasta/puree
Protein	1.59	0.19	1.42	0.98
fat	30.40	0.17	5.75	23.24
Carbohydrate	29.00	4.35	32.97	4.92
Crude fiber	15.44	0.91	14.01	0.74
Ash	1.25	0.87	1.11	0.66
Water content	37.38	94.42	56.75	70.20

Source: analysis results of lab.TP Brawijaya University, 2019

The red fruit has seeds called drupa, the shape of the seeds is attached to the pith and neatly arranged, so that at first glance the shape resembles a jackfruit skin with a seed length of about 1 cm and a diameter of 0.2 cm. Red fruit seeds are very hard and fibrous, red in color with an oily texture. According Waluyo (2017) in Tharukliling, S (2021) red fruit plant is one of the pandanus family (Pandanceae) which has the characteristics of leaves measuring 189–200 cm, seed fruit measuring 25 mm, cephalium triangular with a size of 42–110 cm.

Based on the data in table 1, the protein content of red fruit for each fraction is only slightly in the range of 0.19 to 1.59, the seed fraction has the highest protein content. According Adrienne, et al (209) Protein is the main component of most body cells, for example, muscles, connective tissue, and skin are all made of protein. Red fruit seeds also contain fat, carbohydrates and crude fiber with the highest composition of all red fruit fractions

Red fruit oil as the main product of red fruit shows that the highest nutritional component is fat. Based on the fat data in each fraction, the pith is the part that is almost without fat because this part is only a stem/pith where the fruit seeds are attached and this pith based on table data 1 pith contains the most water. The fat content in the pulp and red fruit paste experienced a significant change due to both of these fractions a heating process had occurred when the fruit was processed into red fruit oil.

b) Comparison of FFA and carotene for each red fruit fraction

The content of free fatty acids in the oil can be tested by testing FFA (Free Fatty Acid). The high and low value of FFA indicates the quality of the oil. According to

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Rizky et al (2017) oil with a higher FFA value means it has low quality and vice versa, the lower the FFA value in the oil, the better the quality of the oil. In the following, data on the FFA and Carotene content of each red fruit fraction are presented.

Table 2. FFA and Carotene Content of Each Fraction

Nutritition content i	Fresh seed	pith	Pulp	Paste/puree
FFA (%)	24.31	Not detected	2.06	7.41
Carotene total(µg/g)	2047.52	Not detected	412.99	1317.90

Source: analysis results of lab.TP Brawijaya University, 2019

Based on the data in table 2, a very high FFA value of 24.31 was found in fresh seeds that had not been processed into red fruit oil while the red fruit pulp had a fairly low FFA value of 2.06. Red fruit pulp is the residue of seeds that have come out red and contain oil during the first stage of boiling in a wet rendering system to obtain red fruit oil which is sold commercially. Excessive heating according to Chairul, et al (2013) causes oxidation and polymerization processes to occur in the vitamin or essential fat content in the oil or fat which ultimately results in a material with an unattractive color and if consumed can cause an itchy throat.

Carotene is the dominant red-orange colored pigment found naturally in plants and fruits. Carotenoids have antioxidant activity that can reduce the risk of several chronic diseases, such as cancer, heart disease, aging and prevent oxidative damage. The highest total carotene in the red fruit fraction was found in the fresh fresh seeds fraction of 2047.52 g/g, followed by the red fruit paste fraction of 1317.90 g/g and the pulp fraction of 412.99 g/g. Heating time and high temperature can affect the value of carotene in red fruit. Carotenoid pigment is a secondary metabolite compound that has antibacterial activity as in the results of research by Awang, et al. (2016) extracts of carotenoid pigments from the soft coral symbiont bacteria Sarcophyton sp. has antibacterial activity against Staphylococcus aureus ATCC 25923 which is indicated by the diameter of the inhibition zone which increases with the increase in the pigment extract level. Tharukliling et al (2021) in their research on the antibacterial ability of red fruit paste showed that the average inhibition zone of n-hexane extract was higher than that of ethanol extract against Staphylococcus aureus FNCC-0047.

CONCLUSION

Based on the results of the study, it can be concluded that each fraction of red fruit has a different composition of nutritional value. These nutritional values can be used as a reference for the development of future research materials.

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