Analysis Of Nutritional Content in *Petai* (*Parkia Speciosa* Hassk.) With Various Food Processing Methods

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ABSTRACT

Petai (Parkia speciosa Hassk.) is a plant commonly grown and consumed in Indonesia. Indonesian people usually consume Petai in fresh or processed form such as boiled and fried which can be used as an alternative sources of energy and potassium. This research aim to analyze protein, fat, carbohydrate and potassium content in Petai with various food processing methods This study used descriptive analytic design. The objects of this research used Petai were obtained from Kedung District, Jepara Regency, Central Java Province. This treatment used on this research were are fresh Petai, boiled Petai and fried Petai. Processing techniques performed were boiling and frying Petai with the skin until the processing was complete, stripping the skin of Petai seeds, next step is the Petai seeds were tested for nutritional content, analysis of nutrient protein content by kjeldahl method, fat content by soxhlet method, carbohydrate content by difference method and potassium content by Atomic Absorption Spectrometry method. Analysis of nutrient content was conducted at Chemistry Laboratory, Satya Wacana Cristian University, Salatiga.The highest protein content was found in boiled Petai (11.59g / 100g), and the lowest was found in fried Petai (4.96g / 100g). The highest fat content was found in fried Petai (0.75g / 100g), and the lowest was found in fresh Petai (0.15g / 100g). The highest carbohydrate content was found in fried Petai (80g / 100g), and the lowest was found in boiled Petai (63.7g / 100g). The highest potassium content was found in boiled Petai (143mg / 100g), and the lowest was found in fried Petai (106mg / 100g) he highest protein and potassium content was found in boiled Petai, while the highest fat and carbohydrate content was found in fried Petai

Keywords: *Petai*, protein, fat, Carbohydrate, Potassium

INTRODUCTION

The number of *Petai* (*Parkia speciosa* Hassk.) productions in 2018 reached 306.651 tons in Indonesia, this number is more than the previous year which only reached 213.361 tons. Java Island is the area that produces the most *Petai*, followed by Sumatera and Kalimantan (Statistics Indonesia, 2018). The increase in the amount of *Petai* production continues to increase from year to year in line with the increase in population, income and community demand.

Behind the very pungent aroma of *Petai*, *Petai* seeds have many health benefits, but not many people know it. *Petai* is a potential source of energy, consuming two servings of *Petai* provides enough energy to do heavy work for 90 minutes (Verawaty & Novel, 2018). *Petai* has a high potassium content of 221 mg in 100 grams of fresh *Petai* (Kemenkes RI, 2018). Potassium is believed to reduce blood pressure in hypertensive sufferers. Kusumastuty (2016) research results stated that the higher

the intake of potassium, the lower the systolic and diastolic blood pressure of hypertension sufferers.

Indonesian people usually consume *Petai* in fresh or processed form such as boiled, griied, fried, to eat fast food. In addition, *Petai* can also be found in various dishes as a mixture (Elidar, 2017).

Food processing aims to obtain a better taste, better aroma, softer texture, to kill microbes and activate all enzymes. The use of heat in the cooking process greatly affects the nutritional value of these foods (Winarno, 2004; Sumiati, 2008; Sundari, 2015). Based on previous research conducted by Fajri & Sulasmi (2014) concerning frying of peanut nutrition, it is stated that the frying treatment causes protein levels to decrease and fat levels to rise in fried peanut tempeh. Astiana (2015) states that frying food can reduce water content, protein and carbohydrate content, while the frying process can increase fat content and ash content. Whereas in the boiling process it can reduce nutritional value because food ingredients that are directly exposed to boiled water will reduce nutrients, especially water-soluble vitamins (such as vitamin B complex and vitamin C) and also protein (Sundari, 2015). The processing process also reduces the mineral content of calcium, magnesium, phosphorus, potassium and zinc in food (Salamah, 2012).

Therefore, researchers are interested in conducting research on the analysis of nutritional content in *Petai* with various food processing methods as an alternative food source of potential energy and as an alternative to lowering blood pressure in people with hypertension. The aims of this study are to describe the differences in nutritional content of *Petai* with various food processing methods (boiled and fried) to provide an alternative to improving nutrition for the community.

METHODS

This study used descriptive analytic design to describe the nutritional content in *Petai* with various food processing methods. *Petai* processing is carried out at Food Laboratory, Ngudi Waluyo University. Analysis of nutrient content was conducted at Chemistry Laboratory, Satya Wacana Cristian University, Salatiga in August 2020.

The objects of this research used *Petai* were obtained from Kedung District, Jepara Regency, Central Java Province. Analysis of nutrient protein content by kjeldahl method, fat content by soxhlet method, carbohydrate content *by difference* method and potassium content by *Atomic Absorption Spectrometry* method.

Research Procedure

This treatment used on this research were are fresh *Petai*, boiled *Petai* and fried *Petai*. Processing techniques performed were boiling and frying *Petai* with the skin until the processing was complete, stripping the skin of *Petai* seeds, next step is the *Petai* seeds were tested for nutritional content. *Petai* processing by boiling method is carried out with 100℃ heat for 15 minutes with a ratio of 1: 10 ingredients and water. The frying method *Petai* processing is carried out at 175℃ for 1 minute with a ratio of ingredients and cooking oil 1: 6.

Data Analysis

Data analysis was performed, namely tabulation of nutritional value of each processed

Petai, then the data was processed using *Microsoft Office Excel software.*

RESULTS AND DISCUSSION

The results of nutrition analysis of nutritional content in fresh, boiled and fried *Petai* include the content of protein, fat, carbohydrates and potassium in 100 grams of food.

1. Protein Content

Table 1 Protein Content in 100 grams of Fresh, Boiled, and Fried *Petai*

Parameter	Protein (grams)
Fresh *Petai*	8,42
Boiled *Petai*	11,59
Fried *Petai*	4,96

Protein content in *Petai* with processing boiling methods increases because of decrease in the water content of food, from the original fresh *Petai* water content of 25,69% to 23,02 % after the process of boiling. This is in accordance with Winarno (2008) statement in Erfiza (2018), a decrease of water content can cause an increase in the amount of fat, protein and carbohydrate content in food. Similar to the results obtained by Riansyah (2013), the longer the cooking time and the higher the temperature, the water content will decrease so that it can increase the protein content of a material.

Petai with processing frying methods decreased the protein content of 8,42 grams to 4,96 grams. The loss protein content, the possible reason for this might be that the high temperature frying more than 160℃, so that the protein is damaged. The process of frying food method reduces protein content higher than boiling because the temperature used is very high and the protein will be damaged by very high heat (Sundari et al., 2015).

Based on Permenkes RI (2014) Household Size (URT) for fresh *Petai* as a vegetable source of food, namely 1 large board / seed or 20 grams, in 1 board there are about 12 large pies. The protein requirement for men aged 19-29 is 65 grams, consuming 20 grams of fresh *Petai* can contribute 2.58% of the daily protein requirement, 3.55% boiled *Petai*, and 1.52% fried banana. The protein requirement for women aged 19-29 is 60 grams, so consuming 20 grams of fresh *Petai* can contribute 2.8% of the daily protein requirement, 3.85% boiled *Petai*, and 1.65% fried *Petai*.

2. Fat Content

Table 2 Fat Content in 100 grams of Fresh, Boiled, and Fried *Petai*

Parameter	Fat (grams)
Fresh *Petai*	0,15
Boiled *Petai*	0,54
Fried *Petai*	0,75

The fat content increases after receiving treatment methods of processing boiled and fried. The increase in fat content

in processed *Petai* is thought to be due to reduced water due to heating at high temperatures which can cause an increase in the amount of fat, protein and carbohydrate content in food (Ranken, 2000; Domiszewski, 2011; Erfiza, 2018). This is in accordance with Nurmala (2014) statement which states that all processing treatments can increase fat content, this is because the discharge of water due to cooking causes the water content to decrease so that it increases fat content and protein content, because if there is one proximate component of a food ingredient it decreases then the other proximate components will increase to achieve equilibrium.

The processing of frying method increase the fat content in *Petai* because of the presence of cooking oil that is absorbed by the food. Similar to the results obtained by Nurmala (2014), frying process using cooking oil as the medium of heat, causing the penetration of oil into the food so that the water contained in food ingredients evaporate, then slit or pore pore which was filled with water is replaced by cooking oil. Frying occurs a dehydration process from food products, both from the outside and the whole product, using oil or fat as a medium for heat transfer. There is a process of transferring heat from the surface of the frying pan to the oil / fat and from the hot oil / fat to the surface of the fried product. Cooking oil as a heat transfer medium can be absorbed into fried products or coat the surface of the product through a process of adsorption, absorption or chemical reactions to form a hard layer (*crust*) with distinctive properties (Aqliyah, 2015).

Based on the Angka Kecukupan Gizi (AKG) 2019, the amount of fat intake that should be consumed in a day for adult males aged 19-29 is 75 grams, thus the fat content for 1 large board / seed or 20 grams (URT) can contribute to the daily fat requirement of 0,04%, boiled *Petai* by 0.14%, and fried *Petai* by 0.2%. The recommended fat for adult women aged 19-29 is 65 grams, so consuming 20 grams of fresh *Petai* can contribute to the daily fat requirement of 0.04%, boiled *Petai* by 0.16%, and fried *Petai* by 0.23%.

3. Carbohydrate Content

Table 3 Carbohydrate Content in 100 grams of Fresh, Boiled, and Fried *Petai*

Parameter	Carbohydrate (grams)
Fresh *Petai*	63,92
Boiled *Petai*	63,7
Fried *Petai*	80

The carbohydrate content in *Petai* with processed by the boiled method has decreased, presumably due to the effect of the increase in protein and fat content. Carbohydrate determined by calculating the difference between 100% and the amount of protein, fat, water and ash, so that if the amount of the

content is much increased then decreased carbohydrate levels (Winarno, 2004; Latif, 2018). In addition, the decrease in carbohydrate content in *Petai* is also thought to be due to the long boiling time. According to Yulianti (2015), the loss of carbohydrate content increase in both boiling time. This is because many carbohydrate molecules are degraded into simple sugar molecules.

The processing of frying method increases the carbohydrate content. This is presumably because the frying treatment has caused several components to be damaged and come out with the water, causing the component that remains to be mostly carbohydrates. The heating treatment with a temperature that is not too high causes less damage to the carbohydrate components in food. Increased carbohydrate content in this study can also be thought to be caused by the influence of a decrease in the levels of water, protein content and fat content that increases levels of carbohydrates produced food (Latif, 2018).

Based on AKG 2019, the recommended carbohydrate should be consumed in a day for adult males aged 19-29 years is 430 grams, thus the carbohydrate content of one board / large seeds or 20 grams (URT) can contribute to the needs of daily carbohydrate by 2,97%, boiled *Petai* by 2.96%, and fried *Petai* by 3.72%. The carbohydrate requirement for adult women aged 19-29 years is 360 grams, so consuming 20 grams of fresh *Petai* can contribute 3.55% of the daily carbohydrate needs, 3.53% boiled *Petai*, and 4.44% fried *Petai*.

4. Potassium Content

Table 4 Potassium Content in100 grams og Fresh, Boiled, and Fried *Petai*

Parameter	Potassium (mg)
Fresh *Petai*	140
Boiled *Petai*	143
Fried *Petai*	106

The potassium content in *Petai* processed by boiling method has increased by 2 mg. According to Yazid & Setyawati (2014) the increase in potassium content after boiling is due to minerals in food that can change their chemical structure during the cooking process or due to interactions with other ingredients. Mineral solubility can increase or decrease depending on the process. This result is different from the research of Lewu *et al* . (2010) stated that there was a decrease in several minerals, especially zinc, phosphorus, calcium and potassium after the boiling process was carried out.

The frying method reduces the potassium content. The decrease in potassium content is thought to be caused by the nature of potassium which dissolves easily during the processing process so that the release of potassium in the *Petai*

into the media used. Potassium has a melting point of 97.5℃, so a frying temperature of 175℃ can cause the potassium to melt and release. This result is supported by research Purwaningsih (2011) which states that the processing method reduces the mineral content of potassium. Salamah et al (2012) also state that the processing method reduces the potassium mineral content of food ingredients. During the processing process using heat, time and temperature are the main factors that can affect protein quality, as time and temperature increase, it causes large amounts of protein denaturation and has an impact on the loss of minerals such as potassium (Abraha, 2018).

Based on previous research conducted by Ramadhian & Hasibuan (2016), the potassium and lycopene content in tomatoes can reduce blood pressure in patients with hypertension. Dal am 100 grams of fresh red tomatoes in potassium amounted to 164,9 mg (Kemenker RI , 2018). Tomatoes and *Petai* same as having potassium in the medium category so that a banana could be expected to be made as alteratif food sources of potassium to lower the blood pressure of hypertensive patients, in this study the most potential and the largest in potassium is a *Petai* boiled at 143 mg.

According to Ando, *et al.* (2010), potassium together with sodium helps maintain osmotic pressure and acid-base balance. A balanced content of potassium in the blood can prevent high blood pressure. If the ratio of potassium sodium intake increases, the incidence of hypertension also increases. Consumption of potassium will increase its concentration in the intracellular fluid, so it tends to draw fluid from the extracellular region and lower blood pressure. The ratio of potassium to sodium in the diet plays a role in preventing and controlling hypertension (Atun, 2014).

Based on AKG 2019, the amount of potassium intake that should be consumed in a day for adult men and women aged 19-29 years is 4700 mg, thus the potassium content for 1 large board / seed or 20 grams (URT) can contribute to the daily potassium requirement of 0.59%, boiled *Petai* by 0.60%, fried *Petai* by 0.45%.

CONCLUSION

The nutritional content in 100 grams of fresh *Petai* is 8,42 grams of protein; 0.15 g fat; 63.92 g carbohydrate; and 140 mg of potassium. The nutritional content in 100 grams of *Petai* with processing boiling method is 11.59 g of protein; 0.54 g of fat; 63.7 g carbohydrate; and 143 mg of potassium. The nutritional content in 100 grams of *Petai* with processing frying method is 4.96 g of protein; 0.75 g of fat; 80 g of carbohydrate; and 106 mg of potassium

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