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ANALYSIS CARBOHYDRATE CONTENT AS AN ALTERNATIVE TO HALAL FOOD IN NATA JACKFRUIT

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Abstract: Jackfruit (*Artocarpus heterophyllus*) is a fruit that has a high nutritional content and almost all parts of the plant have benefits. Jackfruit contains high carbohydrates, so it is good to be used as a basic ingredient for making nata. Utilization of jackfruit (*Artocarpus heterophyllus*) is one of the efforts to add economic value. The purpose of this study was to determine the amount of Carbohidrate Nata Jackfruit (*Artocarpus heterophyllus*) As analternative to halal food. The type of this research is qualitative research with a descriptive research approach. The results showed that there was nutrient content in nata de jackfruit in 1 gram with carbohydrate content of 3.59%, so it is safe for consumption.

Keywords: *Artocarpus heterophyllus*, carbohydrates, halal food, jackfruit, nata

Abstrak: Nangka (*Artocarpus heterophyllus*) adalah salah satu buah yang memiliki kandungan nutrisi yang cukup tinggi dan hampir semua bagian tanaman mempunyai manfaat. Buah nangka mengandung karbohidrat yang cukup tinggi, sehingga baik digunakan sebagai bahan dasar untuk pembuatan nata**.** Pemanfaatan buah nangka (*Atocarpus heterophyllus*) adalah salah satu upaya untuk menambah nilai ekonomis. Tujuan dari penelitian ini adalah untuk mengetahui jumlah kandungan karbohidrat pada nata buah Nangka (*Arthocarpus heterophyllus*) sebagai salah satu alternatif makanan halal. Adapun Jenis penelitian ini merupakan penelitian kualitatif dengan pendekatan penelitian yang bersifat deskriptif. Hasil penelitian menunjukkan bahwa terdapat kandungan nutrisi pada *nata de jackfruit* dalam 1 gram dengan kadar karbohidrat sebesar 3.59%, sehingga aman untuk dikonsumsi.

Kata Kunci: *Artocarpus heterophyllus*, karbohidrat, makanan halal, nangka

Introduction

Jackfruit (*Artocarpus heterophyllus*) is rich in high energy content, which is 95 calories for every 100 g. Likewise, the carbohydrate content which reaches 23.25 g and protein as much as 1.72 g, makes this fruit worthy as an alternative food ingredient. The high productivity of jackfruit has an impact on the abundance of the fruit and many are damaged because it has a relatively short shelf life (Amalia, 2017). This is a separate problem and requires a solution to utilize the abundance of fruit, for example, being processed into new food ingredients. This is based on its carbohydrate content, so it has the potential to be processed into processed products such as nata.

Nata is one of the good foods to eat because it contains carbohydrates, protein, fiber and others. Nata is a food product in the form of a cellulose layer as a result of fermentation of nata-forming bacteria, namely *Acetobacter xylinum*. Nata is classified as health food or diet food because it contains cellulose (dietary fiber) which is useful in the digestive process in the human small intestine and in the process of water absorption in the large intestine (Hayati, 2003).

According to SNI (Indonesian National Standard) in 1996, the characteristics of nata that must be considered are normal aroma, taste, color, texture and fiber content. The main principle of a food ingredient that can be processed into nata is the presence of adequate carbohydrate content in the material. Jackfruit is a fruit that contains quite a lot of carbohydrates so that it can be processed into nata. Processing jackfruit into nata is one of the efforts to optimize the utilization of jackfruit. Carbohydrates are one of the nutrients needed by humans that function to produce energy for the human body. Another function of carbohydrates for the body is to give food a sweet taste, save protein, regulate fat metabolism and help remove feces (Siregar, 2014).

Halal food is very important for muslims, whatever is consumed must be halal and thoyyiban (good). because good food will affect all aspects of a muslim's life. In the word of Allah swt. in QS. Fathir/35: 27.

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اَلَمۡ تَرَ اَنَّ اللّٰهَ اَنۡزَلَ مِنَ السَّمَآءِ مَآءً ۚ فَاَخۡرَجۡنَا بِهٖ ثَمَرٰتٍ مُّخۡتَلِفًا اَلۡوَانُهَا ؕ وَمِنَ الۡجِبَالِ جُدَدٌۢ بِيۡضٌ وَّحُمۡرٌ مُّخۡتَلِفٌ اَلۡوَانُهَا وَغَرَابِيۡبُ سُوۡدٌ ﴿۲۷﴾

Meaning:
"Do you not see that Allah sends down rain from the sky, and We produce thereby fruits of varying colors? And in the mountains are tracts, white and red of varying shades and [some] extremely black"(Ministry of Religion of the Republic of Indonesia, 2012).

This verse explains that Allah swt. reduce rain which contains a lot of mineral content, so it is needed by plants to produce quality fruits that can be processed into products and used for humans. For example jackfruit which is processed into nata. One of the signs that a food is both halal and good is that it contains enough carbohydrates to serve as an alternative to food. Based on the background above, this research is very important to do.

Materials and Methods

The tools used in this research are analytical balance, oven, beaker, measuring cup, pH indicator, ruler, knife, spoon, stove, pan, basin, blender, jam bottle, fruit plastic, filter, pipette, destruction tube, tube reaction, porcelain dish, atomic absorption spectrophotometer (AAS), UV-VIS spectrophotometry, kjeldahl flask, petri dish, beaker, analytical balance, scissors, spoon, desiccator, stirring rod, dropper, fume hood, hotplate, measuring cup, bottle You.C1000, burette, stative, mortar and pastle, funnel, scale pipette, and filler pipette.

The materials used in this study were jackfruit, starter, bean sprouts, aquades, water, sugar, acetic acid, plastic, 5% phenol solution, H_2SO_4, chloroform, filter paper, 6% meta phosphoric acid, aluminum foil, petroleum benzine, selenium reagent, sulfuric acid, sodium hydroxide, 3% HCl, acetic acid, 30% NaOH, starch, potassium iodide, phenolphthalein, 0.1 N sodium thiosulfate, nitric acid, $KH_2HPO_4.2H_2O$.and rubber bands.

Equipment sterilization is carried out using an oven. Tools to be sterilized are wrapped in HVS paper properly and neatly so that no air enters. Sterilization is carried out at 180 °C for 2 hours. The next stage is making the starter. Starter making with coconut water (*Cocos nucifera*) sugar, bean sprout extract, and vinegar. The composition of the starter medium consisted of 60 g of granulated sugar, 12 ml of bean sprout extract, 30 ml of acetic acid, and 600 ml of coconut water. After finishing the preparation of the medium, then put all the ingredients into the pot, boil until boiling. After boiling the pan is removed and cooled. After that, pure *Acetobacter xylinum* culture was added to the solution while stirring continuously until evenly distributed. Then the inoculated solution was put into a bottle, then covered with fruit plastic until tightly then tied using a rubber band. Then the bottle is stored in the incubation room for one week. The starter is ready to use. The change in turbidity and the formation of a floating nata layer on the nata starter medium from coconut water indicated the success of the acclimation stage of *Acetobacter xylinum* (Ridwan, 2018).

Making bean sprouts is done using 100 grams of green beans which are washed and then soaked in water for ± 15 hours, drained and stored in a perforated container, then the container is closed then the sprouts are doused with running water when it is dry and the sprouts process is carried out for 3 days (Ridwan, 2018). Next, make bean sprouts solution use 200 grams of bean sprouts are mixed with 400 ml of water then cooked until boiling for ± 10 minutes, then wait for it to cool. Then put the bean sprouts boiled water into a bottle and tightly closed using plastic and rubber (Ridwan, 2018).

Making nata from jackfruit juice by removing the skin of the jackfruit then taking the flesh and separating it from the seeds as much as 200 grams. The jackfruit that has been separated from the seeds is blended until smooth by adding 600 ml of distilled water and filtered to get the juice. Jackfruit juice was added with 60 grams of sugar and 12 ml of bean sprouts and heated to boiling for ± 3 minutes and added 30 ml of acetic acid and pH measurements were taken. The finished mixture was put in 200 ml

jam bottles each and allowed to cool and added with 20 ml of *Acetobacter xylinum* into each bottle, closed and stored for 14 days at room temperature and observed every day (Ridwan, 2018).

Carbohydrate content analysis was carried out by weighing 1 gram of the sample, put the material into a flat bottom flask then added 25 ml of 3% HCl then put into a flat bottom flask after that it was heated for 3 hours, the pH was measured then put into a 50 ml Erlenmeyer flask and then the volume was made up with distilled water. then filtered into You.C1000 bottles. Heat 25 ml of distilled water then add 0.25 grams of starch after that 20 grams of potassium iodide are taken and then dissolved in a container containing 100 ml of distilled water. 2 ml of the sample was taken and then 15 ml of distilled water was added, 25 ml of luff was then heated for 20 minutes. After 20 minutes, it was removed and allowed to cool and then titrated by adding 0.1 N sodium thiosulfate into the titration tube, then a sample was taken and then 15 ml of potassium iodide was added, 25 ml of 25% H_2SO_4 was added, titrated to light yellow color and then 10 ml of starch was added. The drops are then titrated again until the color changes to milky white, then the titration volume is calculated (Makassar Health Laboratory Center).

Result and Discussion

The results of the carbohydrate content in nata Jackfruit can be seen in the Table 1.

Table 1. Nutrient content of nata de jackfruit per 1 gram

No	Nutrition Type	Nutrition Content (%)
1	Carbohydrate	3,59

Nata is cellulose which is the result of sugar synthesis by *Acetobacter xylinum* in the form of agar, white in color which is floating due to the presence of CO_2 gases produced during the metabolic process and attached to the pellicle fibrils causing it to float. Some things that need to be considered in making nata include *Acetobacter xylinum* bacteria obtained from rejuvenating bacteria twice in addition to sugar bacteria, it must also be considered where sugar is an energy source for microbes to produce acetic acid along with the formation of cellulose that wraps bacterial cells (Ridwan, 2018).

According to Manikharda (2011), carbohydrates are the main energy source for metabolism in humans and as a means to maintain the health of the human digestive tract. Carbohydrates are organic compounds that contain carbon, hydrogen and oxygen in both simple and complex molecular forms. Carbohydrates are the main contributor to the components that make up food, both natural components and added ingredients. In a food ingredient, it is important to recognize the percentage of carbohydrate content in food.

Carbohydrate test was carried out using the Luff School method. This method is the best method for measuring carbohydrate or glucose levels with an error rate of 10% (Hastuti, 2011). The results obtained from the analysis of the carbohydrate content of nata de jackfruit as much as 3.59% per 1 gram. The high carbohydrate content in nata de jackfruit is influenced by other nutritional components contained in nata de jackfruit, the smaller the value of other nutritional components in nata de jackfruit, the higher the carbohydrate content and vice versa if the carbohydrate content is lower, the other nutrients components will be higher. The results of this study are supported by Fatkurahma (2012) which states that carbohydrate levels can be influenced by other nutritional components, the lower the other nutritional components, the higher the carbohydrate content. Vice versa, the higher the other nutritional components, the lower the carbohydrate content. The nutritional components that affect the amount of carbohydrate content include protein, fat, water, ash content.

Conclusion

Based on the research conducted and the results obtained, it can be concluded that the nutritional content of nata de jackfruit in 1 gram with a carbohydrate content of 3.59%, so that it can be used as a halal and good alternative food.

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