

Variation of Artocarpus Altilis as a Healthy Nugget Among the Community of Politeknik Merlimau, Melaka.

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Abstract

Artocarpus Altilis or known as Buah Sukun in Malaysia contents vitamin C, minerals, antifungal and anti-inflammatory. Nowadays, awareness on healthy eating habits among society is still low. Looking at its potential and benefit a research has been conducted to produce Altilis bite from flesh of Artocarpus Altilis. This study is assigned to determine the presence of carbohydrate, calorie and acceptance level of respondent towards Altilis bite. The Gas Chromatography (GC) has been used to detect carbohydrate and total calorie content in the product. 30 respondents were selected randomly based on their locality. Descriptive analysis was used to analyze data collected using SPSS version 22. This study indicates the presence of carbohydrate 36.9g/100g with total calorie value 190kcal/100g and acceptance level of respondents towards Altilis bite is high with a mean value of 4.45. In conclusion, Altilis Bite contains carbohydrate, energy and accepted at moderately high level.

Keywords: Artocarpus Altilis, Buah Sukun, breadfruit

1.0 Introduction

Breadfruit (*Artocarpus Altilis*) is a species of flowering tree in the mulberry and jackfruit family (Moraceae) originating in the South Pacific and eventually spreading to the rest of Oceania (Ragone, 2006). British and French navigators introduced a few Polynesian seedless varieties to Caribbean Island during the late 18th century. Today it is grown in some 90 countries throughout south and Southeast Asia, the Pacific Ocean, the Caribbean, Central America and Africa (Ragone, 2006).

Its name is derived from the texture of the moderately ripe fruit when cooked, similar to freshly baked bread and having a potato like flavour. Breadfruit also can be eaten once cooked, or can be further processed into a variety of other foods. Breadfruit trees usually produce large crops at certain times of the year. Preservation of the harvested fruit is an issue through. One traditional preservation technique is to bury peeled and washed fruit in a leaf-lined pit where they ferment over several weeks and produce a sour, sticky paste (Craig & Ragone, 2018).

Most breadfruit varieties also produce small number of fruit throughout the year. Fresh breadfruit is always available, but somewhat rare when not in season. Breadfruit (*Artocarpus Altilis*) is a carbohydrate rich food and staple diet in some developing countries of the world (Graham, 1981). Breadfruit is

a unique tree in that it produces a starchy staple, the carbohydrate energy food necessary for life, as well as providing equally effective canopy cover to prevent erosion, and provide relief from global atmospheric CO₂ build up. The nutritious starchy fruit is rich in iron, calcium, potassium, magnesium, and fibre. Some varieties are good sources of anti-oxidants and carotenoids (Kalaheo, 2009).

Breadfruit has lumpy green flesh and a potato-like texture. It is widely eaten in the Pacific Islands and scientists are encouraging the planting of trees in countries with poor food security. One breadfruit, which weighs around seven lbs (3kg) provides the carbohydrate portion of a meal for a family of five. The fruit is rich in vitamins and is a source of carbohydrate and protein. The protein in the fruit has a higher proportion of amino acids than soy (Griffiths, 2014).

Looking at its potential and benefit a research has been conducted to produce Altilis bite from flesh of Artocarpus Altilis. Therefore, the objectives of this research are to examine the nutritional value in 'Altilis Bites', to identify the level acceptance of customer's towards 'Altilis Bites' and to compare the nutritional value in 'Altilis Bites' among commercialised nugget in the market.

1.1 Literature Review

1.1.1 Breadfruit

Breadfruit is gluten free and its protein is complete, providing all of the essential amino acids necessary for human health (Ragone, 2011). Breadfruit is an energy-rich food and a good source of complex carbohydrates, fibre, and minerals such as potassium, calcium, iron, magnesium, phosphorus, manganese, and zinc. This nutritious fruit also provides B vitamins, niacin, thiamine, and Vitamin C (as shown in figure 1). Some varieties have high levels of pro-vitamin A carotenoids, nutrients essential to good health.

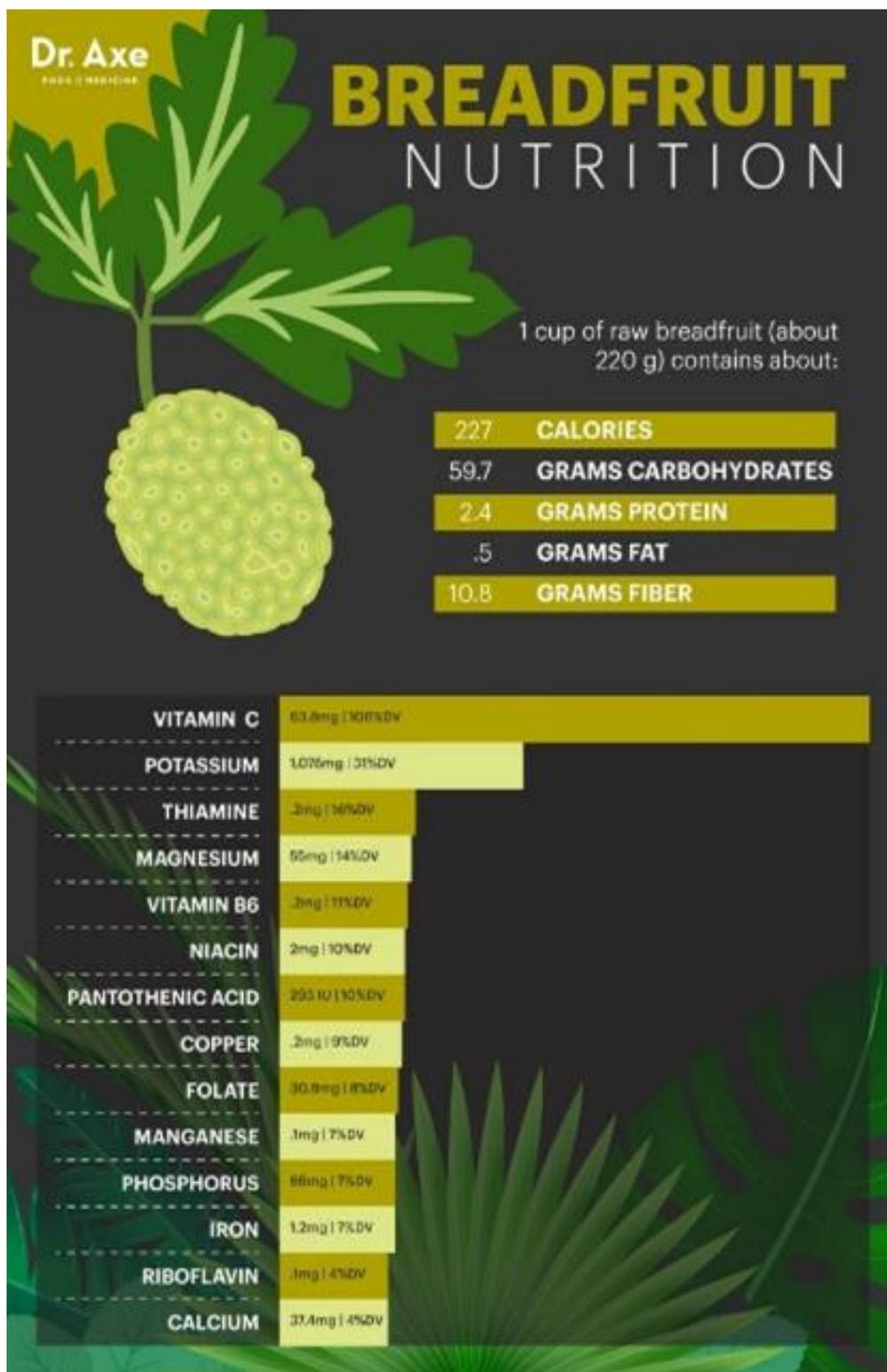


Figure 1: Nutrition Fact of Bitter Melon Fruit

As shown in Figure 2, there are different types of breadfruit over the world (features and origin). *Artocarpus Altilis* is a fast-growing evergreen tree frequently cultivated and naturalized through the tropics (Ragone, 2006).

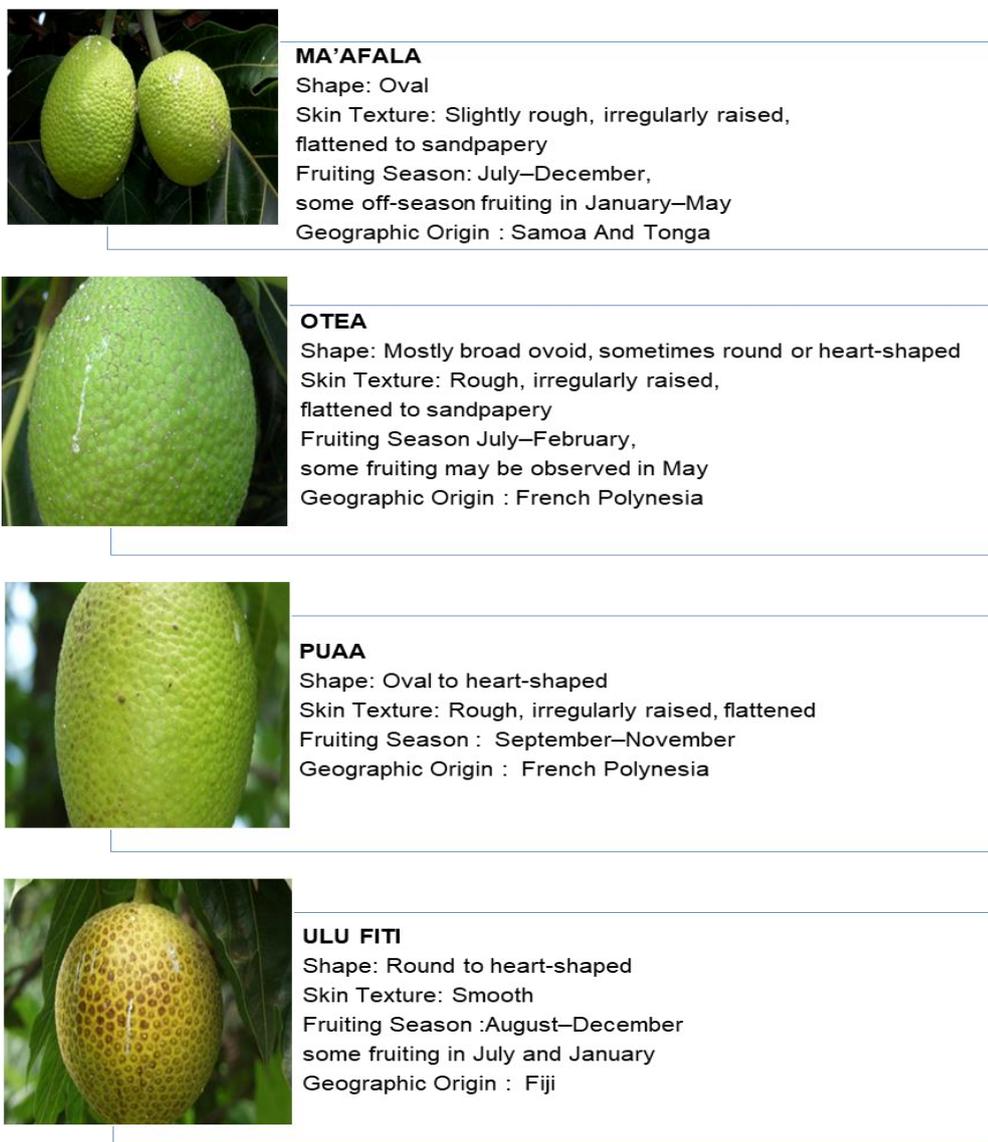


Figure 2: Types of Breadfruit (features and origin)

1.1.2 Chicken Nugget.

By doing a research on healthy nugget from breadfruit, the researcher studied on features of commercialised nugget in the market. Chicken Nugget is one of the chicken meat processing products that have a certain taste, usually golden yellow. Currently, chicken nuggets become one of the fast-growing chicken meat products. Chicken nuggets are chicken products that are made from minced meat and eggs, then fried or roasted. Fast food restaurant usually fries in vegetable oil or coconut oil (Doyle, 2013). According to McKenna (2012), chicken nuggets were created in 1950 by Robert C. Baker, a professor of food science at Cornell University, and published as an unpatented academic work. This baker makes it possible to form chicken nuggets in any console. Figure 3 shows the process of making chicken nuggets in food industry based McDonald's chicken nugget process.

McDonald's chicken nugget is the best examples of commercialized nugget process.



Figure 3: Process of making chicken nugget

2.0 Material and Methods

To develop product from the breadfruit, the researcher collects the matured breadfruits and process the fruit to becomes mashed breadfruit. Then, the process continues with the making breadfruit nugget and ready to be a sample to the respondents.

2.1 Standard Procedure

400gm of mashed breadfruit that come from 2.3kg of raw breadfruit required in making 'Altilis Bite' as shown in Table 1. The breadfruits are then boiled and mashed. The process includes of peel-off the skin of breadfruit, cut the breadfruit into a cubic size (15mm x 15mm x 15mm) and it takes 15 minutes at 100oC for boiling process. Then the water is strained and mashed in mixer for 20 minutes until it becomes a mashed breadfruit as shown in Figure 4.

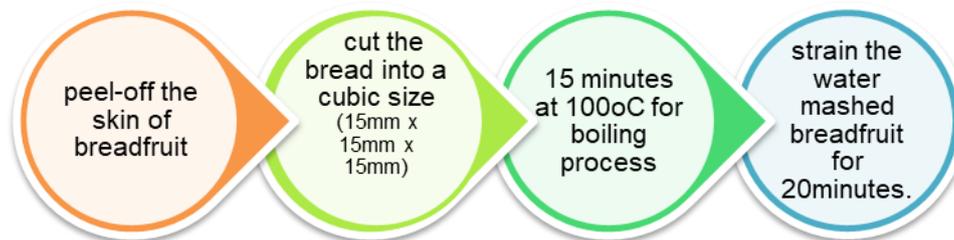


Figure 4: Process of boiling and mashed breadfruit

2.2 Standard Recipe

The process of preparing 'Altilis Bite' started with prepared the ingredients and cooked process. Then, all ingredients are mixed and shaped into a small piece. After that, fried the shaped nugget for 3 minutes (200°C). Lastly, the finish 'Altilis Bite' stored and frozen at -18°C as shown in Figure 5. Table 1 is a list of ingredients have been used for making Altilis Bite.

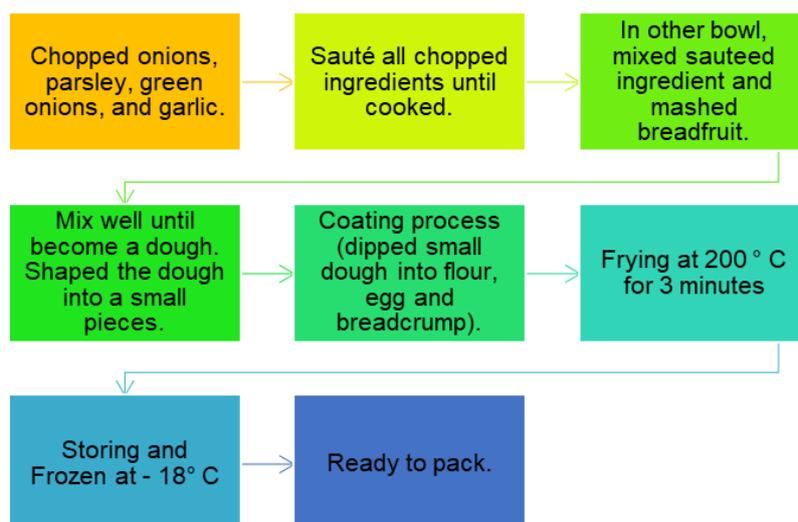


Figure 5: Process of making ‘Atilis Bite’

Table 1: Recipe of ‘Atilis Bite’

INGREDIENTS	QUANTITY
Mashed Breadfruit	400 g
Chicken	200 g
Onion	50 g
Oregano	40 g
Green Onions and Parsley	30 g
Oil	1 kg
Garlic	15 g
Egg	60 g
Water	1 litre
Pepper	40 g
Salt	10 g
Breadcrumbs	50 g
Flour	50 g

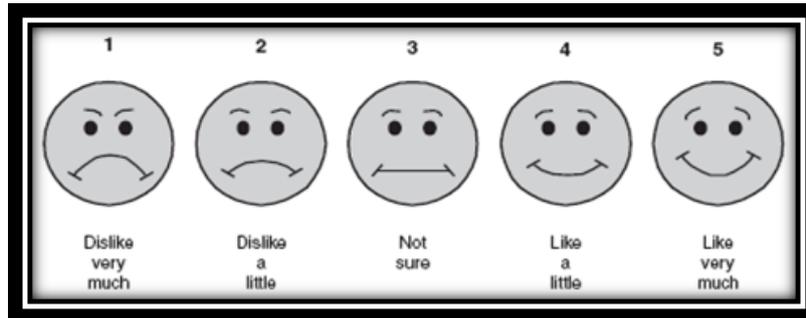
2.3 Sample Test (Nutrition Fact)

Sample of Atilis Bite had been submitted to the Melaka Biotechnology Corporation for laboratory food testing. 100gm sample of Atilis Bite are required to be submitted for this purposes. The benefit of food testing labs is that they can calculate accurate nutrition facts using their extensive database and food science technology. The comparison of nutritional value between Atilis Bite and commercial chicken nugget will also analysed.

2.4 Sensory evaluation

Researcher use hedonic test with 5 facial hedonic scales for this study. The hedonic test was done by 30 untrained panels consist of students and staff at Politeknik Merlimau Melaka in order to determine the level of consumer’s acceptance over Atilis Bite. Stone & Sidel(2004) claimed that the 30 respondents are enough for sensory evaluation. The 5-point facially hedonic

scale test comprised of 5 = Like very much, 4 = Like a little, 3 = Not sure, 2 = Dislike a little and 1 = Dislike very much as shown in Figure 6.



(Sources: Munro, 2017)

Figure 6: 5-point facially Hedonic Scales

2.5 Data Analysis Technique

The data was analysed using the Statistical Package for the Social Sciences (SPSS) version 22 to get the mean, score and percentage result. The interpretations mean score scale that used to analyse as shown as Table 2.

Table 2: Mean Value Range Interpretation

(Sources: Wiersma, 1995)

3.0 Results and discussion

MEAN SCORE	INTERPRETATION	LEVEL
1.00 - 2.49	Low	Poor
2.50 - 3.49	Medium	Medium
3.50 - 5.00	High	Good

3.1 Demography Analysis

The demography analysis in this research is looking at the age and gender of the respondents. Based on the Table 3, 30% of the respondent age 18 to 21 years old (9 respondents), followed by 26.7% (8 respondents) from 22 to 25 years old and 13.3% (4 respondents) come from the age 26-29 years old. The smaller percentage was from 30 to 33 years old with 10% (3 respondents) and 20% (6 respondents) is 33 years old and above. The total of 30 respondents on sensory evaluation are accepted by Stone & Sidel(2004). Figure 7 showed the bar chart of total respondents.

Table 3: The Total of Respondents

Frequency (N)		Valid Percent (%)
Age	18 – 21	9
	22 – 25	8
	26-29	4
	30-33	3
	33 and above	6
Total		30
Gender	Men	8
	Female	22
Total		30

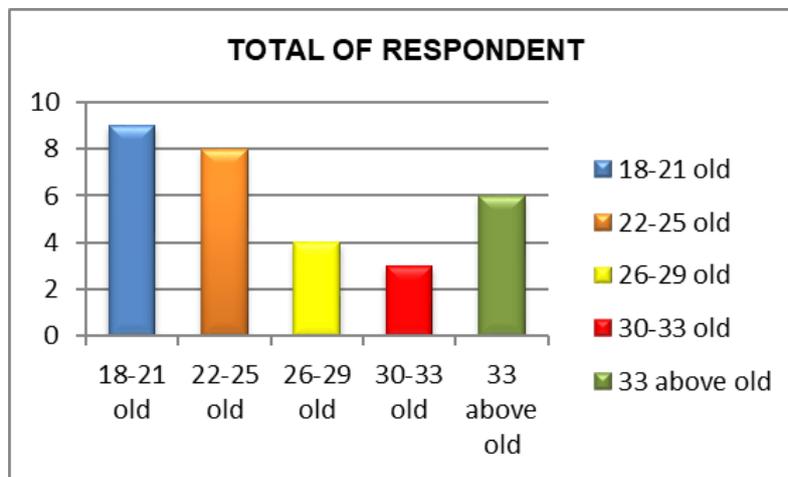


Figure 7: Bar Chart of Total of Respondent

3.2 Sensory Evaluation

Sensory Evaluation is defined as a scientific discipline used to evoke measure, analyze, and interpret those responses to products that are perceived by the senses of sight, smell, touch, taste, and hearing (Stone & Sidel 2004). Sensory evaluation is a vital instrument in measuring the patterns of product as well as determining the consumer’s acceptance of the product. Table 4 shows that the means score obtained through the sensory evaluation test conducted.

Table 4: Mean score of ‘Atilis Bite’

CHARACTERISTIC	MEAN	INTERPRETATION
Smell	4.33	High
Texture	4.47	High
Colour	4.47	High
Taste	4.53	High
Overall Acceptance	4.45	High

Data analysis in Table 4 and Figure 8 indicated the mean score the acceptance level of respondents towards Altilis Bite is at high level. Smell is the first characteristic that determines the respondent's acceptance of the product. From the research conducted, the mean score for smell was 4.33. It interprets the higher result. The second characteristics that analyzed were texture. The mean score of texture was same as color that was 4.47. The mean score of taste was 4.53 which was the high mean among the characteristics. The overall acceptance of this product was 4.45 that give a high interpretation. It means that the Altilis Bite was accepted among the community Politeknik Merlimau, Melaka.

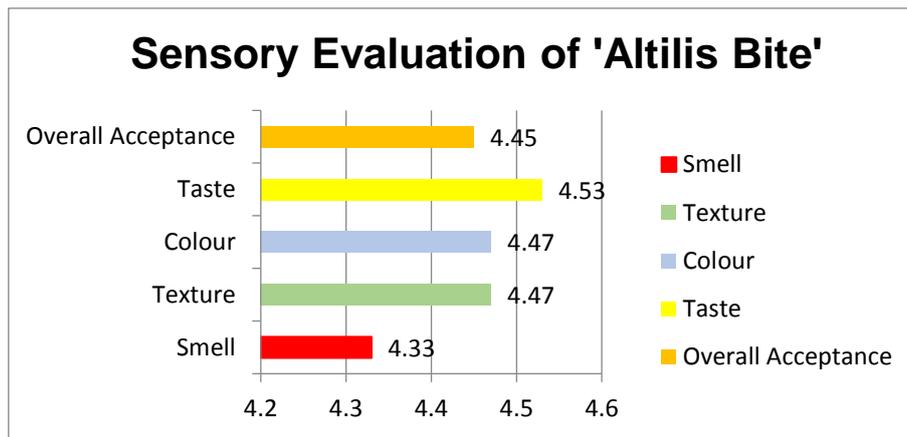


Figure 8: Mean Bar Chart of Sensory Evaluation of 'Altilis Bite'

3.3 Nutrition Fact

The analysis from the sample Altilis Bite shows in Table 5. The nutrition content of analysis from Melaka Biotechnology Corporation showed the test parameter, the method and the result of the sample. The Altilis Bite contains 53.4gm moisture, 2.0gm fiber, 2.3gm total fat content, 5.38gm crude protein contains, 36.9gm total carbohydrate and 190Kcal energy content for 100gm.

Table 5: Nutrition Content of 'Altilis Bite'

TEST PARAMETER	UNIT	RESULT
Moisture	g/100g	53.4
Fiber	g/100g	2.0
Total Fat Contain	g/100g	2.3
Crude Protein Content	g/100g	5.38
Total Carbohydrate	g/100g	36.9
Energy Content	Kcal/100g	190

Sources: Melaka Biotechnology Corporation (2017)

The researcher makes a comparison of nutritional value between Altilis Bite and Chicken Nugget. Table 6 shows that Altilis Bite contain higher value of energy and carbohydrate than Chicken Nugget. This is great for people who play sports because its provide energy to them and who wants to keep fit

because it can replace rice as a major food source. Besides that, the protein and fat contain in chicken nugget is higher than Altilis Bite. The result also shows that Altilis Bite is healthier than chicken nugget in the market.

Table 6: Differentiate nutritional value Altilis Bite and Chicken Nugget

ASPECT/PER 100G	UNIT	ALNILIS BITE	CHICKEN NUGGET
Energy (kcal)	Kcal/100g	190	120
Carbohydrate	g/100g	36.9	32
Protein	g/100g	5.38	16
Fat	g/100g	2.3	17

Analysis shows that the amount of fat of 'Altilis Bite' is lower than commercial chicken nugget which only contain 2.3g compared to commercial chicken nugget that contains 17g. The protein contains in 'Altilis Bite' is also low with 2.3g of protein compared to commercial chicken nugget that contains 16g of protein. The process of making 'Altilis Bite' is difficult as the supply is low. Besides that, the production of the tree itself is not seasonal. Breadfruit trees usually produce large crops at certain times of the year, preservation of

However, the overall acceptance of this product is high. This research is needed to better evaluate on positive and negative impact for quality improvement. In future, further research can be made in producing stuffed tofu and bakery product from the breadfruit in order to varieties the type of product derived from breadfruit. It is concluded that Altilis Bite resulted better and healthier in comparison to chicken nugget nutrition value and Altilis Bite nutrition value. The result analysis from the Melaka Biotechnology Corporation are proven to objectives of this research. Sensory quality on Altilis Bite also refer to the acceptability of respondent towards this product. With respect of the product, Altilis Bite will be a good product in order to promote healthy food among consumer.

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