

# ANALYSIS OF PHYSICAL PROPERTIES, PROPERTIES AND PROXIMATE CONDITIONS OF SNACK BAR FORMULATION OF RED RICE FLOUR (ORYZA NIVARA) AND GROUND NUTS (ARACHIS HYPOGAEA, L)

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## Abstract

*Snack bar has a variety of nutrients and meets daily nutritional needs. Brown rice has high fiber levels, helps control blood sugar level. Objective of research to know the physical properties, level of preference, and proximate content of snack bars in various formulations of brown rice flour and peanuts. This type of research is Quasi experimental, using a completely randomized design (CRD) with 4 variations of brown rice flour A: 100%, B: 80%, C: 60%, and D: 50%. Result of research, Physical test of Snackbar was brown, flavored with brown rice flour, slightly sweet taste, and slightly soft texture. The most preferred Snackbar organoleptic test was snackbar D. The highest proximate, water content and carbohydrate test results were snackbar A, namely 25.57% and 58.83%. The highest ash content, fat content, protein content and fiber content of snackbar D were 2.2%, 15.49%, 11.63% and 1.00%. There are differences in color, there is no difference in smell, taste and texture of the four variations of the snackbar. The level of preference for color, smell, taste and texture is the highest at snackbar D. There are differences in water content, fat, crude fiber, protein and carbohydrates, there is no difference in ash content.*

**Keywords:** *Snack Bar; Brown Rice Flour; Peanuts*

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## 1. Introduction

Diabetes Mellitus (DM) is a chronic disease characterized by blood sugar levels exceeding normal limits and disruption of carbohydrate, fat and protein metabolism caused by a lack of the hormone insulin. Uncontrolled blood sugar levels will lead to acute and chronic metabolic complications (LeMone et al., 2015) Indonesia is in the 7th position in the world with 10 million adults (International Diabetes Federation, 2017). The prevalence of DM in Indonesia based on a doctor's diagnosis in people aged  $\geq 15$  years in 2013 is 1.5% and in 2018 it increased to 2.0% (Moeloe, 2015).

DM management includes education, diet management, activity management and treatment, people with diabetes (diabetes) are required to be obedient in the management of diabetes for life (Damayanti, 2015), including when a disaster occurs. One of the difficulties experienced by people with diabetes during a disaster is in managing the DM diet during the evacuation, the food that is usually found is instant food, where the fiber content is low. Lack of exercise, stress and lack of fiber intake causes an

increase in blood sugar levels (Rimbawan, 2004). Fiber can decrease the efficiency of absorption of carbohydrates which will lead to a rapid increase in blood sugar levels. Fiber also improves the function of the pancreas in producing insulin, so that the pancreas works lighter. Dietary fiber that can improve pancreatic function is soluble fiber, such as pectin, guar gum, and glucomannan, which are found in many vegetables, fruits and tubers (Rimbawan, 2004). Vegetables and fruit generally do not last long, especially for logistics in disaster areas. Other food ingredients that contain fiber and last relatively longer include brown rice.

Brown rice has a high fiber content of 3.33 grams while white rice is only 0.74 grams in 100 grams of food (Nuryani, 2013). Relatively high fiber usually contains low sugar levels and low fat content, fiber also affects the glycemic index level, the low glycemic index category is  $<50$  (Rimbawan, 2004). Foods with a low glycemic index will reduce the rate of glucose absorption and suppress the secretion of the hormone insulin. pancreas so there is no spike in blood glucose levels 2 hours postprandial. The

response of blood glucose levels 2 hours postprandial to the glycemic index is influenced, among others, by the degree of insulin resistance, body fat, physical activity, genetics. According to the 2012 Aurora study, the benefits of foods with low GI values and high fiber lead to lower post-prandial blood glucose levels and insulin responses so that according to research The benefits of foods with low GI values and high fiber cause post-prandial blood glucose levels and insulin response lower levels so as to improve lipid profiles and reduce the incidence of insulin resistance (Sambou et al., 2014)

Brown rice belongs to the low glycemic index, namely 68% while white rice is 73% (Atkinson et al., 2008). Brown rice can also be made into flour to be processed into a food product. Flour is a semi-finished product that undergoes a grinding process. Brown rice flour is recommended because flour has good durability, is easy to mix, fortise, shape and cook faster as needed. Brown rice flour in 100 grams of food contains nutrients consisting of 333.6 kcal of energy, 9.4 g of protein, 3.3 g of vitamin B, 72.2 g of carbohydrates, 4.6 g of fiber and 11.3 g of water. (List of Indonesian Food Ingredients Composition, 2009).

Protein is a nutrient that is also needed by the body. Peanuts are a source of vegetable protein. Peanuts as a consumption material can be processed in various forms of food such as cakes, snacks, or other processed products (Andrianto & N. Indarto, 2004). The nutritional content contained in 100 grams of peanuts is 30.4 grams of protein, 47 fat, 7 grams, 11.7 grams carbohydrates and 2.5 grams fiber (Purwono & Purnamawati, 2007). The content in brown rice flour and peanuts is expected to produce products that are rich in fiber, so that it can control blood sugar levels in the body, according to the results of research which also states that the higher the fiber intake, the lower the blood sugar levels in the body (Kadir, 2018).

Foods that contain enough fiber, for example, are snack bars. Snack bars are snack bars made from cereals and nuts which are currently favored by people of various age groups (Riezalea, 2011). Snack bars can be used as an alternative snack to control blood sugar levels. The nutritional content of a 24-gram snack bar generally contains 2 grams of protein, 3 grams of fat, 15g of carbohydrates, 1 gram of fiber (AKG, 2016). Snack bars can also be

categorized as EFP (Emergency Food Product), which is food that can be used for disaster victims because EFP is food consumed during an emergency that has a variety of nutrients and is good that can meet the daily nutritional needs of each person, namely 2100 kcal. Indonesia is an archipelagic country located at the junction of the world's three plates where this condition makes Indonesia vulnerable to natural disasters, anytime and anywhere (BNPB, 2017)

## 2. Method

The type of research used was quasi experimental. The research design used was a completely randomized design (CRD) consisting of 4 treatments with 3 experimental units and 2 repetitions. The organoleptic test respondents were a fairly trained panelist, as many as 25 people were not sick, had no allergies to the material the researcher would use and signed an informed concern as proof of willingness to participate in this study. Processing and Data Analysis Organoleptic test, panelists who have been selected get each Snack bar on the table that has been coded by the researcher then get a hedonic test form which contains color, smell, taste and texture. With a range of test values for the level of preference 1-6 which include: 1 = very dislike, 2 = very dislike, 3 = dislike, 4 = like, 5 = very like, 6 = very much like very much, bivariate analysis of Kruskal wallis and man whitney. Test of proximate levels: fat protein, moisture content, ash and carbohydrate content, bivariate analysis using One Way Anova, Post Hoc Testt.

## 3. Results and Discussion

### Snackbar Physical Properties

Physical characteristics of brown rice flour and peanut snackbar with a variety of mixing brown rice flour: peanuts which are 100% brown rice flour, 80%: 20%, 60%: 40%, 50%: 50% with 2 repetitions, carried out subjectively includes color, smell, taste and texture which the researcher observes sensory. The snackbar observed by the researcher was 16 pieces with a size of 1x2 cm and a weight of  $\pm$  10 grams, from each repetition of the snackbar taken was 2 pieces randomly. Subjectively the results of the snackbar observation of brown rice flour and peanuts can be seen in Table 1.

Table 1. Physical Properties of Brown Rice and Peanut Snackbar

Snack Bar	Physical Properties			
	Color	Smell	Taste	Texture
A	Dark brown	Very Flavourful Brown Rice Flour	slightly sweet	a little soft
B	Brown	Flavoured Brown Rice Flour	slightly sweet	a little soft
C	Brown	Flavoured Brown Rice Flour	slightly sweet	a little soft
D	Brown	Flavoured Brown Rice Flour	slightly sweet	a little soft

## Snackbar Preferred Level

Tabel 2. Mean Organoleptic Test Results for Snack Bars

Organoleptic test	Mean				P Value
	Snackbar A	Snackbar B	Snackbar C	Snackbar D	
Color	30.82	52.48	52.50	64.20	0.000
Smell	42.14	50.88	51.96	57.02	0.246
Taste	44.50	43.86	53.88	59.76	0.136
Texture	44.38	47.20	51.90	58.52	0.289

Based on the Kruskal Wallis test, the snackbar formulation based on brown rice flour and peanuts on the organoleptic characteristics including color, smell, taste and texture can be seen in Table 2.

Based on table 3, it is known that the data analysis of the level of preference using the Kruskal-Wallis test shows that there is a significant difference in the level of preference for the panelists to the color of the snackbar so that it is continued using the Mann-Whitney test while the smell, taste and texture of the snackbar are not significant ( $p > 0.05$ ).

Table 3. Results of the Level of Favorability towards Snackbar Color (n = 25).

Snack Bar	mean $\pm$ SD	Modus	Categori
A	3.12 $\pm$ 0.93	3	Do not like it much
B	3.88 $\pm$ 0.73	4	Like
C	3.84 $\pm$ 0.94	4	Like
D	4.28 $\pm$ 0.94	5	Really like

Based on the results of the analysis, the level of preference for the snackbar color can be seen in table 3. The assessment of the preference of the snackbar product panelists to the color, obtained the highest rating was treatment D with an average rating of 4.28, while the lowest assessment result was treatment A) with an average rating of 3.12.

Table 4. Results of the level of liking for the smell of snack bar (n = 25)

Snack Bar	mean $\pm$ SD	Modus	Categori
A	3.56 $\pm$ 0.87	4	Like
B	3.88 $\pm$ 0.88	4	Like
C	3.96 $\pm$ 0.73	4	Like
D	4.08 $\pm$ 0.91	4	Like

Table 5. Results of the level of liking for the taste of snack bars (n = 25)

Snack Bar	mean $\pm$ SD	Modus	Categori
A	3,56 $\pm$ 1.50	4	Like
B	3,60 $\pm$ 1.19	4	Like
C	4,04 $\pm$ 1.14	4	Like
D	4,24 $\pm$ 1.09	5	Really like

The results of the level of preference for the snackbar smell can be seen in table 4. Based on the value of the hedonic test results in table 4.4 above 56% of panelists chose answer 4.0 for the smell on snack bars A, B, C and D which were included in the like category. The Kruskal Wallis test results showed that the variation between formulas was not significantly different for the snackbar smell parameter ( $p = 0.246$ ).

The results of the level of preference for the taste of the snack bar can be seen in table 5. Based on the level of liking for taste, your favorite snack bar is D.

Table 6. Results of the Level of Preference for the Snack Bar Texture (n = 25)

Snack Bar	Mean $\pm$ SD	Modus	Categori
A	3.48 $\pm$ 1.08	3	Do not like it much
B	3.60 $\pm$ 0.96	3	Do not like it much
C	3.80 $\pm$ 1.04	3	Do not like it much
D	4.00 $\pm$ 0.91	3	Do not like it much

Based on the results of texture analysis, the results of the level of preference for the texture of the snackbar can be seen in table 6. Based on the value of the hedonic test results, the panelists chose the answer 3.0 for the texture on snack bars A, B, C and D which were included in the dislike category. The summary of the results of the organoleptic test on the snackbar of variations in the composition of brown rice flour and peanuts can be seen in the image below:

Based on Figure 1 shows the color, smell, taste and texture of the snackbar most liked by the panelists is snackbar D.

## Proximate level

Proximate analysis is used to analyze water, ash, fat, crude fiber, protein and carbohydrate content. The results of the snackbar proximate analysis are presented in table 7

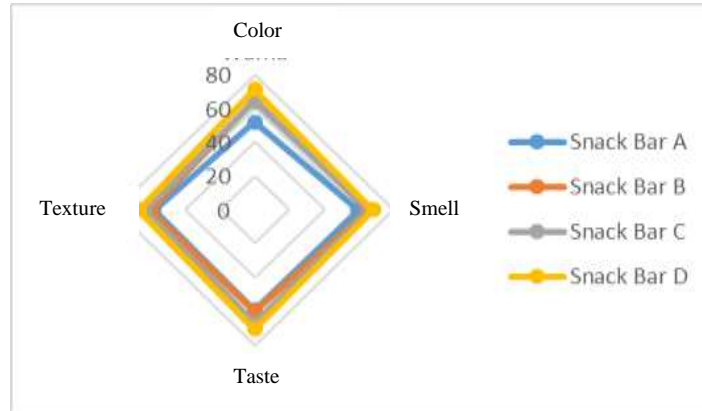


Figure 1. Spider Web organoleptic test results on variations in the composition of brown rice flour and peanuts.

Table 7. Proximate Analysis Results for Snack Bar

Analysis (%db)	Levels (Mean $\pm$ SD)				P Value
	Snack Bar A	Snack Bar B	Snack Bar C	Snack Bar D	
Water	25.57 $\pm$ 0.19	23.37 $\pm$ 0.06	23.76 $\pm$ 0.11	21.73 $\pm$ 0.13	0.000
Ash	2.00 $\pm$ 0.007	2.01 $\pm$ 0.014	2.00 $\pm$ 0.014	2.22 $\pm$ 0.014	0.214
Fat	6.59 $\pm$ 0.41	11.01 $\pm$ 0.45	14.29 $\pm$ 0.59	15.49 $\pm$ 0.39	0.000
Crude Fiber	0.43 $\pm$ 0.08	0.75 $\pm$ 0.17	0.80 $\pm$ 0.13	1.00 $\pm$ 0.02	0.030
Protein	7.01 $\pm$ 0.11	8.45 $\pm$ 0.25	9.01 $\pm$ 0.01	11.63 $\pm$ 0.13	0.000
Carbohydrates by diff	58.83 $\pm$ 0.33	55.16 $\pm$ 0.28	50.93 $\pm$ 0.50	48.93 $\pm$ 0.40	0.000

The highest water content was at snackbar A, the lowest was at snackbar D. The One Way ANOVA test results showed that there was a difference ( $p = 0.000$ ) in the water content of the four snackbar formulations. Based on the results of the ash content test on the snackbar, the highest ash content was the snackbar. The One Way ANOVA test results of the ash content in snack bars A, B, C and D were not different ( $p = 0.214$ ). Based on the results of the fat content test on the snackbar, it is known that the highest fat content is at snackbar D while the lowest fat content is at snackbar A, the results of the One Way ANOVA test on fat content on snackbar A, B, C and D show a significant difference ( $p = 0.000$ ). The results of the Post Hoc test) showed that there were significant differences between treatments. however, snackbar C and snackbar D were not significantly different. Based on the results of the crude fiber content test on the snackbar, the highest crude fiber content was at snackbar D while the lowest crude fiber content was at snackbar A which was 0.43%. The One Way ANOVA test results on crude fiber content on snack bars A, B, C and D showed a significant difference ( $p = 0.030$ ). The results of the follow-up test (Post Hoc test) showed that there was a significant difference between snackbar A and snackbar B, C and D, while snackbar B, snackbar C and snackbar D were not significantly different. Based on the results of the protein content test on snackbar, the highest protein content was at snackbar D while the lowest protein content was at snackbar A. The One Way ANOVA test results on protein

content in snack bars A, B, C and D showed a significant difference ( $p = 0.000$ ). The results of the Post Hoc test showed that there were significant differences between snack bars A, B, C and D. Based on the results of the test, the highest carbohydrate content was on the snackbar while the lowest by diff was on the snackbar D. carbohydrate levels by diff on snackbars A, B, C and D showed a significant difference ( $p = 0.000$ ). The results of the follow-up test (Post Hoc test) showed that there was a significant difference between snack bars A, B, C and D.

#### Physical Properties

Based on the results of physical characteristics, from the formulation, snackbar A produces a more prominent dark brown color, this is because the composition of the brown rice flour is more than that of snackbar B, C, D. The color of rice in brown rice is genetically influenced, due to differences in genes set the aleurone color. the aleurone contains genes that produce anthocyanins which are the source of the red or purple color. Based on the smell, of the 4 different snack bar variations is snack bar A, which has a sharper smell typical of brown rice, because the composition of brown rice is more. The smell of brown rice is also influenced by the shelf life, brown rice has a shorter shelf life than outih rice, when it is -5 months old merh rice will give off a musty smell, because the layer of red skin that is not disososh contains oil, while white rice has an oily layer. these have been lost with the aging

process so that they have a longer shelf life (Damardjati et al., 2000) For taste and texture, all variations have the same taste and texture.

### **Organoleptic Test** **Snack Bar Color**

Based on the Kruskal-Wallis test, it shows that there is a difference in the level of preference for the panelists to the color of the snackbar, while the smell, taste and texture of the snackbar are not significant ( $p > 0.05$ ). The snack bar A is lower based on the organoleptic value of the resulting darker color so that the panelists do not like the color of the snackbar. Anthocyanin pigment that produces a dark red color on the snackbar. A snack bar that is mixed with brown rice flour will darken the color. In accordance with research (Dewi et al., 2016) which states that brown rice flour contains anthocyanins which cause its color to be darker. The snackbar with mixing more brown rice flour will result in a darker snackbar color. The roasting process also affects the color on the snackbar. The brownish color on the snackbar is caused during the roasting process, a reaction between the reducing sugar and the primary amino group in the protein occurs which is called the Maillard reaction (Winarno, 2012).

### **Smell**

The smell that the panelists liked the most was snackbar D. The smell that has the lowest rating is snackbar A. This dislike is due to the resulting snackbar having an unpleasant smell which causes the panelists to dislike it. The higher the brown rice flour used, the stronger the smell of brown rice in the snackbar will be. Brown rice flour has a distinctive smell, which is unpleasant and this smell is still there even though the cooking process has been carried out. The smell will arise and feel stronger during cooking processes such as roasting, boiling or frying (Febriana, 2014)

### **Taste**

The taste that was most favored by the panelists was snackbar D while the taste that had the lowest rating was snackbar A. The large amount of rice flour caused a more dominant taste in the resulting product. Thoif's research states that the more brown rice flour is added, the more distinctive taste of brown rice flour is felt (Thoif, 2014). Research conducted by (Dewi et al., 2016) stated that steamed sponge with variations in mixing brown rice flour of 40%: 60%, 50%: 50% and 60%: 40% began to taste typical of brown rice because brown rice can affect the taste of steamed sponge. The more the use of brown rice flour, the more distinctive the brown rice itself will taste (Dewi et al., 2016). The results showed that the higher the use of peanuts in the snackbar product, the higher the level of preference for the taste attributes. This is influenced by peanuts which have a sweet taste and

are widely used to make various types of cakes. The fat content in peanuts with a high fat content of 46% - 52% is very likely to be the cause of the delicious and savory taste of peanuts (Heddy, 1994). The resulting snackbar taste is also influenced by other additives used such as sugar, salt, margarine, skim milk and raisins.

### **Texture**

The most preferred texture of the panelists was snackbar D, the texture that had the lowest rating was snackbar A. Based on the results of the research, it can be concluded that the more rice flour is added, the resulting texture of the snack bar will be coarser and disliked by the panelists. The higher the addition of brown rice flour, the coarser the texture of the resulting snackbar will be. Research conducted by (Pranata, 2005) states that the higher the addition of brown rice flour (30%) to sweet bread, the texture will be disliked by the panelists (Pranata, 2005). The addition of peanuts in the snackbar gives a crunchy texture to the snackbar. The balanced mixing of the basic ingredients between brown rice flour and peanuts makes the snackbar texture a little soft. The addition of other additives such as margarine to the dough provides a shortening function and a texture function so that the product becomes softer.

### **Proximate Test** **Water content**

The highest water content was at snackbar A while the lowest water content was at snackbar D, this value is quite high compared to the water content of commercial snackbar (maximum 11.40%) and water content of snackbar according to USDA standard 25048 (maximum 11.26%). Water content with SNI standards, because the snackbar-like product has not been registered in SNI and the water content test is one of the limitations of researchers who cannot compare with SNI and cannot know for sure for product storage for a long period of time. The water content of the snack bar is greatly influenced by the ingredients used. In this test the resulting snackbar has a high water content compared to previous research, namely research by Rinda et al (2018) which produced a snackbar with an average water content of 17.70%. The water content of the snackbar ranges from 6.85% to 16.91%, while according to (Septiani, 2016) research, the water content of food items that are safe for storage is less than 14% so that snack bars with low water content are sufficient to prevent the growth of bacteria and molds (Septiani, 2016) .

### **Ash content**

Based on the results of the ash content test on the snackbar, it is known that the snackbar with the lowest addition of brown rice flour has a high ash content. From the test results showed that the lower the use of brown rice flour, the higher the ash content

on the snackbar. The highest ash content was on the snackbar D. The ash content obtained in this test was not much different from the research conducted by Rufaizah (2011), namely a snackbar made from sorghum flour which has an ash content ranging from 1.47 to 2.17% (Rufaizah, 2011). Research conducted by Rahmawati (2017) produced a snackbar made from coconut dregs flour and green bean flour which had an ash content of 2.4%. This result is higher than the ash content produced in this study, namely 2.22%. Based on the results of research conducted by Natalia (2010), the ash content of snackbar products on the market is between 2.20 - 2.50%. The resulting ash content can be affected by the addition of peanut containing minerals such as iron, phosphate, magnesium, calcium and other minerals (Natalia, 2010).

#### **Fat level**

Based on the results of the fat content test on the snackbar, it is known that the snackbar with the addition of brown rice flour has the most low fat content. Based on the results of this test, it shows that the lower the use of brown rice flour, the higher the fat content in the snackbar. The highest fat content was at snackbar D while the lowest fat content was at snackbar A. The fat content of the brown rice flour and peanut formulations A, B, and C snackbar had met the SNI 01-4216-1996 standards regarding "over control diet", namely the range 1, 40% -14%, while snackbar D did not meet the SNI standard because it exceeded the SNI standard for fat content.

Research conducted by Suloi et al (2020) obtained nutritional content of snackbar samples with the formulation of peanuts and bananas, namely 23.9 grams of protein, 48.1 grams of carbohydrates and 31.0 grams of fat. This study was specifically designed by utilizing local food that contains a low glycemic index, namely peanuts with a glycemic index of 29 - 45 (Rimbawan, 2004). Food in the form of snack food bars for people with Diabetes Mellitus is recommended for 10-15% of the daily calorie requirement per serving, and can be consumed 2-3 times a day. In his research, snack food bars were designed with a calorie content of 210 kcal / bar consisting of 55% carbohydrates (27.5 g), 20% protein (10 g) and 25% fat (27.5 g) of the calorie needs of individual snacks. serving of snack food bars. Snack food bars used as Emergency Food Products (EFP) must have an energy content of 2100 kcal consisting of 35 - 45% fat. The amount of fat is about 9-12 grams per 50 grams. The fat content obtained in this study was about 15 grams per 100 grams.

This means that the fat content in the snack bar is still below the recommendation for DM sufferers (Sunarta, 2018). The fat content of the snackbar produced in this study was not much different from the previous study, namely research by (Rufaizah, 2011) which produced fat content of

3.77% to 14.63% on the snackbar with sorghum flour as the base ingredient. Based on the results of this study, it is known that the higher the addition of peanuts will increase the amount of fat in the snackbar. In 100 grams of peanuts contain 42.7% fat. When compared with commercial products on the market, namely soyjoy raisin peanut, the fat content is 6 grams / 30 grams or about 20.0% [28].

#### **Crude Fiber Content**

Based on the results of the crude fiber content test on the snackbar, it is known that the snackbar with the addition of brown rice flour has the most low crude fiber content. The results showed that the lower the use of brown rice flour, the higher the crude fiber content in the snackbar. Research (Amalia, 2011), regarding the manufacture of snack bars made from tempeh flour and dried jackfruit, the resulting fiber content is relatively high because tempeh flour contains fiber. This is because the basic ingredients for making the snack bar itself use tempeh flour which has a higher fiber value in tempeh than the fiber content in jackfruit, with a fiber content in tempeh flour of 4.8% and in jackfruit 1.6%.

The highest crude fiber content was at snackbar D which was 1.00% while the lowest crude fiber content was at snackbar A. Based on the research results, it is known that the more the addition of peanuts, the higher the crude fiber of the snackbar. In 100 grams of peanuts contain 31% fiber.

#### **Protein Content**

Based on the results of the protein content test on the snackbar, it is known that the snackbar with the addition of brown rice flour has the most low protein content. The results showed that the lower the use of brown rice flour, the higher the protein content in the snackbar. The highest protein content was at snackbar D while the lowest protein content was at snackbar A which was 7.01%. The protein content contained in the snackbar of brown rice flour and peanuts did not meet the SNI 01-4216-1996 standards regarding "over control diet" foods, namely the range of 20-50%.

Based on the test results, it was found that the highest protein content was at snackbar D. The high protein content in snackbar D was due to peanuts containing a lot of protein. The nutritional content of peanuts per 100 grams consists of 43% protein, 34% fat, 8% carbohydrates, 31% fiber, 25% vitamin E and some mineral content (Penny, 2005). This shows that peanuts increase protein content in the snackbar. The lowest protein content was at snackbar A (100% brown rice flour) with an average value of 7.01%. This is presumably because there is no addition of peanuts. Low protein content indicates a small protein source content in the fortification used (Huda et al., 2010). The results of this test when compared with previous studies are a snackbar made

from sorghum which has a protein content value of 7.03% to 14.10 %. If you compare this snackbar with commercial products on the market, namely soyjoy raisin peanut, the protein content in the snackbar is 4 grams / 30 grams or 13%. Snackbar D has lower protein, namely 11.63%. This is due to too long the cooking and drying process at high temperatures.

Sunarta's research (2018) in his book "Snack Food Bars Low Glycemic Index", snack food bars used as Emergency Food Products (EFP) must have an energy content of 2100 kcal consisting of 10-15% protein. The recommended protein is about 7.9 grams per 50 grams to avoid kidney disorders and excessive thirst. The protein content obtained in this study was around 11.63 grams per 100 grams.

#### 2.4.3.6. Carbohydrate levels by difference

Based on the results of the carbohydrate content test on the snackbar, it is known that the snackbar with the addition of brown rice flour has the highest carbohydrate content by diff. The results showed that the lower the use of brown rice flour, the lower the carbohydrate content by diff on the snack bar. The highest carbohydrate content by diff was at snackbar A (100% brown rice flour), which was 58.83%, while the lowest by diff was at snackbar D (50% brown rice flour: 50% peanut), which was 48.93%.

Research (Kadir, 2018) in his book "Low Glycemic Index Snack Food Bars", snack food bars used as Emergency Food Products (EFP) must have an energy content of 2100 kcal consisting of 40 - 50% carbohydrates. The largest macronutrient making up EFP is carbohydrates. The recommended amount of carbohydrates is around 23 - 35 grams per 50 grams. Patients with diabetes mellitus are recommended to consume foods with high fiber, low glycemic index and low carbohydrates so that blood sugar can be controlled (Setyowati, 2013). Research conducted by Setyowati (2013) modified brownies as a snack for people with diabetes mellitus. The results of the research on macro nutrition and fiber obtained that brownies that met the dietary requirements of diabetes mellitus sufferers were peanut brownies with protein content of 11.96 grams per 100 grams, fat 23.68 grams per 100 grams and carbohydrates 35.89 grams per 100 grams. fiber of 24.86 grams per 100 grams. Peanut brownies are also accepted by people with diabetes. The levels of carbohydrates obtained in the Setyowati study differed greatly from this study

that is 48.93 grams per 100 grams. These carbohydrate levels are recommended for consumption by people with diabetes mellitus.

The carbohydrates obtained in the previous research Snackbar ranged from 70.92% to 91.1% (Rufaizah, 2011). When compared with the snackbar in this study, it is not much different. The value of the best formulated carbohydrates is 58.83% higher than the snack bars on the market which are 45.1 - 45.9% (Natalia, 2010). The higher the addition of brown rice

flour, the higher the carbohydrate content. According to (Indriyani et al., 2013) in 100 grams of brown rice, there are 77.6 grams of carbohydrates. The abundant nutritional content in brown rice is due to the processing of red rice which is different from white rice, which does not go through the milling phase.

The results of the Proximate Content Analysis showed that there were significant differences in the water, fat, crude fiber, protein and carbohydrate content in the four snackbar formulas, while there was no significant difference in the ash content. In this test, the highest water content was obtained at snackbar A while the lowest water content was on snackbar D. The highest ash content was on snackbar D and the lowest ash content was on snackbar A and C. The highest fat content was on snackbar D while the lowest fat content was on snackbar A. The highest crude fiber content was on snackbar D while the lowest crude fiber content was on snackbar A. The highest protein content was on snackbar D while the lowest protein content was on snackbar A. The highest carbohydrate content was on snackbar A while the lowest was on snackbar D.

#### 4. Conclusions and Suggestions

Based on the physical properties of the four formulations, the color and smell of snackbar A are different from other snack bars, while the taste and texture of all formulations are the same. The organoleptic test showed that there was a significant difference in the color of the snackbar, while the smell, taste and texture of the snackbar were not significant. The highest assessment of the level of preference for color, smell, taste and texture is on snackbar D (50% brown rice flour: 50% peanut). Proximate analysis shows that there are differences in water content, fat, crude fiber, protein and carbohydrates in the four snackbar formulas, while there is no difference in the ash content.

Suggestions this research is modification of the snackbar formula needs to be done in order to increase the panelist's acceptance of the product and increase the texture to resemble the texture of the snackbar in general, namely sticky and crunchy. In this study, most of the panelists gave a dislike of the texture of the four snackbar variations. Further modifications to improve the texture of the snackbar need to be done. The chopped peanuts that are not too soft on the snackbar are able to make the snackbar crisper and the addition of honey for the topping can make this snackbar sticky. The main ingredients used need to be modified to make the snackbar color more attractive. In further research, further research should be carried out on the shelf life of the product so that it can be seen the duration of a good snackbar to be consumed.

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## 6. References

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