FORMULATION AND CHARACTERIZATION OF LOW CALORIC SNACKFOOD BARS BASED ON GOROHO BANANA FLOUR (*Musa acuminate, Sp*)

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Abstract

Commonly, the snack food bars in the market were made of high-calorie materials which cannot be consumed by certain people such as those who are on low-calorie diet namely diabetes patients, obesity and those who were maintaining the body weight. The research aimed to gain the best formulation of raw materials that produced chemical characteristics, organoleptic test and calorie value for 70 kcal/bar. It applied one factor completely randomized design with three replications during the determination of the best formulation by the Bayes method. Result of this work found that the formulation of raw materials of snack food bars influenced chemical characteristics and organoleptic of snack food bars. Beside that formulation 1 is the best formulation of raw materials of snack food bars which containing fat content for 7.43%, 13.67% protein, 62, 70% carbohydrate, 2.5% ash and water content for 14.72%. Then, the acceptance level of panellists on texture, colour and aroma were relatively liked by them. Also, it obtained low calorie for 68.14 kcal/bar that could be consumed for 2-3 bars in a day to meet snack need for 10-15% out of daily calorie need.

Keywords: Snack food bars, snack diabetes, goroho banana flour, low calorie

INTRODUCTION

Snack or what is known as Snack food is a snack consumed or between the main meals of the day and can help meet the nutritional needs of each day. One of the many snacks on the market today is a snack in the shape of a stick, so it is called snack food bars.

The lifestyle of people who tend to be aware of the importance of health and the high level of community activity causes food needs not to be limited to meeting conventional nutritional needs for the body and satisfying mouths with good taste. The food expected to maintain health and fitness, safe for consumption and practical in general ingredients high calories on a low-calorie diet cannot be consumed by people who are on a low-calorie diet such as type two diabetes mellitus, obese people, *moreover, to diet. Snack food bars* Low-calorie results from this study are expected to meet the nutritional needs of each day. The raw materials used in the manufacture of low-calorie snack food bars are goroho banana flour, tofu pulp flour, VCO, red dragon fruit and egg white. In this snack food bar formulation, the use of goroho banana flour is a source of carbohydrates, tofu dregs flour as a source of protein, VCO as a source of fat, red dragon fruit as a flavour and colour giver for snack food bars, and the use of egg whites as a binder for snack food dough bars.

It is recommended that snack food bars contain 10-15% of your daily calorie requirement (2100kkl) per serving and can be consumed at 2-3 bars in one day. In this study, snack food bars were designed with a calorie content of 70kkl per bar consisting of 55% carbohydrates (11.38g), 20% protein (2.63g), 25% fat (1.56g) of the calorie needs of a snack per one dose. They were serving snack food bars. Calories of snack food bars are obtained by converting carbohydrates, fats, and proteins which produce 9kkl per gram for fat and 4kkl per gram for carbohydrates and protein. The total calories of snack food

bars are taken into consideration in determining serving sizes because they play a role in providing sufficient energy for activities and maintaining ideal body weight.

Snack food made from goroho banana flour has never been done before. The combination of goroho banana flour, tofu dregs flour, VCO, red dragon fruit and egg white is expected to produce snack food bars with a good level of consumer acceptance and have good chemical characteristics, especially to meet daily calorie needs. The purpose of this study is to determine the best raw material formula for snack food bars based on sensory characteristics, chemistry, calorie content using the Bayes method. In addition, to determine the effect of the raw material formula on the chemical and organoleptic characteristics of snack food bars made from goroho banana flour.

MATERIALS AND METHODS

The materials used in this study were goroho banana, tofu dregs flavour, dragon fruit, VCO, and egg white. While the analytical material used is the material needed for chemical analysis. The tools used in this study are the tools that will be used in making goroho banana flour (stainless steel baking sheet for blanching, stove, grater, knife, cutting board, aluminium foil, oven container, grinder, 80mesh sieve and glass jar). Equipment used in making tofu dregs flour (container, cloth for wringing, wok, stove and spatula for roasting, and 80 mesh sieve). Equipment used in making dragon fruit dough (knife, blender, and container). Equipment used in making snack food bars (toaster ovens, scales, mixers, moulds, aluminium foil, pans and spatulas).

Research methods

Making Goroho Banana Flour (Putra, 2012)

Goroho bananas with a harvest age of 80-90 days are sorted and then dipped, namely by putting the goroho banana and its skin in boiling water (90ºC) for 5 minutes, then cooled, peeled and weighed. After that, slice it into thin strips using a slicer. The banana slices were then dried using a dryer at 60ºC for 10 hours. After drying, the banana chips are removed and aired at room temperature and mashed using a grinder, then sieved with an 80 mesh sieve.

Making Tofu Dregs Flour (Noor, 2012)

Making tofu dregs flour begins with the stage of washing tofu dregs using clean water, then reducing the moisture content by squeezing it using a cloth, which is then roasted on low heat for 45-60 minutes and sifting the finished tofu dregs flour using an 80mesh sieve.

Raw Material Characterization

Furthermore, the characteristic of raw materials by carrying out a proximate analysis of the main raw materials for the manufacture of snack food bars. The analysis was carried out for the main raw materials, namely goroho banana flour and tofu pulp flour. For other ingredients such as dragon fruit, VCO, and egg white, the proximate content is taken based on previous literature.

The formulation of raw materials used for making snack food bars

At this stage, data from the analysis of the main raw materials and other raw materials are used to determine the ratio of materials to be made. In addition, the total energy production will also be calculated using the mass balance principle with the help of Microsoft Excel*Solver*(Sitanggang, 2008). The basis for calculating the product energy is with a total energy of 70kkl per car can be seen in Table 1.

Table 1. Raw Material Formulation for Each Bar

Raw material	Formula 1 (g)	Formula 2 (g)	Formula 3 (g)	Formula 4 (g)
Goroho Banana Flour	11.0	11.0	9.5	10.0
Tofu Dregs Flour	2.0	3,3	5.0	4.0
VCO	1.4	1,1	1.0	1,2
Dragon fruit	10.0	8.0	5.0	7.0
Egg whites	16.5	13.0	12.0	13.0

The Process of Making Snack Food Bars (Kasim et al., 2015)

The process of making snack food bars consists of several stages, namely weighing the ingredients, mixing the ingredients (mixing), printing the dough, roasting with an oven, cooling (cooling) and packaging (packing). All ingredients used to make snack food bars are weighed according to the results of 4 raw material formulations with three repetitions. Then do the mixing of the ingredients starting with mixing the goroho banana flour and tofu pulp flour (dry ingredients). At the same time, dragon fruit that has been blended until smooth is mixed with VCO and egg whites for 10 minutes (Wet Material). The dry mixture is then added to the wet ingredients mixture and stirred until well blended. After the dough is finished, proceed with the printing of snack food bars using aluminium bar-shaped moulds measuring 10cm x 3cm with a thickness of 1.3cm. Next is a gradual roasting process, namely by initial roasting at 100oC for 20 minutes, and then continued at 160OC for 40 minutes (Kasim et al., 2017). After being cooked, the bars are cooled for 30 minutes and then packed in aluminium-plastic packaging (Chanda, 2010; USAID, 2007).

Testing Procedure
Organoleptic Test (Soekarto, 1981)

Organoleptic testing is a test based on the sensing process. Sensing is defined as a physio-psychological process, namely awareness or recognition of the sensory organs of the properties of objects due to stimuli received by the sensory organs from these objects. The organoleptic test was carried out using the hedonic preference test method. The hedonic method is a preference level test for texture, taste, aroma and colour. Samples that have been coded are presented randomly to the panellists, then the panellists (30 people) are asked to give a value according to the level of preference. The number of scales used is 7 test scales (1 = very dislike, 2 = dislike, 3 = slightly dislike , 4 = neutral, 5 = somewhat likes, 6 = likes, and 7 = very likes).

Proximate Analysis
Moisture content, protein content, fat content and ash content followed the AOAC procedure (1995). Determination of carbohydrate levels using the method by difference.

Calorie calculation (Budianto, 2009)
Calculation of calorie count for low-calorie snack food bars made from goroho banana flour is done by converting the values of carbohydrates, fats and proteins, where 9kkl per gram for fat, 4 kcal per gram for carbohydrates, and 4 kcal per gram for protein.

Data analysis
The data processing in this study used a completely randomized design method (CRD) with three replications and consisted of one factor, namely the formula for the raw material for snack food bars. Data are analyzed with the help of the SPSS application where if the Significance Value is greater than 0.005 (no significant effect) then there is no need for further testing. If the Significance Value is less than 0.005 (significant effect), then further testing should be carried out using Tukey's analysis at the 5% significance level.

Determination of the Best Formula
The best formula for snack food bars will be determined by the Bayes method. Bayes method is a technique that can be used to analyze the best decision making from a number of alternatives with the aim of producing optimal yields. The optimal decisions to produce, various criteria need to be considered (Marimin, 204). Decision making using the Bayes method is carried out by quantifying the likelihood of an event occurring and expressed by a number between 0 and 1 or the conversion scale (Marimin, 2004). The Bayes equation used to calculate alternative values is often simplified to:

Information :
Total score = total final score of the alternative.
Valuej = value of the i-th alternative on the i-criteria
Krij = level o

$$\text{Total nilai} = \sum_{j=i}^{m} Nilai_{ij} \left(Krit_j\right)$$

on

RESULTS AND DISCUSSION

Effect of Raw Material Formulation on Organoleptic Analysis of Snack *Food Bars* Low Calories made from Goroho Banana Flour

Organoleptic analysis in foodstuffs is very important and is a method to determine the level of panellist acceptance of snack products *food bars* resulting from. Organoleptic test results for snack food bars made from 4 raw material formulas can be seen in Table 2.

Table 2. Organoleptic Analysis Results

	Parameter			
	Aroma	Colour	Texture	Taste
F1	6.30	6.37	6,07	3.73
F2	5.40	5.67	5.43	3.20
F3	5,50	4.83	4.93	2.50
F4	5.23	5,6	5.03	2.97

Aroma

The organoleptic test results in Table 1 show that the aroma of snack food bars with the highest acceptance is the formula one treatment which has an average of 6.30 on the liking rating scale, while the snack food bars with the lowest acceptance of aroma parameters is the treatment formula. 4, which has an average of 5.23 on the rating scale rather like it. The results of the analysis of variance obtained F count 3,741 and value (P <0.05), which concluded that there was a significant influence between the four formulas on the aroma attributes of snack food bars. Tukey's continued test results showed that the aroma of snack food bars in Formula 1 was different from the formula. 2, formula 3, and formula 4.

The aroma of the snack food bars is obtained from several constituent ingredients such as goroho banana flour, tofu pulp flour, and VCO. Goroho banana flour has a distinctive aroma, so the amount of goroho banana flour is more, and the amount of VCO is more in formula 1 (as much as 11 grams and 1.4 grams) compared to other formulas, resulting in a fragrant aroma of snack food bars and is liked by panellists. VCO smells good and has a distinct coconut taste, according to Winarno (1995) coconut oil contains phenolic compounds such as tocopherol. In the food and beverage industry, phenolic compounds play a role in providing a distinctive aroma to food and beverage products (Roy, 2010). The smell is one of the criteria for food quality. The aroma of food determines the delicacy of the food or food product. The smell is directly related to the five senses, which can be recognized when it is in the form of vapour. In addition, chemical reactions that occur during the processing process may also produce aroma compounds. The Maillard reaction can produce an aroma compound called Furaneol (Ladamay, 2014).

Colour

Based on the results of the organoleptic testing that has been carried out, it is found that the snack food bars with the highest acceptance power are the formula one treatment which has an average of 6.37 in the liking range with the lowest acceptance of the colour parameter is the treatment formula 3, which has an average of 4.83 on a neutral rating scale. The results of the analysis of variance show that the F count is 11.913 and the Value (P <0.05), which concludes that there is a significant influence. Significant between the four formulas on aroma attributes *snack food bars.* Tukey's other test results show that the colour of the snack food bars in Formula 2 and Formula 4 is the same.

The colour of the snack food bars is very much influenced by the raw material, namely dragon fruit. The more dragon fruit is used (Formula 1), the higher the panellist's preference for the colour of the snack food bars, and the less the number of dragon fruit (Formula 3), the lower the panellist's preference for colour. Formula 2 and formula 4 have almost the same number of dragon fruit, namely 8 grams and 7 grams, so the colour of the snack food bars produced by formulas 2 and 4 is the same. Dragon fruit contains anthocyanin and beta-carotene compounds. Anthocyanins are dyes that play a red colour and have the potential to become natural dyes for food and can be used as an alternative to synthetic dyes that are safer for health. The beta-carotene content in red dragon fruit is 0.005-0.012 mg / 100 grams (Peter, 2008). Apart from dragon fruit, the colour of the snack food bars is influenced by the Maillard reaction that occurs due to the high temperature, which makes the snack food bars slightly brown. The Maillard reaction can occur due to the interaction of amino groups from protein with carbonyl to melanoidin, a brown compound (Winarno, 2004).

Texture

The texture of the snack food bar made from formula one is preferred compared to snack food bars from other formulas with an average value of 6.07 on the liking rating scale. While the snack bar with the lowest acceptance of texture parameters is the treatment formula 3, which has value The average score of 4.93 on the rating scale is rather like. The results of the analysis of variance obtained the results of F counted 6968 and Value (P <0.05), which concluded that there was a significant effect between the

four formulas on the texture attributes of snack food bars. Tukey continued test results shows that the text of snack bars in Formula 2, Formula 3, and Formula 4 are the same.

Formula 1 has a higher preference value than formula three because the ratio of egg whites in formula 1 is more (16.5 grams) than in formula 3 (12 grams). The ratio of more tofu dregs flour and less egg white makes formula 3 has a soft, crumbly texture, so it has low acceptability. This is in accordance with the statement of Suryani (2007) which states that egg white plays a role in forming a more compact dough so that it is preferred by panellists.The texture is closely related to water content, the lower the water content, the texture of the snack food bars, the more brittle and crumbling. This is because the water content in the egg white and dragon fruit will be absorbed by the tofu dregs flour, which has a high enough fibre content. Tofu pulp flour contains 3.23% crude fibre in 100 grams of ingredients. Chandra (2010) states that the more tofu dregs flour used will result in a cracked and crumbled texture. According to Pateda (2017), the criteria for a compact texture is the texture of snack food bars when they are broken it does not produce too many scattered crumbs so that it is preferred by panellists.

Taste

Based on the results of the organoleptic testing that has been carried out, it is found that the taste of snack food bars with the highest acceptance is formula one which has an average of 3.73 (scale 4) on a neutral rating scale, while snack food bars with the lowest acceptance of colour parameters is treatment. Formula 3, which has an average value of 2.50 on the dislike rating scale. The results of the analysis of variance obtained F count 13,631 and value (P <0.05), which concluded that there was a significant influence between the four formulas on the taste attributes of snack food bars. Tukey's continued test results showed that snack food taste bars in Formula 2 and Formula 4 were the same.

The results of panellists' assessment of the taste parameters of snack food bars have low acceptance when compared with the parameters of aroma, colour, and texture. The low level of acceptance by panellists towards the taste of snack food bars is because the resulting snack food bars have a less sweet taste.

The taste of snack food bars is influenced by the basic ingredients used, namely goroho banana flour, tofu dregs flour, VCO, dragon fruit, and egg white. goroho banana flour. The highest level of preference for barrister snack food is in formula 1, where 2 grams and 11 grams of tofu dregs flour and goroho banana flour are used, while the lowest level of preference is in formula 3, where tofu pulp flour and goroho banana flour are 5 grams and 9.5 grams. The more pulp tofu used the manufacture of snack food bars, the fewer characteristics of other ingredients, such as the sweet taste of goroho banana flour.

Effect of Raw Material Formulation on Chemical Analysis of Snack Food Bars Low Calories made from Goroho Banana Flour

Proximate analysis of snack food bars aims to determine the nutritional value of snack food bars. The analysis includes protein content, glue content, moisture content, ash content and carbohydrate content. The results of the chemical testing of snack food bars can be seen in Table 3:

Table 3. Results of Chemical Analyses of Snack Food Bar from 4 Raw Material Formulas

	Parameters (%)			
	Fat	Protein	Carbohydrate	Water
F1	7.43	13.31	62.05	14.71
F2	7,26	13.54	56.77	20.17
F3	7.22	13.93	63.00	13.50
F4	7.31	13.67	58.14	18.65

Fat level

The fat content value of low-calorie snack food bars made from goroho banana flour for all the differences in raw material formulas ranged from 7.22% - 7.43%. The lowest percentage of fat content was in formula 3, namely 7.22%, while the highest percentage of fat content was in formula 1, namely 7.43%. The results of the analysis of variance obtained a significance value of 0.845 (P> 0.05), which concluded that there was no significant effect between the four formulas on the fat content of snack food bars. This is because the total fat content in the four formulas has been formulated in the same amount, in snack food bars the fat is formulated as much as 25% in 70kkl per bar.

The biggest contributor to fat in snack food bars is VCO. The main component of VCO is about 90% saturated fatty acids and about 10% unsaturated fatty acids. The saturated fatty acids of VCO are dominated by lauric acid. VCO contains ± 53% lauric acid and about 7% caprylic acid, both of which are medium-chain fatty acids, commonly known as Medium Chain Fatty Acid (MCFA). Meanwhile, according to Price (2004), VCO contains 92% saturated fat, 6% monounsaturated fat and 2% unsaturated poly fat (Wardani, 2007). VCO contains high medium and short-chain saturated fatty acids, which are about 92%, such as lauric acid and capric acid (caprylic acid). Meanwhile, other types of oil have more long-chain saturated fatty acids. In the metabolic system, long-chain saturated fatty acids can cause the risk of diseases such as obesity, high blood pressure, narrowed blood vessels, heart attack, stroke, diabetes, and cancer. Apart from VCO, other raw materials such as goroho banana flour, tofu pulp flour, and dragon fruit also contribute to fat in the snack food bar formula, although in small amounts.

Protein

Protein is one of the important macromolecules. Apart from functioning as a protein structure builder, it can also act as a contributor to energy with a total of 4 kilocalories per gram. Protein functions as a structure builder through the coagulation process in the roasting process.

The value of the protein content of low-calorie snack food bars made from goroho banana flour on all the differences in raw material formulas ranged from 13.31% -13.93%. The lowest percentage of protein content was in formula 1, namely 13.31%, while the highest percentage of protein content was in formula 3, which was 13.93%. The results of the analysis of variance obtained a significance value of 0.269 (P> 0.05), which means that there is no significant effect between the four formulas on the protein content of snack food bars.

In this study, snack food bars have been formulated to contain 25% protein. Based on the analysis, the protein content of snack food bars has decreased after the roasting process. The decrease in protein content in snack food bars is caused by the type of protein in the snack food bars raw material, namely protein in egg whites. The main protein contained in egg whites is ovalbumin which is easily denatured at a temperature of 60-70oC, so the more egg whites in the snack food bar formulation, the higher the decrease in protein that occurs due to roasting snack food bars at temperatures greater than 70oC. In addition, the decrease in protein content in snack food bars can be caused by protein damage due to Maillard reactions that occur during the roasting process. The Maillard reaction causes the release of protein amine groups which means that the number of amines that are exchanged in the proximate analysis is also reduced. Food processing greatly affects the damage that occurs to protein. The higher the temperature and the longer the processing time, the higher the protein damage that occurs in these foods (Sundari et al., 2015).

Carbohydrate

The value of carbohydrate content of low-calorie snack food bars made from goroho banana flour on all the differences in the raw material formula ranges from 56.77% - 63.00%. The lowest percentage of carbohydrate content is in formula 2, namely 56.77%, while the highest percentage of carbohydrate content is in formula 3, which is 63.00%. The results of the analysis of variance obtained a significance value of 0.000 (P <0.05), which concluded that there was a significant effect between the four formulas on the carbohydrate content of snack food bars.

The carbohydrate content calculated by difference is influenced by other nutritional components, namely protein, fat, water and ash, the higher the other nutritional components, the lower the carbohydrate content and vice versa if the other nutritional components are lower, the higher the carbohydrate content (Fatkurrahman et al., 2012). The biggest source of carbohydrates in snack food bars comes from goroho banana flour, based on the results of the characterization of raw materials, it is known that 100 grams of goroho bananas contain 77.34% carbohydrates, besides tofu dregs, flour and dragon fruit are also contributors of carbohydrates in snack food bars even though in a small amount.

Water content

The moisture content value of low-calorie snack food bars made from goroho banana flour for all the differences in raw material formulas ranged from 20.17% - 13.50%. The percentage of the lowest water content value was in formula 3, namely 13.50%, while the highest percentage of water content was in formula 2, which was 20.17%. The results of the analysis of variance obtained a significance value of 0.000 (P <0.05), which concluded that there was a significant effect between the four formulas on the moisture content of snack food bars. Tukey's other test results show that the moisture content of snack food bars in formula 1, formula 2, formula 3, and formula 4 is different. This is because the amount of wet ingredients from the four formulas is not the same, so it can affect the water content in the resulting product.

Formula 2 has the highest water content, which is 20.17% because in formula two the amount of wet ingredients used is 8 grams of dragon fruit and 13 grams of egg white, while formula 3 has the lowest water content, namely 13.50% the number of wet ingredients used is 5 grams of dragon fruit and 12 grams of egg whites. The moisture content of snack food bars is also influenced by tofu dregs flour, the more the number of tofu dregs flour, the lower the moisture content of the snack food bars, this is influenced by the fibre content in tofu dregs of 3.23% (Rahmawati, 2010), in line with the research. Mediati (2010) states that fibre has the property of easily absorbing water, so that the more use of tofu pulp flour, the more it absorbs liquid which makes it difficult for the water to be evaporated.

Ash content

The value of ash content of low-calorie snack food bars made from goroho banana flour for all the differences in raw material formulas ranges from 2.50% -2.23%. The lowest percentage of protein content is in formula 2, which is 2.23%, while the highest percentage of ash content is in formula 1, which is 2.50%. The results of the analysis of variance obtained a significance value of 0.107 (P <0.05), which means that there is no significant effect between the four formulas on the moisture content of snack food bars.

Total Calories

*Snack food bar*s low calorie based goroho banana flour is formulated with total calories per bar of 70kkl based on 10-15% of daily calorie requirements (2100kkl), this snack food bar can be consumed 2-3 bars in one day. The total calorie of snack food bars is calculated based on the dry weight of the snack food bars or weight after the roasting process, which is 18.5 grams per bar. Analysis of the total calories of a low-calorie snack food bar made from goroho banana flour with four different formulas is shown in Figure 2.

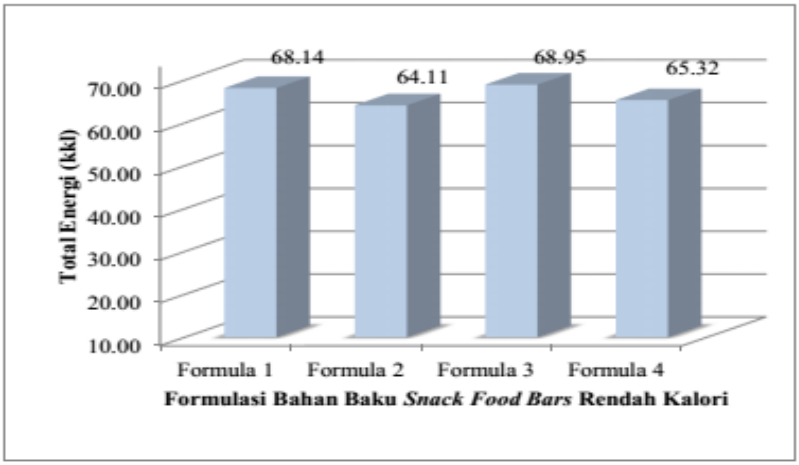

Figure 1. Total Calorie Calculation Results for Snack Food Bars from 4 Raw Material Formulas

The total calorie value of low-calorie snack food bars made from goroho banana flour for all the differences in raw material formulas ranges from 64.11 kkl - 68.95 kkl. The lowest percentage of total calorie value is in formula 2, namely 64.11 kkl, while the highest percentage of total calories is in formula 3, which is 68.95 kkl. The results of the analysis of variance obtained a significance value of 0.000 (P <0.05), which concluded that there was a significant effect between the four formulas on the moisture content of snack food bars. Tukey's other test results show that the moisture content of the snack food bars in formula three and formula 1 are the same and formula two and formula four are the same.

Total calories are obtained by converting the analysis results of protein content, fat content, and carbohydrate content, which yields 9kkl per gram for fat, 4kkl per gram for protein and carbohydrates in the dry weight of snack food bars, which is 18.5 grams. A significant difference in the total energy of the four formulations occurs due to the amount of carbohydrate content which is influenced by the number of other nutrients, especially the moisture content of snack food bars. The moisture content of snack food bars is not included in the limit when formulating snack food bars so that uncontrolled water content during formulation will cause differences in the number of carbohydrates and which will ultimately affect the total energy of snack food bars.

Determination of the Best Formula

Determination of the best formula for low-calorie snack food bars is obtained using the Bayes method. The Bayes method is a technique or technique that can be used to perform analysis in making the best decision from a number of alternatives with the aim of producing optimal results. To produce optimal decisions, various criteria need to be considered (Marimin, 2004 in Ahmad 2013). In this low-calorie snack food bar product, the analysis parameters used are the proximate, total energy, and organoleptic yield parameters. The results of the analysis of the effective index of the Bayes method on low-calorie snack food bar products are presented in Table 4:

Parameter	Formulasi *Snack Food Bars* Rendah Kalori			
	Formula 1	Formula 2	Formula 3	Formula 4
Total Energi	3	1	4	2
Lemak	4	2	3	1
Protein	3	2	4	1
Karbohidrat	3	1	4	2
Rasa	4	3	1	2
Tekstur	4	3	1	2
Aroma	4	2	1	3
Warna	4	3	1	2
Kadar Air	2	4	1	3
Kadar Abu	4	2	3	1
Total Nilai	3.48	2.15	2.51	1.84
Rangking	**1**	**3**	**2**	**4**

Based on the analysis of the Bayes method above, it shows that Formula1 occupies rank 1. This means that formula 1 is the optimal formula that produces the best quality in terms of total calories, chemical content and organoleptic aspects including colour, texture, taste and aroma. Then formula three at rank 2, formula two at rank 3, and formula four at rank 4.

Conclusion

Based on the research results of low-calorie snack food bars that have been done, it can be concluded that:

1. The low-calorie snack food bar raw material formulation made from goroho banana flour has an effect on the chemical and organoleptic characteristics of snack food bars.
2. The best formulation for low-calorie snack food bars made from goroho banana flour is formula 1, with a fat content of 7.43%, the protein content of 13.31%, the carbohydrate content of 62.70%, an ash content of 2.50% and a moisture content of 14.71%, as well as the level of panellists' acceptance of the texture, colour and aroma that the panellists relatively liked, with a total calorie of close to 70 kkl, which is 68.14 kkl, which can be consumed 2-3 bars a day to meet the needs of a snack, which is 10-15% of the total daily calorie requirement.

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