THE PRODUCT OF GREEK YOGHURT WITH BLACK TAPE JAM AS A SNACK HIGH IN FIBER AND ANTIOXIDANT

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Abstract. **Background :** Greek yogurt with black sticky rice tape is a product that uses the main ingredients of black sticky rice tape and yogurt. The purpose of this study was to determine the effect of balance, organoleptic properties and nutritional value of the modified Greek yogurt product with black sticky rice tape as a food high in fiber, antioxidants and a source of probiotics.

Methods : The method used is descriptive research to 30 panelists. The results of the research to the panelists of the most popular greek yogurt product with black sticky rice tape is the 50% : 50% balance which is the most preferred in terms of color, taste, texture, aroma, and overall. The research is an experimental research design with 3 types of formulas, namely 75%: 25%, 50%: 50%, 25%: 75%.

Results : Assessment of organoleptic properties based on color, taste, aroma, texture, and overall of greek yogurt with black tape was carried out using a hedonic test which aims to determine the level of panelists' preference for the product being tested. From the data that has been taken, the panelists prefer the result of Greek yogurt black tape which has the best overall in terms of color, taste, texture and balanced aroma.

Conclusion : The formulation used in this study was the formulation Greek youghut black tape with a ratio of 75%: 25%, 50%: 50%, and 25%: 75%. The highest level of preference from the results of the hedonic test based on color, texture, flavour, scent and overall to the panelists is formula (2) with a balance of 50% black sticky rice jam and 50% Greek yogurt.

Keywords: Greek Yoghurt, Black Tape Jam

Background

The development of food and nutrition science as well as the increasing popularity of functional food products in today's society can bring about changes in eating patterns where many people now tend to prefer natural and healthy foods that function to prevent the emergence of a disease and treat a disease. The human body produces free radicals under any conditions. One of the causes of a weak immune system is the lack of nutritious food intake, especially foods that contain antioxidants. Sources of antioxidants can come from a variety of foods, some examples of which are anthocyanins found in black glutinous rice which is processed into fermented black glutinous rice and also probiotic drinks or what we often know as yogurt products. (Khaira, 2010). One of the types of probiotic drinks that contain these benefits is yogurt, the probiotic bacteria used in making yogurt are Lactobacillus bulgaricus and Streptococcus thermophilus. By modifying plain yogurt into thick yogurt or Greek yogurt, the nutritional composition of the food will have less fat content, twice the protein content and other nutritional values such as carbohydrates and iron

that are much higher than regular yogurt because Greek yogurt contains whey. and lactose are removed or reduced during the filtering process. The purpose of using Greek yogurt in this modified product is also because yogurt is a source of probiotic drinks that have benefits for the digestive system.

Methods

In this study is an experimental study because it provides treatment to the material, namely the effect of the balance of black sticky rice tape and yogurt on the organoleptic properties (color, aroma, taste, texture) which were assessed by the panelists. This research will be carried out in September 2020 - April 2021 which includes preparation, literature study, preliminary research, main research, data processing and data analysis.

Experimental design

This research is an experimental study with a total of 3 treatments, namely:

a. Treatment 1 with the formula of 75% black sticky rice tape and 25% yogurt
b. Treatment 2 with the formula of 50% black sticky rice tape and 50% yogurt
c. Treatment 3 with the formula of 25% black sticky rice tape and 75% yogurt.

In this study there were 3 treatments, in each treatment each preference test was carried out once without repetition. The scheme of analysis of the preference test experiment can be seen in the following picture.

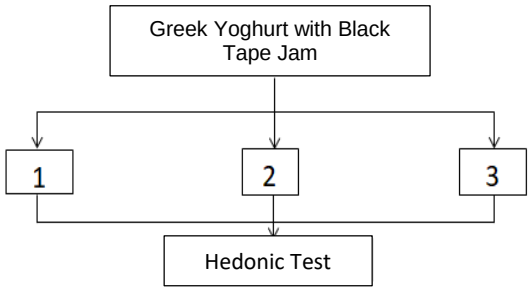

Figure 1. The scheme of analysis of the preference test experiment

Organoleptic Testing Scheme

Information:

1= Greek yogurt jam with black sticky rice formula 1
2= Greek yogurt jam with black sticky rice formula 2
3= Greek yogurt jam tape black glutinous rice formula 3

This research is an experimental design research with a formulation between black sticky rice tape and yogurt. The sample number is determined randomly using a calculator. Can be seen in the following table:

Table 1. Organoleptic Experiment Unit Randomization

RANDOM NUMBER	RANKING	TREATMENT
703	1	A
948	2	B
251	3	C

After getting random numbers, then the ranking order is done from smallest to largest.

Table 2. Organoleptic Experiment Unit Rank

RANDOM NUMBER	RANKING	TREATMENT
251	1	A
703	2	B
948	3	C

Results and Discussion

The procedure for making greek yogurt with black glutinous rice tape begins with making black sticky rice tape which is done by blending the black sticky rice tape and then heating briefly to reduce the water content and extend the shelf life of the black sticky rice tape jam. Mixing the jam with sugar as much as 5% of the number of black sticky rice tape. Furthermore, in making Greek yogurt, it is done by mixing yogurt seeds with pure milk, the ratio of giving yogurt seeds is 10% of the amount of pure milk, then incubation

with a temperature of about 42-45oC is carried out for approximately 8-12 hours, the yogurt that has been incubated is then filtered in the refrigerator to get the final result of thick yogurt, filtering is carried out for approximately 6 hours in the refrigerator. The processed black sticky rice tape and Greek yogurt are then put into cups according to each formulation. The greek yogurt product with black sticky rice jam is a breakthrough in food processing, the manufacture of yogurt which is processed until the final result becomes thick makes the product have a nutritional value that is twice as high as yogurt in general. can be consumed by all age groups, besides that these two products have the advantage of being high in fiber, antioxidants, probiotic bacteria and other nutritional values. Greek yogurt with black sticky rice jam is eaten and stored in cold conditions with a temperature of approximately 4oC to maintain probiotic bacteria in yogurt, intended as a snack.

Organoleptic Properties Test Results

Assessment of organoleptic properties including color, taste, aroma, texture, and overall of greek yogurt with black sticky rice jam was carried out using a hedonic test which aims to determine the level of panelists' preference for the product being tested. The hedonic test was carried out on 30 moderately trained panelists, namely students from the Department of Nutrition, Poltekkes Bandung, who had received food technology courses.

Color

The color produced from the three formulas of greek yogurt, jam, tape, black sticky rice, when mixed together will produce a purple color. There are color differences from formula 1 to 3.

Formula 1 has a darker purple color, formula 2 has a lighter purple color than the color in formula 1, and formula 3 has a light purple color because it contains more milk.

The results of the hedonic test from 30 panelists on the three balances of black sticky rice tape and yogurt 75%: 25%, 50%: 50%, and 25%: 75% on the greek yogurt product with black sticky rice tape can be seen in the following table.

Table 3. Distribution Of Level Of Liked On The Color Of Greek Yoghurt Jam Tape Black

Formula	Levels of pleasure										Amount	
	Very dislike		Do not like		Neutral		Like		Really like			
	N	%	N	%	n	%	N	%	n	%	n	%
F1	0	0	0	0	6	20	14	46.7	10	33.3	30	100
F2	0	0	0	0	0	0	17	56.7	13	43.3	30	100
F3	0	0	0	0	12	40	15	50	3	10	30	100

Based on the table above, it shows that the panelists who stated that they liked and really liked the color of formula one were 80%, then the formula two panelists who stated that they liked and really liked the color was 100% and in the formula of three panelists who stated that they liked and really liked the color. formula that is as much as 60%. In conclusion, the color from formula 2 is the most preferred by the panelists because the color produced by purple is not too dark and not too pale, the purple color produced is fresh purple from black sticky rice tape which has anthocyanin pigments so that it can cause a purple color. Anthocyanins are also able to provide a protective effect against cardiovascular disease, cancer, diabetes mellitus, obesity, and as antioxidants(Suhartatik, 2014).

Flavor

The taste produced in a food product is the most important component in determining whether the product is acceptable or not. The taste produced from the greek yogurt product with black sticky rice jam is sweet sour cream of yogurt. In formula 1 the taste produced is dominantly sweeter and has a stronger alcohol taste than the other formulas because there is more black sticky rice tape jam than Greek yogurt, in formula 2 the resulting taste is balanced sweet and sour because the ratio of yogurt and black sticky rice jam is balanced so as to produce the right product, in the 3 flavor formula the dominant acid is derived from plain Greek yogurt which has a sour taste. The distribution of the level of preference for the taste of greek yogurt with black sticky rice jam can be seen in the following table

Table 4. Distribution Of Level Of Liked To Taste

Formula	Levels of pleasure										Amount	
	Very dislike		Do not like		Neutral		Like		Really like			
	n	%	N	%	n	%	n	%	n	%	N	%
F1	0	0	1	3.3	7	23.3	14	46.7	8	26.7	30	100
F2	0	0	1	3.3	6	20	7	23.4	16	53.3	30	100
F3	0	0	4	13.3	9	30	16	53.3	1	3.3	30	100

Based on the table above, it shows that the panelists who stated that they liked and really liked the taste of formula one were 73.4%, then the two panelists who stated that they liked and really liked the taste were 76.7% and in the formula three panelists who stated they liked and really like the taste of the formula as much as 56.4%. Based on these data, formula 2 is the most preferred by the panelists because it produces a more fitting and balanced taste between sweet and sour. The taste produced by this product comes from black sticky rice tape and yogurt due to fermentation resulting in a sweet, sour and slightly alcoholic taste.

Texture

Texture in the processing of greek yogurt products with black sticky rice jam affects the final result of the whole product. The texture of the greek yogurt with black sticky rice jam produced has a thick and slightly dense texture, the texture of the three formulas is influenced by the density of greek yogurt and black sticky rice tape jam, formula 2 has a balanced texture because the ratio of the product balance is 50%: 50% while Formula 3 has a soft and slightly runny texture because there is more yogurt than black sticky rice tape.

Table 5. Distribution Of Level Of Liked On The Texture

Formula	Levels of pleasure										Amount	
	Very dislike		Do not like		Neutral		Like		Really like			
	N	%	n	%	n	%	N	%	N	%	N	%
F1	0	0	1	3.3	5	16.7	11	36.6	13	43.3	30	100
F2	0	0	0	0	4	13.3	6	20	20	66.7	30	100
F3	0	0	2	6.7	6	20	20	66.7	2	6.7	30	100

Based on the table above, it shows that the panelists who stated that they liked and really liked the texture of formula one were 79.9%, then the two panelists who stated that they liked and really liked the texture were 86.7% and in the formula three panelists who said they liked and really like the texture of the formula as much as 73.4%. Based on these data, the most preferred formula is formula 2 because it produces a balanced and fitting texture between tape jam and greek yogurt, the texture produced from greek yogurt products with black sticky rice jam comes from milk and fiber contained in black glutinous tape jam, Black sticky rice tape has insoluble dietary fiber which functions in smoothing the digestive system, preventing constipation, preventing obesity,(Fauziyah, Afiani, Sulaeman, Fitria, & Syarief, 2020).

Scent

The aroma in any food product can be recognized using the sense of smell, it can affect the quality of a food. From the three product formulas, there are slight differences, namely in formula 1 the aroma produced is stronger because the aroma of tape is more than the other two formulas, in formula 2 the aroma produced is balanced between the distinctive aroma of milk in yogurt and the aroma of alcohol on black sticky rice tape. because the ratio of the formula is 50%: 50%, in formula 3 the aroma of yogurt, namely the distinctive smell of milk, is very strong compared to other formulas because the balance of yogurt is more than the other two formulas. The distribution of panelists' preference for the aroma of greek yogurt with black sticky rice jam can be seen in the following table.

Table 6. Distribution Of Level Of Liked To Scent

Formula	Levels of pleasure										Amount	
	Very dislike		Do not like		Neutral		Like		Really like			
	n	%	n	%	n	%	n	%	n	%	n	%
F1	0	0	1	3.3	6	20	14	46.7	9	30	30	100
F2	0	0	0	0	3	10	14	46.7	13	43.3	30	100
F3	0	0	0	0	12	40	12	40	6	20	30	100

Based on the table above, it shows that the panelists who stated that they liked and really liked the aroma of formula one were 76.7%, then the two panelists who stated that they liked and really liked the aroma were 90% and in the formula three panelists who said they liked and really liked it. on the aroma formula that is as much as 60%. Based on these data, the most preferred formula is formula 2 which has a balanced aroma from the distinctive aroma of fermented black sticky rice jam which produces a slight alcohol aroma from glucose hydrolysis and alcohol oxidation.(Fauziyah rn, 2020), then the aroma of fermented milk which produces a distinctive aroma of fermented milk, this aroma comes from the conversion of milk lactose into lactic acid by lactic acid bacteria. Lactic acid is what causes yogurt to have a sour aroma caused by volatile compounds that are formed and produce a distinctive acid(Yunus, 2017).

Overall

Each hedonic test assessed by the panelists will determine a good overall result, overall or the whole product is a unit of hedonic test components that will determine whether or not the final result of a food product is feasible. The overall results are assessed as a whole starting from the color, aroma, texture and taste which will determine the best formulation and acceptable to the panelists from the three formulations of the greek yogurt product of black sticky rice tape. The distribution of the panelists' preference for the overall Greek yogurt with black sticky rice jam can be seen in the following table.

Table 7. Distribution Of Like Level On Overall

Formula	Levels of pleasure										Amount	
	Very dislike		Do not like		Neutral		Like		Really like			
	N	%	N	%	N	%	N	%	n	%	n	%
F1	0	0	0	0	4	13.3	16	53.3	10	33.3	30	100
F2	0	0	0	0	2	6.7	12	40	16	53.3	30	100
F3	0	0	3	10	10	33.3	16	53.3	1	3.3	30	100

Based on the table above, it shows that the panelists who stated that they liked and really liked the overall formula one were 86.6%, then the two panelists who stated that they liked and really liked the overall was 93.3% and the three panelists who stated they liked and really like the overall formula as much as 56.6%. Based on these data, the most preferred formula is formula 2 which has the best overall in terms of color, taste, texture and balanced aroma and is most favored by the panelists. So that formula 2 is the product with the most superior formulation in the hedonic test and can be well received by the panelists.

Nutritional Value Analysis

Greek yogurt with black sticky rice tape is a food product that has a high fiber content, a source of antioxidants and is a source of probiotics. Based on the results of the nutritional value analysis conducted at the Food Technology Lab, Pasundan University, a nutritional value analysis was carried out based on the most superior product from the organoleptic side, namely formula 2, the results of the analysis can be seen in the following table.

Table 8. Value Analysis

NUTRITIONAL VALUE	GREEK YOGHURT	Black glutinous rice jam
Fat	2.1237 gr	1.0793 gr
Protein	5,660 gr	7.8255 gr
Carbohydrate	7.8324 gr	19.6851 gr
Fiber	0.34 gr	1.6635 gr
Fe	0.1 mg	0.3 mg
Anthocyanins		348.26 ppm

According to the 2019 nutritional adequacy rate, the fiber requirement for adolescent girls and boys is 30.65 g. To meet the needs of fiber from snacks, it must meet 10% of the total daily needs, therefore 3 grams of fiber is needed. When viewed from the nutritional value in formula 2, the total fiber is 2 grams, so that to meet the fiber needs in snacks, teenagers are recommended to consume 1 cup of Greek sticky rice yogurt jam for one consumption. This product is made as an alternative snack high in fiber and antioxidants.

Conclusion

1. The formulation used in this study was the formulation of black sticky rice tape jam and Greek yogurt with a ratio of 75%: 25%, 50%: 50%, and 25%: 75%.
2. The highest level of preference from the results of the hedonic test based on color to the panelists is formula 2 with a balance of 50% black sticky rice jam and 50% Greek yogurt.
3. The highest level of preference from the results of the hedonic test based on taste to the panelists is formula 2 with a balance of 50% black sticky rice jam and 50% Greek yogurt.
4. The highest level of preference from the results of the hedonic test based on aroma to the panelists is formula 2 with a balance of 50% black sticky rice jam and 50% Greek yogurt.
5. The highest level of preference from the hedonic test results based on texture to the panelists is formula 2 with a balance of 50% black sticky rice jam and 50% Greek yogurt.
6. The highest level of preference from the results of the hedonic test based on overalls to the panelists is formula 2 with a balance of 50% black sticky rice jam and 50% Greek yogurt.
7. Formula 2 is the best formula in terms of hedonic testing and the most preferred by panelists because of its balanced taste.

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