Chocolate substitution with sweet soy sauce in making steamed brownies

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Article Info	ABSTRACT
	This study aims to find out how sensory Assessment and receipt of steamed brownies with the substitution of sweet soy sauce differ and how the cost of production differs. The background of this study is that it looks at the opportunity for the presence of sweet soy sauce to be abundant in the market, as well as the opportunity for the absence of steamed brownie products that use sweet soy sauce. The Number of participants in this study amounted to 15 lecturers and students from The International Prima Tourism Polytechnic. The sampling technique is based on Gay and Diehl's theory (1992), which states that in experimental research, at least 15 people are trained panelists who are lecturers who are experts in their fields and students who practice real work in pastry. The hedonic test was conducted on 30 untrained panelists. Data collection is done using questionnaires/questionnaires with an ordinal scale. The analytical methods used are descriptive sensory test analysis and hedonic test. Data analysis techniques group random design analysis techniques and variant analysis (ANOVA) using calculations through Microsoft Excel were used. The study's results based on sensory and hedonic tests showed that steamed brownie products coded B2K2 with an increase in the concentration of sweet soy sauce by 30% is the best formulation based on Color, taste, aroma, Texture, and appearance parameters. It also showed that the cost of producing steamed brownies that use sweet soy sauce was lower than that of steamed brownies control products.

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1. Introduction

One of the foods that is being loved by the public is various types of cakes. One of the types of cakes that are most in demand by the public and is easy to find is brownie cake. Brownies are usually made from dough ingredients such as wheat flour, cooking chocolate, cocoa powder, eggs, and sugar. Brownies can be divided into two types: baked brownies and steamed brownies. The study aimed to determine panelists' preference for brownies from various formulas (taro belitung, cassava flour, and tomato) based on chemical and physical properties and shelf life. And the conclusion of the study can be concluded that the panelists prefer brownies with a composition of 100 gr (40%) cassava flour, 150 gr (60%) steamed taro Belitung, and 80 gr (32%) tomato porridge. This is one of the reasons and motivation for the author to substitute ingredients for steamed brownies by using sweet soy sauce instead of chocolate. One of the ingredients of brownies. Chocolate is widely used in the essential ingredients of baking and baking. However, this time, the author will replace chocolate with sweet soy sauce as the essential ingredient for making steamed brownies. This is based on the opportunity that there are no brownie products that use sweet soy sauce as the essential ingredient and the opportunity to use sweet soy sauce so that it can be used more widely, especially in a dessert dish. Apart from that, the author chose the use of sweet soy sauce in making steamed brownies as a substitute for the use of chocolate bars, and the texture and color of sweet soy sauce are almost the same as the chocolate bars that have been thawed. Based on this, the author was interested in conducting an experiment on steamed brownies with sweet soy sauce substitution as a substitute for chocolate bars.

2. Literature Review

2.1.   Overview of Steamed Brownies

According to [1], brownies have soft and dense textures, are blackish-brown, and have a distinctive chocolate taste. Meanwhile, food diversification efforts can be carried out by replacing or modifying foods made from chocolate bars with local foods in Indonesia. Processed food products that can be used as food alternatives are brownies. One of them is in making steamed brownies with sweet soy sauce substitution. Steamed brownies are a type of brownie whose finish or cooking method is steamed, so the Texture is softer.

Table 1. Standard Steamed Brownies Recipe [10]

No	Ingredients	Qty
1	Medium Flour	80 gr
2	Eggs	4 pcs
3	Castor Sugar	150 gr
4	Melted Butter	120 ml
5	Dark Chocolate Compound	100 gr
6	Chocolate Powder	30 gr
7	Baking Powder	1 tsp
8	Vanilla Essence	1 tsp
9	Emulsifier	7 gr

2.2. Ingredients for Steamed Brownies

The main ingredients used in making steamed brownies are wheat flour, eggs, sugar, butter, baking powder, emulsifier, vanilla extract, and chocolate. Each ingredient is explained below.

a. Wheat flour

According to [2], wheat flour is defined as follows. "Wheat flour is flour or fine powder derived from crushed wheat grains/grains, and it is usually used to make noodles, cakes, and bread. Wheat flour contains many starchy substances, complex carbohydrates insoluble in water. Wheat flour also contains protein in the form of gluten, which plays a role in determining the chewiness of foods made from wheat."

In their preparation, brownies use wheat flour with low to medium protein content. This type of flour helps during the mixing process because it is easier to blend with other ingredients. The disadvantage is that this type of flour is not suitable for making bread. This is because its water absorption capacity is less, so it is difficult to stir and ferment.

b. Eggs

Eggs commonly used in making brownies are purebred chicken eggs. In making brownies, eggs form a skeleton that serves as a softener and binder. In addition, eggs also function for aeration, namely the ability to capture air when the dough is beaten so that the air spreads evenly on the dough. Eggs can affect color, aroma, and taste. The lecithin in the egg yolk has an emulsifying power, while the lutein (egg yolk pigment) can evoke the product's color.

c. Granulated sugar

Sugar is an organic compound of the carbohydrate group that tastes sweet and functions as a energy source. The sugar used in making brownies is granulated sugar. It gives sweetness to brownies; besides that, sugar affects the formation of brownie structure, improves Texture and softness, extends the shelf life of brownies by binding water, and stimulates the formation of good color. Sugar is added to baking to give it a sweet taste and affect the texture, so the high amount of sugar makes the cookie crumbs softer and wetter [8].

d. Butter

Butter is a solid fat that is most often used to process pastry and bakery products. Butter is made by separating cream from milk [7] so that butter has a better taste and fragrance than most other solid fats. According to Henny Krissetiana [11], in its use, butter is divided into two forms.

"Mixed in dough in 2 forms: whipped butter and melted butter. Both will give different flavors to the resulting product. The whipped butter will mix easily when stirred with the egg batter, resulting in a more tender brownie product. This is because the whipped butter is lighter, so the dough will easily rise or rise when baking."

e. Chocolate

According to [6], the definition of chocolate is as follows. "Chocolate is a derivative product of the cocoa plant (Theobroma Cacao), originating in Central America. The part of the plant that is taken to produce chocolate is the seeds contained in cocoa or chocolate fruit. In one

chocolate, there are 30-40 chocolate beans. Chocolate serves to give flavor and color to brownies. The chocolate used in making brownies is chocolate bars and powdered chocolate. Chocolate powder serves to strengthen the taste, aroma, and color of brownies."

f. Baking powder

Baking Powder is a baking ingredient used to manufacture brownies in the form of white powder [6]. This development ingredient serves to develop and improve the Texture of brownies [5].

g. Emulsifier

An emulsifier is a substance that is able to unite two substances that usually cannot come together. An emulsifier is a dough stabilizer so that the dough does not fall easily during shaking, and the final result of steamed brownies becomes softer and more durable [6].

2.3. Equipment used

In order to get good quality brownies, in addition to paying attention to the ingredients used and the formula, equipment is also one of the factors that must be considered in the brownie-making process. The equipment used in making steamed brownies includes the following.

a. Scales

A good scale is the right one to measure size. A bad scale can affect the resulting steamed brownies, as the size of the ingredients being weighed must be precise. The scales used in making steamed brownies for sweet soy sauce substitutions are digital scales.

b. Steamer

A steamer is a tool used to steam a foodstuff. For maximum results in the process of making steamed brownies, the lid of this steamer must be closed using a clean washcloth. This is so that water vapor does not drip into the dough.

c. Mixer

A mixer is a tool used to beat eggs or dough to make it rise optimally.

d. Baking sheets

A baking sheet is a tool used to print dough or a food product so that the dough can be shaped as desired.

e. Kom

A kom is a tool or container used to mix ingredients together to produce a dough. A good compost must be clean from fat or dirt and also dry.

f. Spatula

A spatula is an aid used to mix ingredients so that the dough is evenly mixed.

g. Brush

The brush serves to knead the butter into the pan.

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2.4. Brownies making process
a. Material selection

The first thing that must be considered in the brownie making process is to select ingredients with good quality. The use of good essential ingredients will affect the final result of a good brownie product.

b. Washing

The Washing in question is the cleaning of the tools that will be used for making steamed brownies. This is to ensure the cleanliness of the brownie product.

c. Weighing

This process is carried out to measure the ingredients to be used according to the standard recipe. Ensure all ingredients are weighed accurately to avoid the risk of failure in the brownie-making process.

d. Mixing

Mixing the dough to make brownies includes wheat flour, eggs, sugar, chocolate powder, chocolate bars, sweet soy sauce, melted margarine, emulsifier, baking powder, and vanilla extract. Mixing the dough is done by stirring all the ingredients together using a mixer and spatula to produce an even dough.

e. Steaming

The final process in making steamed brownies is the steaming process. This process takes approximately 30 minutes using medium heat. Make sure the steamer lid is lined with a washcloth; this is to prevent moisture from dripping onto the dough and not resulting in failed and slammed brownies.

2.5. Brownies criteria

Based on the researcher's observations, it can be concluded that the quality of brownies can be seen from the aspects of Color, taste, aroma, Texture, and appearance, which will be explained as follows:

a. Color

The color of brownies is generally dark blackish brown. What affects the color in making brownies is chocolate. The chocolate used in making brownies is cooked chocolate and powdered chocolate. The chocolate is what causes the dark brown or blackish brown color in the brownies.

b. Aroma

A pleasing brownie aroma is that it has a distinctive aroma of chocolate. Ingredients that can affect the aroma of brownies are butter/margarine, eggs, and chocolate. However, the ingredient that dominates the aroma of brownies is chocolate, so the aroma caused by brownies is the typical aroma of chocolate.

c. Texture

The Texture of a good steamed brownie is that it has a moist and smooth texture. This is due to the light dough, which is made with the use of an emulsifier and the beating of eggs and sugar that rises. So that it produces brownies with a smooth and moist texture.

d. Taste

A good brownie flavor is an element of legit sweetness and a slight bitterness from chocolate.

e. Appearance

A good steamed brownie appearance is one that expands perfectly, with brownie pores visible and a moist look.

2.6. Overview of sweet soy sauce

According to [9], explaining the meaning of soy sauce.

"Soy sauce is an extract from the fermentation of soybeans mixed with other ingredients such as sugar, salt, and spices with the aim of improving the taste of food. There are two types of soy sauce: Chinese soy sauce and Japanese soy sauce. Chinese soy sauce is darker and sweeter in color due to the addition of cane sugar; Chinese soy sauce has a higher specific gravity, viscosity, and nitrogen content than Japanese soy sauce. Meanwhile, Japanese soy sauce has a higher amino acid content, especially the amino acid glutamate. "

Table 2. Nutritional Composition of Sweet Soy Sauce per 100 gr

No.	Nutritional Elements	Sum
1	Water	63.0 g
2	Energy	71 kal
3	Protein	5.7 g
4	Fat	1.3 g
5	Carbohydrates	9.0 g
6	Calsium	123 mg

3. Method

The research approach used is experimental. The experimental research method is a research method used to find the effect of certain treatments on others under controlled conditions [14]. In this study, the experiment carried out was the manufacture of brownies made from cooked chocolate as a substitute for sweet soy sauce. The experimental method can be interpreted as the most complete quantitative research approach, in the sense that it meets all the requirements to test the cause-and-effect relationship [15]. Based on the variables studied, the research method used in this study is an experimental descriptive research method. According to [16], "The purpose of descriptive research is to make a systematic, factual and accurate description, description or painting, regarding the facts, properties, and relationships between the phenomena being investigated". The experimental design used in this study is Perfect Random Design, which is a design in which the treatment is applied completely randomly to the experimental units or vice versa [3]. In this study, the experimental design scheme used refers to the Pottest-only Control Design (random on subjects), which is classified as True Experimental Design, which is the type of experiment that is considered good because they have met the

requirements [4]. According to [4], the randomness of the subjects, namely the subjects of the experimental group and the subjects of the comparison group, has been determined randomly. Where the first group or experimental group is given treatment (X) and the other group is not [13].

The experiment in this study was carried out 3 times, meaning that in making brownies with chocolate as a substitution of 20%, 30%, and 40% of sweet soy sauce, the researcher conducted experiments 3 times with the same essential ingredients. This repetition is carried out in order to obtain maximum, standard, and accountable results. The number of samples from this study is that experimental research, the minimum number of samples is 15 subjects [15]. The data analysis method uses organoleptic tests. In this study, the sensory test was carried out by 15 trained panelists who were lecturers at the Prima International Tourism Polytechnic who were experts in their fields, and students who had done OJT in the Pastry Department. A hedonic test or preference test is performed through data processing using a random design. According to [12], the data processing for the Group Random Design is as follows:

$$FK = \frac{\left(\sum X\right)^2}{T*r}$$

$$JK\,(P) = \frac{(X)^2 + ... + (X)^2}{r} - \text{Correction Factors}$$

$$JK\,(S) = \frac{(Y)^2 + ... + (Y)^2}{T} - \text{Correction Factors}$$

$$JK\,(T) = (S^2 + ... + S^2) - FK$$

$$JK\,(G) = JK\,Total - JK\,Panelists - JK\,Sample$$

Definition:

FK   = Correction Factors

JK (P) = Number of Squares of Panelists

JK (S) = Number of squares of Sample

JK (T) = Sum of Total Squares

JK (G) = Number of Squares of Error

X = The sum of each panelist's rating of all samples

Y = The Number of all panelists' ratings for each product/Sample

T = Number of panelists

r = Number of samples

S = Assessment of each Sample.

From the results of the hedonic test, a variant analysis (ANOVA) (table 3.3) was carried out, followed by the Least Significant Difference test with a confidence interval of 95% to determine the influence between treatments.

1. Finding standard errors

$$\sqrt{Average\ Number\ of\ squares\ of\ errors\quad Number\ of\ panelists}$$

2. Find the Least Significant Difference in the Significant Studentized Range table at the 5 % level, for the comparison value is: standard error x least significant difference value.
3. The average calculation results are sorted from the largest to the smallest and then compared with the comparison value.

Table 3. RAK Variant Analysis Table (ANOVA) [12]

Variates	DB	JK	KT	Fh	F 0.5
Panelists (P)	n-1	JK (P)	$\frac{JK\ (P)}{DB\ (P)}$	$\frac{KT\ (P)}{KT\ (G)}$	
Sample (S)	n-1	JK (S)	$\frac{JK\ (S)}{DB\ (S)}$	$\frac{KT\ (S)}{KT\ (G)}$	
Error	db (T) - db (P)-db (S)	JK (G)	$\frac{JK\ (G)}{DB\ (G)}$		
Total (T)	(panelists x sample)-1	JK (T)	$\frac{JK\ (T)}{DB\ (T)}$		

4. Results and Discussion

4.1. Sweet soy sauce steamed brownies experiment

This study gave steamed brownies different treatments with sweet soy sauce concentrations of 20%, 30%, and 40%. Sample products of steamed brownies with sweet soy sauce of 20% are marked with B1K1, Sample products of steamed brownies with sweet soy sauce of 30% are marked with B2K2, Sample products of steamed brownies with sweet soy sauce of 40% are marked with B3K3. For each product, the formulation of the ingredients has not changed, apart from chocolate bars that have been replaced with sweet soy sauce. According to the experiment results above, the third experimental stage is the most suitable for making steamed brownies with sweet soy sauce.

Table 4. Product Experiment of Sweet Soy Sauce Steamed Brownies

No	Sample Product	Experiment and Result
1	B1K1 (80 grams of chocolate: 20 grams of sweet soy sauce)	1st experiment: Sweet soy sauce is infused in au bain marine along with melted margarine and chocolate bars. The result is a very strong, sweet soy sauce aroma that interferes with the taste of steamed brownies. 2nd experiment: Sweet soy sauce is added when the dough has been well mixed or at the end of the mixing process. As a result, the distinctive aroma of sweet soy sauce is not too strong, and some parts are not too even. 3rd experiment: Sweet soy sauce is added with melted chocolate and margarine and is already cooled. The results in terms of taste, aroma, Color, Texture, and appearance for the author are quite good.
2	B2K2 (70 grams of chocolate: 30 grams of sweet soy sauce)	1st experiment: Sweet soy sauce is infused in au bain marine along with melted margarine and chocolate bars. The result is a very strong, sweet soy sauce aroma that interferes with the taste of steamed brownies. 2nd experiment: Sweet soy sauce is added when the dough has been well mixed or at the end of the mixing process. As a result, the distinctive aroma of sweet soy sauce is not too strong, and some parts are not too even. 3rd experiment: Sweet soy sauce is added with melted chocolate and margarine and is already cooled. The results in terms of taste, aroma, Color, Texture, and appearance for the author are quite good.
3	B3K3 (60 grams of chocolate: 40 grams of sweet soy sauce)	1st experiment: Sweet soy sauce is infused in au bain marine along with melted margarine and chocolate bars. The result is a very strong, sweet soy sauce aroma that interferes with the taste of steamed brownies. 2nd experiment: Sweet soy sauce is added when the dough has been well mixed or at the end of the mixing process. As a result, the distinctive aroma of sweet soy sauce is not too strong, and some parts are not too even. 3rd experiment: Sweet soy sauce is added with melted chocolate and margarine and is already cooled. The results in terms of taste, aroma, Color, Texture, and appearance for the author are quite good.

4.2. Organoleptic characteristics
 a. Color

From the results of the organoleptic test, the Variant Analysis (ANOVA) continued by looking for the Least Significant Difference with a confidence interval of 95%, it was known that F calculated 4.59 and F table 3.84 showed that the addition of sweet soy sauce concentration in products coded B2K2 was significantly different from products coded B1K1 and B3K3. However, products coded B1K1 are not significantly different from coded products.

Table 5. Effect of Adding Sweet Soy Sauce Concentration Against the Color of Steamed Brownies

Sweet Soy Sauce Concentration	Grade Point Average
20 gr (B_1K_1)	3,3 b
30 gr (B_2K_2)	4,3 a
40 gr ($B_3K_{3)}$	3,5 b

Remarks: The average value of the treatment followed by the same letter shows no significantly different according to the LSD test with a 95% confidence interval.
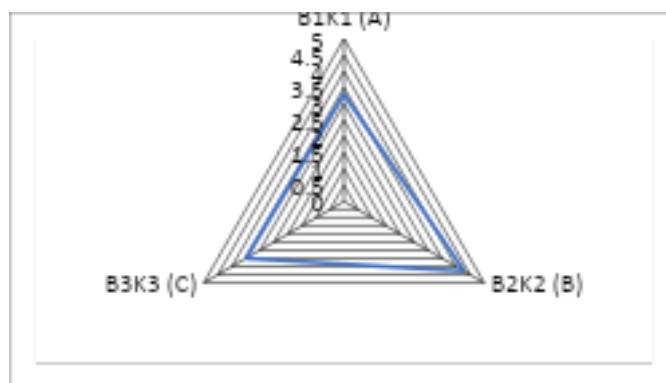

Figure 1. Color Characteristics

The lowest average value for the color of steamed brownies coded B1K1 was 3.3 with a concentration of sweet soy sauce addition of 20 grams. Meanwhile, the highest value coded B2K2 with the addition of sweet soy sauce with a concentration of 30 grams is the preferred treatment with the highest average value of panelists' preference of 4.3 (between dark brown and blackish brown).

b. Taste

From the results of the organoleptic test, the Variable Analysis (ANOVA) continued by looking for the Least Significant Difference with a 95% confidence interval. F was calculated at 3.68, and F in the table was 2.84, showing that the addition of sweet soy sauce concentration in products coded B2K2 was significantly different from products coded B1K1 and B3K3. However, the product coded B1K1 is not significantly different from the product coded B3K3.

Table 6. Effect of Adding Sweet Soy Sauce Concentration Against the Taste of Steamed Brownies

Sweet Soy Sauce Concentration	Grade Point Average
20 gr (B_1K_1)	3,9 b
30 gr (B_2K_2)	4,6 a
40 gr ($B_3K_{3)}$	3,9 b

Remarks: The average value of the treatment followed by the same letter shows no significant difference according to the LSD test with a 95% confidence interval.
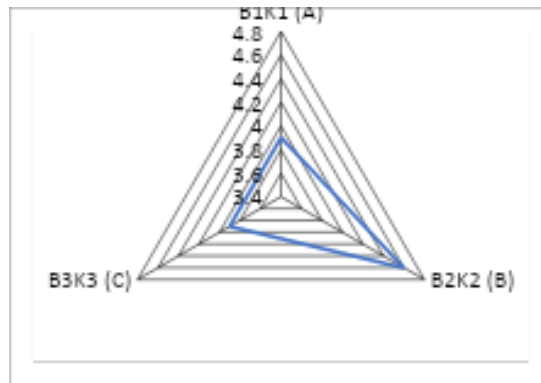
Figure 2. Color Characteristics

The average lowest value for the taste of steamed brownies coded B1K1, and B3K3 was 3.9 with a concentration of sweet soy sauce addition of 20 grams and 40 grams. Meanwhile, the highest value coded B2K2 with the addition of sweet soy sauce with a concentration of 30 grams is the preferred treatment with the highest average value of panelists' preference of 4.3 (between slightly ideal sweet and ideal sweet).

c. Aroma

The average lowest value for the aroma of steamed brownies coded B3K3 was 3.4, with a concentration of sweet soy sauce of 40 grams. Meanwhile, the highest value coded B2K2 with the addition of sweet soy sauce of 30 grams is the preferred treatment, with the highest average value of panelists' preference of 4.1 (between slightly sweet soy sauce flavored and sharp sweet soy sauce).

d. Texture

From the results of the organoleptic test, Variant Analysis (ANOVA) continued by looking for the Least Significant Difference with a confidence interval of 95%, it was known that F count was 1.45 and F table was 2.84, showing that the addition of sweet soy sauce concentration did not differ significantly from the texture preference value.

Table 7. Effect of Adding Sweet Soy Sauce Concentration Against the Texture of Steamed Brownies

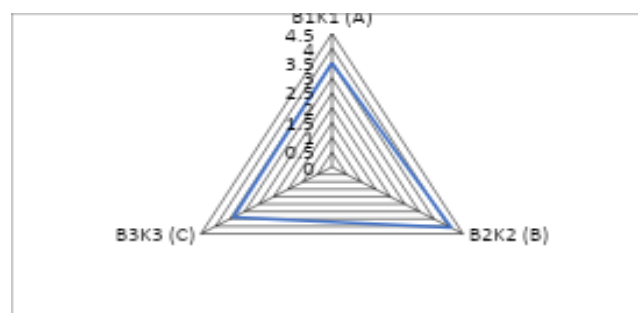| Sweet Soy Sauce Concentration	Grade Point Average
20 gr (B_1K_1)	3,97b
30 gr (B_2K_2)	4,1 a
40 gr (B_3K_3)	3,6 b

Figure 3. Color Characteristics

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The average lowest value for the aroma of steamed brownies coded B3K3 was 3.6, with a concentration of sweet soy sauce of 40 grams. Meanwhile, the highest value coded B2K2 with the addition of sweet soy sauce of 30 grams is the preferred treatment, with the highest average value of panelists' preference of 4.1 (between smooth and slightly smooth).

e. Appearance

From the results of the organoleptic test, the Variant Analysis (ANOVA) continued by looking for the Least Significant Difference with a confidence interval of 95%, it was known that F calculated 2.86 and F table 2.84 showed that the addition of sweet soy sauce concentration in products coded B2K2 was significantly different from products coded B1K1 and B3K3.

Table 8. Effect of Adding Sweet Soy Sauce Concentration Against the Texture of Steamed Brownies

Sweet Soy Sauce Concentration	Grade Point Average
20 gr (B$_1$K$_1$)	3,5b
30 gr (B$_2$K$_2$)	4,2 a
40 gr (B$_3$K$_{3)}$	3,7 b

Remarks: The average value of the treatment followed by the same letter shows no significant difference according to the LSD test with a 95% confidence interval.
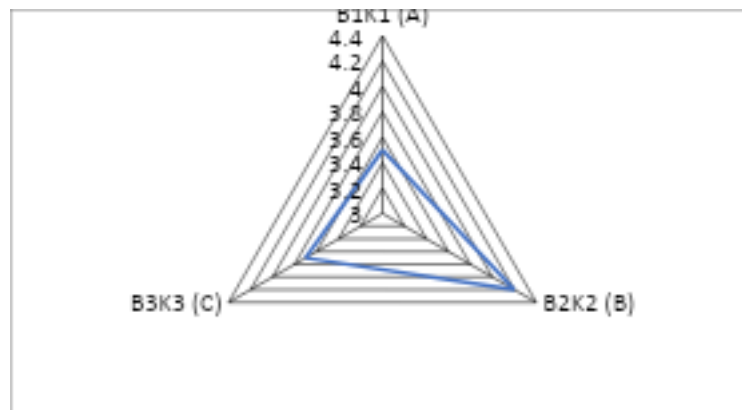

Figure 4. Appearance Characteristics

The table and figure above show that the addition in various concentrations has a noticeably different effect on appearance. In terms of physical appearance, the concentration of B2K2 is significantly different from B1K1 and B3K3. The average lowest value for the aroma of steamed brownies coded B1K1 was 3.5 with a concentration of sweet soy sauce addition of 20 grams. Meanwhile, the highest value coded B2K2 with the addition of sweet soy sauce with a concentration of 30 grams is the preferred treatment with the highest average value of panelists' preference of 4.2 (Between slightly hollow and solid hollow).

The results of the analysis using ANOVA and Least Significant Difference from the three steamed brownie samples with concentrations of 20%, 30%, and 40% showed that the B2K2

sample with a concentration of 30% or 30 grams of sweet soy sauce obtained the highest value and was significantly different from the B1K1 and B3K3 samples.

4.3. Acceptability test

a. Color

From the results of the hedonic test, the Variance Analysis (ANOVA) continued by looking for the Least Significant Difference with a confidence interval of 95%. It was known that F counted 1.21 and F table 2.84 showed that the addition of sweet soy sauce concentration in products coded B2K2 was significantly different from the color of products coded B4K4.

Table 9. Effect of Adding Sweet Soy Sauce Concentration Against the Texture of Steamed Brownies

Sweet Soy Sauce Concentration	Grade Point Average
B_2K_2	4,1 a
B_4K_4	3,8 b

Remarks: The average value of the treatment followed by the same letter shows no significant difference according to the LSD test with a 95% confidence interval.

The lowest average preference value for sweet soy sauce steamed brownies coded B4K4 is 3.8 (between neutral and like). Meanwhile, the highest score coded B2K2 is the preferred treatment with the highest average value of panelists' liking, which is 4.1 (between likes and very likes).

b. Taste

From the results of the hedonic test, the Variant Analysis (ANOVA) continued by looking for the Least Significant Difference with a confidence interval of 95%, it was known that F calculated 1.37 and F table 2.84 showed that the addition of sweet soy sauce concentration in products coded B2K2 was significantly different from the taste of products coded B4K4.

Table 10. Effect of Adding Sweet Soy Sauce Concentration Against the Texture of Steamed Brownies

Sweet Soy Sauce Concentration	Grade Point Average
B_2K_2	4,3 a
B_4K_4	4,0 b

Remarks: The average value of the treatment followed by the same letter shows no significant difference according to the LSD test with a 95% confidence interval.

The lowest average value of preference for steamed brownies with sweet soy sauce coded B4K4 is 4 (neutral). Meanwhile, the highest score coded B2K2 is the preferred treatment with the highest average value of panelists' preference of 4.3 (between likes and very likes).

c. Aroma

The results of the hedonic test showed that the addition of sweet soy sauce concentration in products coded B2K2 was significantly different from the aroma of products coded B4K4.

Table 11. Effect of Adding Sweet Soy Sauce Concentration Against the Texture of Steamed Brownies

Sweet Soy Sauce Concentration	Grade Point Average
B_2K_2	4,2 a
B_4K_4	3,7 b

Remarks: The average value of the treatment followed by the same letter shows no significant difference according to the LSD test with a 95% confidence interval.

The lowest average preference value for sweet soy sauce steamed brownies coded B4K4 was 3.7 (between neutral and like). Meanwhile, the highest score coded B2K2 is the preferred treatment with the highest average panelist preference score of 4.2 (between likes and very likes).

d. Texture

From the results of the hedonic test, the Variance Analysis (ANOVA) continued by looking for the Least Significant Difference with a 95% confidence interval known as an F count of 0.24 and an F table of 2.84. This showed that the addition of sweet soy sauce concentration in products coded B2K2 did not significantly differ from the Texture of products coded B4K4.

Table 12. Effect of Adding Sweet Soy Sauce Concentration Against the Texture of Steamed Brownies

Sweet Soy Sauce Concentration	Grade Point Average
B_2K_2	3,7 a
B_4K_4	3,9 b

Remarks: The average value of the treatment followed by the same letter shows no significant difference according to the LSD test with a 95% confidence interval.

The lowest average preference value for sweet soy sauce steamed brownies coded B2K2 was 3.7 (between neutral and like). Meanwhile, the highest score, coded B4K4, is the preferred treatment with the highest average value of panelists' liking, which is 4.3 (between likes and very likes).

e. Appearance

The results of the test can be seen in the table.

Table 13. Effect of Adding Sweet Soy Sauce Concentration Against the Texture of Steamed Brownies

Sweet Soy Sauce Concentration	Grade Point Average
B_2K_2	4,3 a
B_4K_4	4,1 b

Remarks: The average value of the treatment followed by the same letter shows no significant difference according to the LSD test with a 95% confidence interval.

In appearance, the concentration of B2K2 is significantly different from B4K4 according to the Least Significant Difference test with a confidence interval of 95%. The lowest average preference value for sweet soy sauce steamed brownies coded B4K4 is 4.1 (between likes and very likes). Meanwhile, the highest score coded B2K2 is the preferred treatment with the highest average value of panelists' preference of 4.3 (between likes and very likes).

4.4. Comparative Analysis of Production Cost of Steamed Brownies

Table 14. Production Cost Steamed Brownies Using Chocolate (Control Product)

No	Ingredients	Weight	Price (Rp/Kg)	Total (Rp)
1	Medium Flour	80 gr	10.000	800
2	Eggs	4 pcs	26.000	6.500
3	Castor Sugar	150 gr	16.000	2.400
4	Butter	120 gr	25.000	3.000
5	Dark Chocolate Compound	100 gr	53.000	5.300
6	Chocolate Powder	30 gr	60.000	1.800
7	Baking Powder	5 gr	20.000	100
8	Vanilla Essense	5 gr	100.000	500
9	Emulsifier	7 gr	64.000	450
Total				20.750

Table 15. Production Cost Steamed Brownies using sweet soy sauce with a concentration of 30% sweet soy sauce (B2K2 Product)

No	Ingredients	Weight	Price (Rp/Kg)	Total (Rp)
1	Medium Flour	80 gr	10.000	800
2	Eggs	4 pcs	26.000	6.500
3	Castor Sugar	150 gr	16.000	2.400
4	Butter	120 gr	25.000	3.000
5	Dark Chocolate Compound	70 gr	53.000	3.700
6	Chocolate Powder	30 gr	60.000	1.800
7	Baking Powder	5 gr	20.000	100
8	Vanilla Essense	5 gr	100.000	500
9	Emulsifier	7 gr	64.000	450
10	Kecap Manis	30 gr	23.000	690
Total				19.940

From the two total production costs of each brownie, it was concluded that steamed brownies with 30% sweet soy sauce or b2k2 products were worth Rp.800 lower than steamed brownies using chocolate bars only. So, it can also be concluded that sweet soy sauce can reduce production costs when making steamed brownies compared to chocolate bars alone.

5. Conclusion

Sweet soy sauce can be used as a substitute/substitute for chocolate bars as well. It is proven by the organoleptic and hedonic tests that recognized and steamed brownies coded B2K2 as having the best characteristics and good acceptance in the community. The production cost of steamed brownie products using 30% sweet soy sauce (B2K2) has

proven to be lower/more economical than steamed brownies that use chocolate bars only. The hope is that this steamed brownie product with sweet soy sauce will reduce production costs and generate greater profits if sold.

CREDIT AUTHORSHIP CONTRIBUTION STATEMENT

Author 1: Conceptualization, Writing- original draft. Author 2: Writting – review & editing.

DECLARATION OF COMPETING INTERESTS

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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