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Organoleptic Test of Butter Substitution Formulation with Avocado Flesh (*Persea Americana Mill*) On the *Thousand Layers Roll*

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ABSTRACT

The aim of this study was to describe the effect of the substitution of butter with avocado flesh on the organoleptic properties of the thousand layers roll. The second objective of this study was to describe the community's acceptance of the hedonic test on the substitution of butter with avocado flesh on a thousand layers roll. Based on the Duncan test, the entire treatment had significant differences in texture and taste. Whereas color and scent have differences in treatment F0 and F1 but have significant differences in treatment F2 and F3. This is because the texture and taste are largely determined by the level of maturity of the avocado, not all avocados can be precise and the weight ratio used between treatments. In addition, the fiber and fat in the avocado are stronger so that the more avocado content, the thicker it will be and dominate the rolled legit layer cake. In terms of quality of treatment F3 (60% butter, 40% avocado) has the highest value with color 5.68 (like category), texture (like category), scent 5.48 (somewhat like category) and taste 5.84 (like category). Of the four treatments, there was one treatment that was somewhat disliked by the panelists, namely F0 where the composition of 0% avocado butter with an inaccurate formula resulted in the finished product of rolled legit rolls, which differed greatly from the finished results of the other three treatments (F1, F2 and F3). This is because the avocado content cannot fully replace the function of butter in the thousand layers roll.

KEY WORDS: Avocado flesh; organoleptic; butter; thousand layers roll.

INTRODUCTION

The thousand layers roll is a development of the thousand layers cake, which is a snack that often served as a dessert. In terms of taste, thousand layers cake is loved by many people, with a sweet, sticky taste and scenttic of cinnamon spices, making thousand layers cake one of the most popular cakes in Indonesia. Thousand layers Cake is also known as Lapis Spekuk, as stated by Zulivan (2017) that lapis or spekkoek comes from Dutch. Spekkoek has been known to the Indonesian people since the Dutch occupation. With the basic ingredients of butter, egg yolk, sugar, wheat flour, a thousand layers roll has a soft texture. The amount of butter in the thousand layers roll is the highest of the other basic ingredients. Jones (2003) states that butter is an important ingredient in pastry products that contributes to the taste, texture and overall acceptance rate of the product.

Research conducted (Bagus & Paramita, 2019) found that the use of avocado flesh as a substitute for butter in butter cookies has a 'fairly favorable' acceptance level in aspects of color, scent, texture, taste. The research conducted was based on the fact that several ingredients that can replace butter in cookies include apple sauce (Hayek & Ibrahim, 2013) avocado puree and oat rim (Wekwete & Navder, 2008) and eggplant puree (Doolittle, 2007).

Avocado is common in Indonesia. The part of avocado that is widely used as food is the flesh, usually used as food and beverage ingredients such as juice, mixed ice, jam and so on. Another benefit of avocado is that it is a basic part of cosmetics. In addition, avocado is a fruit that is known to have a lot of nutrients, so it is very beneficial for the health. According to (Arukwe et al., 2012) avocado contains carbohydrates, fat, protein, fiber, vitamins and is also a source of minerals such as zinc, iron, sodium, potassium, phosphorus, calcium, manganese and magnesium. Avocado is also one of the ingredients that is considered the most capable of being used as a substitute for butter. The first person to introduce avocado to

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ISSN 2656-1301 (Online) 2656-1336 (Print)

Europeans was Martin Fernandez de Enciso, one of the leaders of the Spanish troops in 1519. Since then, avocado fruit has been spread and recognized by many people in the world (Adnyana & Arnyana, 2000). Jenison (2007) revealed that avocado has a consistency similar to butter. Figoni (2007) alludes to the advantages of butter compared to other types of fat, that butter provides two advantages which are the distinctive taste of butter and creamy mouthfeel. He also mentioned that no other type of fat can match the two properties of butter.

The explanation above forms the basis of this research. The aim of this study was to describe the effect of the substitution of butter with avocado flesh on the organoleptic properties of the thousand layers roll. The second objective of this study was to describe the community's acceptance of the hedonic test on the substitution of butter with avocado flesh on a thousand layers roll.

This research was conducted for 5 months starting from July 2020 to November 2020. The location of this research is in the Laboratory of the Culinary Arts Study Program, Lombok Tourism Polytechnic.

METHOD

Conceptual Framework

To find out the Organoleptic Test and Hedonic Test on the substitution formulation of butter with avocado flesh (Persea americana mill) on the Thousand Layers Roll with the formulation F0 (100% avocado flesh), F1 (20% butter and 80% avocado flesh), F2 (40% butter and 60% avocado flesh) and F3 (60% butter and 40% avocado flesh), then an organoleptic test or sensory test of color, scent, texture and taste was carried out to 25 panels untrained which will then be known terma / hedonic test which can be seen in the following conceptual framework.

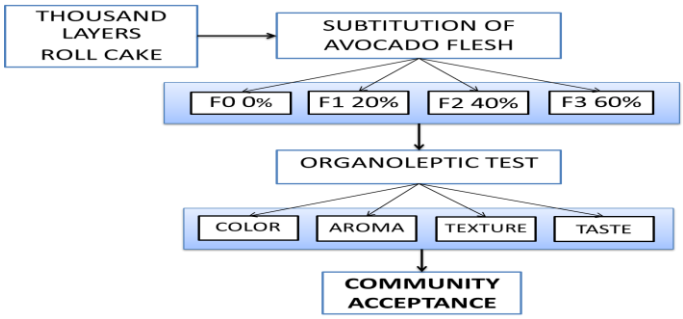

Figure 1.
Source: Authors, 2020

Research Design

For the substitution formulation of the flesh of avocado (Persea americana mill) on the Thousand Layers Roll Cake, using a completely randomized RAL (completely randomized design) experimental design with four levels of treatment, namely F1 20% of avocado flesh, F2 40% of avocado flesh, F3 60% of avocado flesh and F0 without avocado flesh as control of the total weight of butter.

Table 1. Substitute formula for butter with avocado flesh on a thousand layers roll

Ingredients	Amount			
	F0 (0%)	F1 (20%)	F2 (40%)	F3 (60%)
Butter (gr)	0	29	58	87
Avocado Flesh (gr)	145	116	87	58
Egg yolk (gr)	200	200	200	200
Sugar (gr)	90	90	90	90
Medium protein flour (gr)	30	30	30	30
Cornstarch (gr)	7	7	7	7
Milk powder (gr)	14	14	14	14
Total	486	486	486	486

Source: Processed data, 2020

METHODOLOGY

Organoleptic testing is called sensory assessment which is a method of assessment by utilizing the five human senses to observe the texture, color, shape, aroma, taste of a food, beverage or medicinal product. Organoleptic testing plays an important role in product development. Sensory evaluation can be used to assess a desired change or not in a product or formulation ingredients, identify areas for development, evaluate competitor products, observe changes that occur during processing or storage and provide data needed for product promotion (Ayustaningwarno, 2014).

The research design used in this study was the organoleptic test or sensory test with the affective method used to measure the subjective attitudes of consumers towards products based on organoleptic properties. According to (Laksmi, 2012) the organoleptic test was carried out on four parameters, namely color, aroma, taste and texture, because consumers like it or not to a product are influenced by color, aroma, taste and oral stimulation. The human senses are instruments used in sensory analysis, consisting of the senses of sight, smell, taste,

Pusaka: ***Journal of Tourism, Hospitality, Travel and Busines Event***
Volume 4, No. 1 (2022) 11-19
ISSN 2656-1301 (Online) 2656-1336 (Print)

touch and hearing. The method of sensory testing is to use human senses, can be seen for color attributes, by being smelled for aroma attributes, tasted for taste attributes and felt for texture attributes. The results to be obtained are the liking (level of like or dislike) of the product tested by the author namely the substitution of avocado flesh with butter on the Lapis Legit Roll and in this affective method, the writer uses the hedonic test to measure the level of preference for panelists.

The hedonic test is the most widely used test to measure the level of liking for a product. This level of liking is called the hedonic scale, which are Strongly Like, Like, Somewhat Like, Somewhat Dislikes, Dislikes, Strongly Dislikes and others. In the data analysis, the hedonic scale is transformed into a numeric scale (5, 7 or 9 levels of preference) and by using this data, a statistical analysis can be performed. In this study, 7 scales will be used to assess the product under study.
The study used a quantitative type of research involving an untrained panel consisting of 25 people who could be selected based on gender, ethnicity, social level and education, consisting of Lombok Poltekpar staff and the people of Central Lombok. According to (Setyaningsih et al., 2018) the implementation of a sensory test requires a group of people who have quality or give a subjective impression based on certain sensory testing procedures.

The data collection technique started from observation by observing the senses of the avocado flesh, butter and thousand layers roll which was used for data collection in the study. The next step was a questionnaire or questionnaire that is distributed to 25 untrained panels. Sugiyono (2012) suggests that the questionnaire is a data collection technique that is carried out by giving a set of questions or written statements to respondents to answer.

Data from the hedonic test and scoreing test results were then processed using Microsoft Excel for Windows. Statistically analyzed using the SPSS program with variance test (ANOVA) to see the effect of substitution of butter with avocado flesh on the organoleptic variable of the thousand layers roll.

RESULT AND DISCUSSION

The statistical test was carried out to see the organoleptic properties of the butter substitution formulation with avocado flesh on a rolled legit cake with 4 treatments through a single ANOVA test. Before conducting a single ANOVA test, the normality test is first carried out which is presented in Table 2.

Table 2. Normality Test

Tests of Normality							
	Treatments	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Result	Butter 0%	,148	25	,165	,923	25	,059
	Butter 20%	,152	25	,138	,927	25	,075
	Butter 40%	,173	25	,052	,928	25	,078
	Butter 60%	,221	25	,003	,927	25	,074

Source: Processed data, 2020

The results of the analysis of the normality test on 4 treatments using Shapiro-Wilk because the number of panelists is below 50. In table 4.3 it can be seen in the 4 significant columns that the treatment has a value above 0.050, which means that the data is normal and can be tested.

After testing for normality with normal results, the researchers then carried out a sensory test on color, aroma, texture and taste with the following results:

1. Color

The results of the analysis of this study by looking at the organoleptic properties of the color are presented in the data in Figure 2 below:

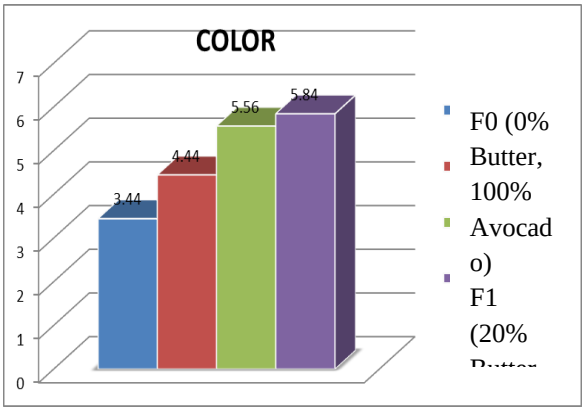

Figure 2. Bar chart of the average color value of the Thousand Layers Roll

In Figure 4.2 above, it can be seen that the average value in each treatment/trial sample shows different numbers. The treatment value F0 occupies the lowest position, which is **3.44** from a scale of 7.00, which means that the color of the F0 treatment is considered **somewhat disliked** by the panelists. While the highest value on color was

Pusaka: ***Journal of Tourism, Hospitality, Travel and Busines Event***
Volume 4, No. 1 (2022) 11-19
ISSN 2656-1301 (Online) 2656-1336 (Print)

occupied by F3 treatment with a value of **5.84** which means that the panelists **like** the color of the composition of 60% butter and 40% avocado.

Furthermore, for the value on a single ANOVA test carried out on color can be seen in Table 3 below:

Table 3. Anova Test for Color

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	90.920	3	30.307	37.377	.000
Within Groups	77.840	96	.811		
Total	168.760	99			

Source: Processed data, 2020

The results of the single ANOVA test in table 4.4 above can describe the organoleptic test of the substitution formulation of butter with avocado on the color of the thousand layers roll, which shows a significant level of 0.000, which is less than a 0.050, which means that the interaction between butter and avocado has a significant effect on the color of the layered legit roll cake. With the significant effect on the finished product, Duncan's continued test can be carried out.

The color difference that occurs in the finished experimental product was caused by the content of avocado which has the natural pigment chlorophyll (Hidayat and Saat, 2006) so that the substitution formulation of F0 which does not mix butter in the dough makes the thousand layers cake look more green than other substitution formulations (F1, F2 and F3). From the results of further analysis of Duncan's test on the color of the thousand layers roll, it can be seen in Table 4 below:

Table 4. Duncan test for color

Treatments	N	Subset for alpha = 0.05		
		1	2	3
BUTTER 0%	25	3.4400		
BUTTER 20%	25		4.4400	
BUTTER 40%	25			5.5600
BUTTER 60%	25			5.8400
Sig.		1.000	1.000	.274

Source: Processed data, 2020

The color table shows the position of butter color 0% (F0) occupies the lowest position and is in a different column with butter 20% (F1), butter 40% (F2) and butter 60% (F3) which means there is a real difference. However, in the treatment of butter 40% (F2) and butter 60% (F3) there was no significant difference because they were in the same column.

2. Aroma

The next process of organoleptic properties is aroma. Aroma on all treatments produces a conclusion which can be seen in Figure 3 in the diagram below:

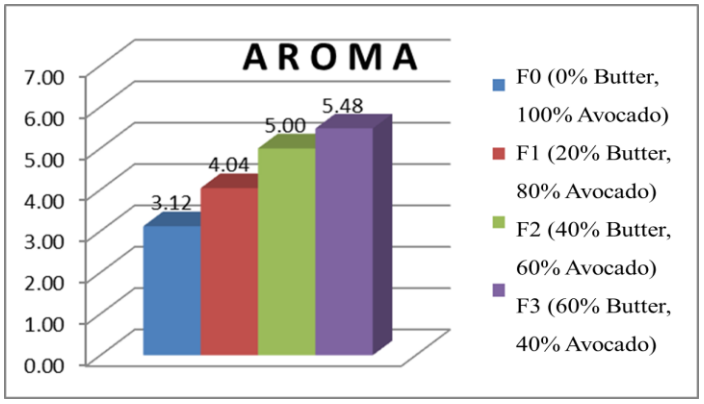

Figure 3.
Source: Processed data, 2020

In Figure 3 above, it can be seen that the average value in each treatment/sample aroma trial shows different numbers. The treatment value F0 occupies the lowest position, which is 3.12 from a scale of 7.00, which means that the F0 treatment aroma is considered somewhat disliked by the panelists. While the highest value on aroma was occupied by F3 treatment with a value of **5.48** which means that the panelists liked the aroma of the composition of 60% butter and 40% avocado.

Furthermore, the value of the single ANOVA test carried out on aroma can be seen in table 6 below:

Table 5. Anova Test for Aroma

Treatment	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	82.350	3	27.450	26.934	.000

Pusaka: ***Journal of Tourism, Hospitality, Travel and Busines Event***
Volume 4, No. 1 (2022) 11-19
ISSN 2656-1301 (Online) 2656-1336 (Print)

Within Groups	97.840	96	1.019		
Total	180.190	99			

Source: Processed data, 2020

The analysis of the results in the single ANOVA test in table 4.6 above can describe the organoleptic test of the substitution formulation of butter with avocado on the lapis legit roll cake aroma, which shows a significant level of 0.000 less than a 0.050, which means that the interaction between butter and avocado has a significant effect on the aroma of thousand layers roll. With the significant effect on the finished product, Duncan's continued test can be carried out.

The aroma on the finished product is different due to the difference in the composition of the avocado fruit content so that the more avocado content, the thicker the avocado aroma on the thousand layers roll.

From the results of further analysis of Duncan's test on the thousand layers rolls aroma can be seen in table 6 below:

Table 6. Duncan Test for Aroma

Treatments	N	Subset for alpha = 0.05		
		1	2	3
BUTTER 0%	25	3.1200		
BUTTER 20%	25		4.0400	
BUTTER 40%	25			5.0000
BUTTER 60%	25			5.4800
Sig.		1.000	1.000	.096
Means for groups in homogeneous subsets are displayed.				

Source: Processed data, 2020

Table 6 aroma in Duncan's continued test shows the position of 0% butter aroma (F0) occupies the lowest position and is in a different column with 20% butter (F1), 40% butter (F2) and 60% butter (F3) which means there is a significant difference. . However, in the treatment of butter 40% (F2) and butter 60% (F3) occupy the same subset table meaning there is no significant difference.

3. Texture

Analysis of the organoleptic properties of the butter texture can be seen in Figure 4 below:

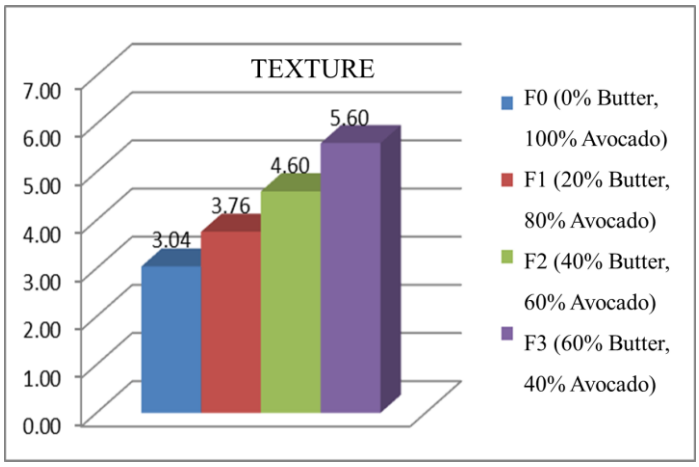

Figure 4.
Source: Processed data, 2020

In Figure 4 above, it can be seen that the average value in each treatment/sample texture trial shows different numbers. The treatment value F0 occupies the lowest position, namely 3.04 from a scale of 7.00, which means that the texture of the F0 treatment is considered somewhat disliked by the panelists. While the highest value on texture is occupied by F3 treatment with a value of 5.60 which means the panelists like the texture of the composition of 60% butter and 40% avocado.

Furthermore, for the value in a single ANOVA test carried out on texture can be seen in Table 7 below:

Table 7. Anova Test for Texture

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	91.230	3	30.410	34.954	.000
Within Groups	83.520	96	.870		
Total	174.750	99			

Source: Processed data, 2020

The research results in the single ANOVA test table 4.8 above can describe the organoleptic test of the substitution formulation of butter with avocado on the texture of the lapis legit roll cake, which shows a significant level of 0.000 less than a 0.050, which means that the interaction

Pusaka: ***Journal of Tourism, Hospitality, Travel and Busines Event***
Volume 4, No. 1 (2022) 11-19
ISSN 2656-1301 (Online) 2656-1336 (Print)

between butter and avocado has a significant effect on the texture of the thousand layers roll. With the significant effect on the finished product, Duncan's continued test can be carried out.

The texture of the finished product is different due to the fiber and fat content in the avocado so that the more avocado content, the wetter, stickier and coarser it will be in the texture of thousand layers roll.

From the results of further analysis of the Duncan test on the texture of the lapis legit roll cake, it can be seen in Table 8 below:

Table 8. Duncan test for texture

Treatments	N	Subset for alpha = 0.05			
		1	2	3	4
BUTTER 0%	25	3.0400			
BUTTER 20%	25		3.7600		
BUTTER 40%	25			4.6000	
BUTTER 60%	25				5.6000
Sig.		1.000	1.000	1.000	1.000

Source: Processed data, 2020

Table 8 textures in the Duncan follow-up test shows that all treatments occupy different subset columns. The 0% butter texture (F0) occupies the lowest position in the subset 1 column. Sequentially, positions 2 and 3 are occupied by butter texture 20% (F1) and butter 40% (F2). And the position of subset of column 4 is occupied by 60% butter texture (F3) and also gets the highest score. It can be concluded that all treatments on texture have significant differences.

4. Taste

In Figure 5, it can be seen that the average value of each treatment / sample taste trial shows different numbers. The treatment value F0 occupies the lowest position, namely 3.00 on a 7.00 scale, which means that the texture of the F0 treatment is considered somewhat disliked by the panelists. While the highest value on taste was occupied by F3 treatment with a value of 5.68, which means that the panelists liked the taste of the composition of 60% butter and 40% avocado.

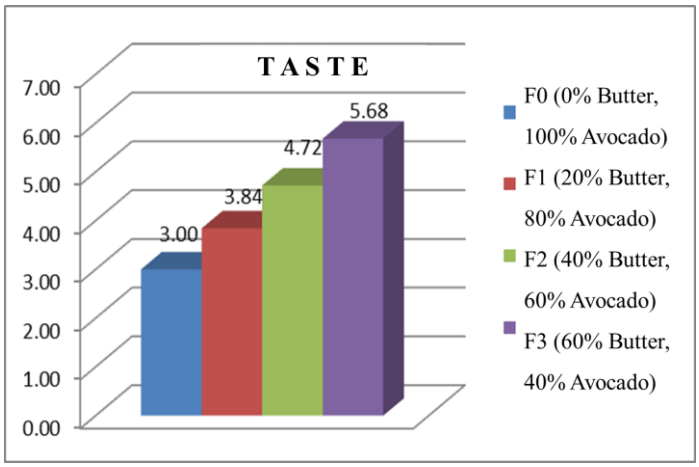

Figure 5.
Source: Processed data, 2020

Furthermore, for the value on a single ANOVA test carried out on taste can be seen in Table 9 below:

Table 9. Anova Test for Taste

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	99.550	3	33.183	40.925	.000
Within Groups	77.840	96	.811		
Total	177.390	99			

Source: Processed data, 2020

In the results of the single ANOVA test table 4.10 above, it can describe the organoleptic test of the substitution formulation of butter with avocado on the taste of the thousand layers roll, which shows a significant level of 0.000, which is less than a 0.050, which means that the interaction between butter and avocado has a significant effect on the taste of thousand layers roll. With the significant effect on the finished product, Duncan's continued test can be carried out.

The taste of the finished product is different due to the fiber and fat content in the avocado which is stronger so that the more avocado content, the thicker it will be and dominate the taste of the rolled legit layer cake. Apart from the differences in size used, other causes of taste can

Pusaka: ***Journal of Tourism, Hospitality, Travel and Busines Event***
Volume 4, No. 1 (2022) 11-19
ISSN 2656-1301 (Online) 2656-1336 (Print)

occur through the selection of avocados, the level of maturity and the process of handling the avocado when processed.

From the results of further analysis of the Duncan test on the texture of the thousand layers roll, it can be seen in Table 10 below:

Table 10. Duncan Test for Taste

Treatments	N	Subset for alpha = 0.05			
		1	2	3	4
BUTTER 0%	25	3.0000			
BUTTER 20%	25		3.8400		
BUTTER 40%	25			4.7200	
BUTTER 60%	25				5.6800
Sig.		1.000	1.000	1.000	1.000

Source: Processed data, 2020

Table 10 taste in Duncan's advanced test shows all treatments occupy different subset columns. The 0% butter flavor (F0) occupies the lowest subset column 1. In sequence, positions 2 and 3 are occupied by 20% butter (F1) and 40% (F2) butter. And the position of subset of column 4 is occupied by 60% butter flavor (F3) and also gets the highest score. It can be concluded that all treatments for taste have a real difference.

5. Hedonic Test

The level of preference in the layer of legit rolls cake by analyzing the organoleptic properties of the color, scent, texture and taste by comparing 4 (four) different treatments is expected to get a liking rating. The assessment criteria used a score of 1-7, namely strongly dislike, dislike, somewhat dislike, neutral, somewhat like, like, strongly like.

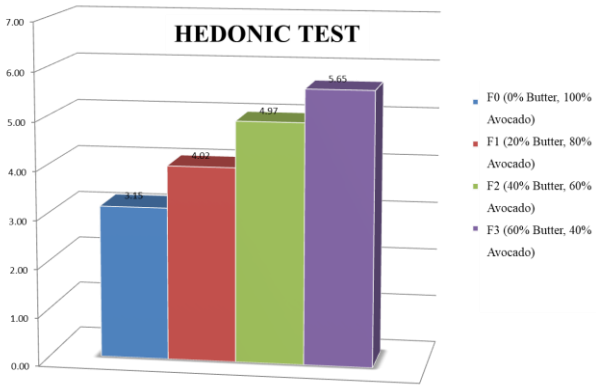

Figure 6.
Source: Processed data, 2020

The data in Figure 4.6 above can be seen that the results of the organoleptic properties with the hedonic test obtained the lowest average value of 3.15 in the F0 treatment (0% butter, 100% avocado) with a slightly dislike category. The highest average value was 5.65 in the F3 treatment (60% butter, 40% avocado) with the like category.

The results of the mean mean above show the difference in numbers in different ranges in each treatment regarding the color, scent, texture and taste of the thousand layers rolls.

Furthermore, the analysis value of the single ANOVA test on preference is presented in Table 11.

Table 11. Anova Test for overall

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	89.632	3	29.877	46.146	.000
Within Groups	62.155	96	.647		
Total	151.787	99			

Source: Processed data, 2020

The results of the single ANOVA test on the organoleptic test of the substitution formulation of butter with avocado flesh on the thousand layers roll had an Fcount of 46.146 with a significant value of 0.000 less than a 0.05 which means that it can be stated that there is a significant effect on the preference of the lapis legit roll cake. Furthermore, the Duncan test must be carried out to determine the difference.

Table 12. Duncan Test Results for Likeness of Thousand Layers Roll

Treatments	N	Subset for alpha = 0.05			
		1	2	3	4
BUTTER 0%	25	3.1500			
BUTTER 20%	25		4.0200		
BUTTER 40%	25			4.9700	
BUTTER 60%	25				5.6500
Sig.		1.000	1.000	1.000	1.000

Source: Processed data, 2020

The Duncan test results in Table 12 explain that each treatment is in a different subset column. In the subset 1 column there is a butter treatment 0% (F0) with a value of 3.1500 which is also the lowest at all levels of color, scent, texture and taste. In the subset columns 2 and 4, respectively, namely the treatment of butter 20% (F1) with a value of 4.0200 and butter 40% (F2) with a value of 4.9700 which can be interpreted as somewhat favored by the panelists. The layer cake product in the subset 4 column, namely 60% butter (F3) with a value of 5.6500, occupies the highest value position, which means that the product is favored by the panelists.

CONCLUSION

Based on the Duncan test, the entire treatment had significant differences in texture and taste. Whereas color and scent have differences in treatment F0 and F1 but have significant differences in treatment F2 and F3. This is because the texture and taste are largely determined by the level of maturity of the avocado, not all avocados can be precise and the weight ratio used between treatments. In addition, the fiber and fat in the avocado are stronger so that the more avocado content, the thicker it will be and dominate the rolled legit layer cake. In terms of quality of treatment F3 (60% butter, 40% avocado) has the highest value with color 5.68 (like category), texture (like category), scent 5.48 (somewhat like category) and taste 5.84 (like category).

Of the four treatments, there was one treatment that was somewhat disliked by the panelists, namely F0 where the composition of 0% avocado butter with an inaccurate formula resulted in the finished product of rolled legit rolls, which differed greatly from the finished results of the other three treatments (F1, F2 and F3). This is because the avocado content cannot fully replace the function of butter in the thousand layers roll.

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