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THE ADDITION OF SURIMI INDIAN MACKEREL (*Rastrelliger kanagurta*) TO THE SENSORY AND CHEMICAL CHARACTERISTICS OF MANTOU

Penambahan Surimi Ikan Kembung (*Rastrelliger kanagurta*) Terhadap Karakteristik Sensori Dan Kimia Mantou

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ABSTRACT

This study aims to determine the most preferred percentage of indian mackerel surimi addition to mantou based on panelist evaluations. The research was conducted from December 2024 to March 2025 using an experimental method with four treatments (0%, 20%, 30%, and 40%) and 20 panelist as the retest. Panelist acceptance was assessed using a hedonic test and Bayes analysis. The hedonic test data were analyzed using the Friedman test. The most preferred mantou sample was further analyzed for its nutritional content through proximate analysis. The results showed no significant differences among treatments in terms of panelist preference. However, the control mantou (0%) and the mantou with 40% Indian mackerel surimi addition had the highest preference scores. The 40% treatment received the highest mean score for appearance (7.90), while the A (0%) control sample scored highest for aroma (8.10) and taste (8.00). Both treatments had the same texture score (7.80). The highest alternative value in the Bayes test was obtained by treatment D (40%) which amounted to 8.03. Proximate analysis revealed that the addition of mackerel surimi tended to increase the nutritional content of mantou, except for carbohydrates. The , 40% surimi mantou had 39.35% moisture, 1.13% ash, 5.17% fat, 10.49% protein, and 43.86% carbohydrates. Meanwhile, the control mantou contained 31.15% moisture, 0.98% ash, 4.57% fat, 8.28% protein, and 55.02% carbohydrates.

Keywords: Nutritional content, Mantou, Surimi mackerel, Bayes test, Hedonic test

ABSTRAK

Penelitian ini bertujuan untuk menentukan persentase penambahan surimi ikan kembung pada mantou yang paling disukai panelis. Penelitian dilaksanakan pada Desember 2024 hingga Maret 2025 menggunakan metode eksperimental dan terdiri atas empat perlakuan (0%, 20%, 30% dan 40%) dan 20 orang panelis sebagai ulangan. Penerimaan panelis dievaluasi menggunakan uji hedonik dan uji Bayes. Data hasil uji hedonik diolah menggunakan uji *Friedman.* Mantou yang paling disukai kemudian dianalisis kandungan gizinya melalui uji

proksimat. Hasil penelitian menunjukkan bahwa tidak terdapat perbedaan nyata antar perlakuan terhadap tingkat kesukaan panelis. Akan tetapi, mantou kontrol 0% (A) dan mantou dengan penambahan surimi ikan kembung 40% (D) memiliki nilai kesukaan tertinggi. Perlakuan 40% memiliki nilai rata-rata tertinggi untuk kenampakan (7,90), sedangkan mantou kontrol A (0%) tertinggi pada aroma (8,10) dan rasa (8,00). Nilai tekstur pada kedua perlakuan adalah sama (7,80). Nilai alternatif pada uji Bayes tertinggi didapatkan oleh perlakuan D (40%) yakni sebesar 8,03. Hasil uji proksimat menunjukkan bahwa penambahan surimi ikan kembung cenderung meningkatkan kandungan gizi mantou, kecuali pada parameter karbohidrat. Mantou dengan penambahan surimi 40% (D) memiliki kadar air 39,35%; kadar abu 1,13%; kadar lemak 5,17%; kadar protein 10,49% dan kadar karbohidrat 43,86%. Sementara itu, mantou kontrol 0% (A) memiliki kadar air 31,15%; kadar abu 0,98%; kadar lemak 4,57%; kadar protein 8,28%; dan kadar karbohidrat 55,02%.

Kata kunci: Kandungan gizi, Mantou, Surimi ikan kembung,Uji Bayes, Uji hedonik

INTRODUCTION

Fish is an excellent source of animal protein for humans because it contributes 57.2% of animal protein, followed by meat at 19.6% and eggs and milk at 23.3% (Indraswari *et al*., 2022). The potential of Indonesia's large fishery resources has not been matched by its consumption level when compared to other countries. Based on statistical data from the Ministry of Marine Affairs and Fisheries (2023), the level of fish consumption in Indonesia increased from 55.16 kg/capita/year in 2021 to 57.27 kg/capita/year in 2022 and reached 57.61 kg/capita/year in 2023. This figure is still much lower than Japan (140 kg/capita/year), Korea (80 kg/capita/year) and Malaysia (70 kg/capita/year) (Djunaidah & Siti, 2017). The low consumption of fish in Indonesia is caused by the lack of public knowledge about the nutritional value and health benefits of fish, as well as limited processing technology that has not been able to produce products according to consumer preferences (Asyari *et al*., 2016). Therefore, collaboration between the food and fisheries industries is needed to create innovative products such as mantou with the addition of fish surimi to meet the nutritional needs of modern society.

Mantou is a typical Chinese food included in the Chinese Steam Bun (CSB) which is made from wheat flour, sourdough, and water through a process of forming, fermentation, testing and steaming (Cao *et al*., 2020). According to Aryani *et al*., (2018), mantou has a low nutritional content which can be seen from the ingredients, namely wheat flour and yeast. Mantou weighing 40 grams has a protein content of 2 g, carbohydrates 24 g, fat 1 g, and energy 120 kcal (Darely, 2020). Efforts to increase the nutritional content of mantou can be done by adding fishery products, one of which is by utilizing fish that are rich in protein such as mackerel (Rastrelliger sp.).

Mackerel is a small pelagic fish that has the potential and is favored by the Indonesian people. Mackerel is widely found, one of which is in the province of West Java. Mackerel production in West Java in 2021 reached 7,764.47 tons according to the West Java Marine and Fisheries Department. According to Aini & Rinawati (2017), mackerel contains high nutrition compared to other fish and has an affordable selling price. Mackerel weighing 100 grams contains 76% water, 125 cal of energy, 22 g of protein, 1 g of fat, 20 mg of calcium, 200 mg of phosphorus, 1 g of iron, 0.05 mg of vitamin A 30 SI and vitamin B 1 (Manurung *et al*., 2017).

The addition of mackerel surimi and the processing process in mantou will affect the properties, both sensory and chemical. The results of Putra & Abdillah's (2021) study regarding the addition of kappa carrageenan to mantou can significantly increase protein content, water content and ash content. On the other hand, carbohydrate levels decreased along with increasing kappa carrageenan concentration. This is in line with the research of Aryani *et al*.,

(2018), namely the addition of a combination of sepat siam flour has an effect on mantou by increasing ash, protein and calcium levels, but reducing water, carbohydrate and phosphorus levels.

Wardani *et al*., (2012), stated that the function of adding nutritional content to a product will be useless if the product is not liked by the public. Measuring the level of preference for a product can be done through a hedonic test involving the use of sensory organs. The quality of food ingredients is not only determined by their chemical composition, but also by the perception of the senses of taste and aroma (Winarno, 2004). Therefore, a hedonic test is needed to find out how much additional mackerel surimi is needed to increase the nutritional content of mantou that is most preferred by panelists.

RESEARCH METHODS

Place and Time

This research was conducted from December 2024 to March 2025. The making of mackerel surimi, mantou and hedonic test were conducted at the Fisheries Product Processing Laboratory, Padjadjaran University. The mantou proximate test was conducted at the PT. Saraswanti Indo Genetech (SIG) Testing Services Laboratory, Bogor.

Research Design

This study used an experimental method, namely the addition of mackerel surimi in making mantou based on the weight of wheat flour consisting of four treatments, including:
Treatment A : Addition of mackerel surimi as much as 0% (control)
Treatment B : Add 20% mackerel surimi
Treatment C : Add 30% mackerel surimi
Treatment D : Add 40% mackerel surimi.

The four treatments were tested on 20 semi-trained panelists consisting of fisheries students, Faculty of Fisheries and Marine Sciences, Padjadjaran University to determine the level of panelists' preference for mantou. The treatment most preferred by the panelists was then tested proximately to determine its nutritional content.

Procedure

Making Mackerel Surimi (*Rastrelliger kanagurta*)

According to Pratama (2018), the making of surimi begins with weeding and cleaning the mackerel from dirt and separating the head, scales, and stomach contents of the fish. Next, the fish is filleted and the white meat and red meat are separated. The white meat is then ground until smooth, washed three times using cold water at a temperature of 1°–5°C with a ratio of 1:3, while adding NaCl as much as 0.3% of the weight of the meat. The water from washing is squeezed with a 100 mesh nylon cloth, washing is done three times. Sugar is added as much as 0.3% of the weight of the surimi and mixed until homogeneous to prevent denaturation during frozen storage. Surimi that has been homogenized in a 15 × 30 cm plastic, then frozen at a temperature of ± -18°C for 1 hour before use.

Making Mantou

The process of making mantou based on Aryani et al., (2018) which has been modified begins by mixing yeast and sugar, then dissolving it in water. Furthermore, salt, margarine, wheat flour, and mackerel surimi are added according to the treatment (concentrations of 0%, 20%, 30%, and 40%) into the yeast-sugar solution, then kneaded until the dough is smooth. The dough that has been formed is placed in a plastic container, covered with a napkin, and left for 20 minutes. After expanding, the gas in the dough is released by piercing the middle, then

the dough is flattened into a rectangle, rolled lengthwise, and cut into ±5 cm sizes. The dough pieces are left again for 30 minutes until they expand, then steamed for 8 minutes.

Table 1. Mantou Formulation with the Addition of Mackerel Surimi

Materials	Treatment			
	A (0%)	B (20%)	C (30%)	D (40%)
Wheat flour (g)	100	100	100	100
Surimi mackerel (g)	0	20	30	40
Warm water (ml)	50	50	50	50
Milk powder (g)	5	5	5	5
Yeast (g)	2	2	2	2
Sugar (g)	20	20	20	20
White butter (g)	8	8	8	8
Salt (g)	1,75	1,75	1,75	1,75

Hypothesis

Based on the framework of thought and preliminary research above, the addition of 30% mackerel surimi produces the most preferred organoleptic characteristics and can increase the nutritional content of the product.

Data Analysis

The hedonic test data were analyzed using non-parametric analysis, namely Friedman's two-way variance analysis, to determine the effect of adding mackerel surimi on the level of mantou preference. Friedman's formula according to (Setiawan, 2005) is as follows:

$$X^2 = \frac{12}{bk\,(k+1)} \sum_{j=1}^{k} (Rj)^2 - 3b\,(k+1)$$

Information :

X^2 = Friedman test statistics
b = Repeat
k = Treatment
Rj^2 = Total ranking of each treatment

If there are the same numbers, the correction factor (FK) is done with the following formula:

$$\text{Correction Factor} = 1 - \frac{\sum T}{bk\,(k^2+1)}$$

The significant value of the observed price X2 can be determined by using critical prices. db = k – 1 ; = 0,05. The decision rule for testing a hypothesis is:

H_0 = Treatment does not give a real difference at the a = 0.05 level
H_1 = The treatment gave a significant difference at the level a = 0.05

The results of the organoleptic test assessment will usually get the same numbers so that an analysis is needed that can provide differences in each treatment in the form of a Bayes test, with the Bayes Equation as follows:

$$Total\ Nilai_i = \sum_{i-1}^{m} Nilai_{ij}\ (Krit_j)$$

Information :

Total $Nilai_i$	= Total final value of the i-th alternative
$Nilai_{ij}$	= Value of the i-th alternative on the j-th criterion
$Nilai_j$	= Level of importance (weight) of the jth criterion
i	= 1,2,3 …. n;n = number of alternatives
j	= 11,2,3 …. n;n = number of criteria

The analysis of the proximate test data for the control and most preferred mantou was carried out descriptively and comparatively with SNI 8371: 2018. The research results are presented in the form of a scientific narrative from which conclusions can be drawn.

RESULT

Level of Likeability

Appearance

Appearance is a parameter that can be observed visually and is the first aspect in the organoleptic assessment by the panelists. The first impression of a good or disliked appearance will lead the panelists to assess other parameters such as smell, taste and texture (Husen, 2022). The average value of the appearance of mantou with the addition of mackerel surimi can be seen in Table 2.

Table 2. Average Appearance of Mantou with the Addition of Mackerel Surimi

Puffer Fish Surimi Treatment (%)	Median	Average Appearance
A (0%)	7	7,2a
B (20%)	7	7,2a
C (30%)	7	7,8a
D (40%)	**7**	**7,9a**

Note: The same letter after the average treatment number indicates no significant difference according to the 5% level of multiple comparison test.

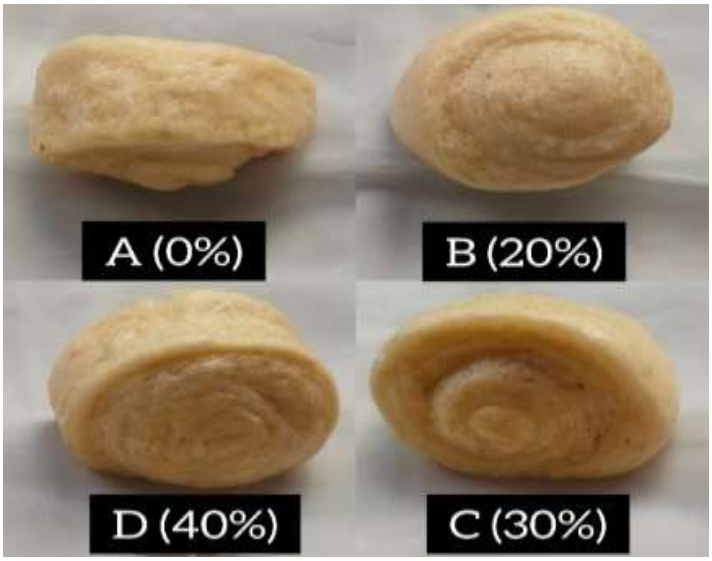

Figure 1. Mantou with Added Mackerel Surimi

Aroma

Aroma is an organoleptic attribute that can be assessed through the sense of smell (nose). The aroma of food products can be assessed by smelling the odor produced by the product. The smell that is smelled will determine the aroma of the food, so the aroma test is very important in the food industry to assess production results (Khalisa et al., 2021). The average value of the aroma of mantou with the addition of mackerel surimi can be seen in Table 3.

Table 3. Average Aroma of Mantou with the Addition of Mackerel Surimi

Puffer Fish Surimi Treatment (%)	Median	Average Aroma
A (0%)	**9**	**8,1a**
B (20%)	7	6,9a
C (30%)	7	7,4a
D (40%)	7	7,0a

Note: The same letters after the average treatment number indicate no significant difference according to the 5% level of multiple comparison test.

Texture

Texture is a sensation felt through pressure and can be observed both visually and when the material is bitten, chewed, swallowed, or touched with fingers (Qamariah *et al*., 2022). The texture of a material is influenced by its physical condition, so its assessment includes aspects of hardness, crispiness, and elasticity (Akbar *et al*., 2019). Testing the texture of mantou with the addition of mackerel surimi, namely touching the surface of the mantou, biting, chewing and swallowing the mantou. The average value of the texture of mantou with the addition of mackerel surimi can be seen in Table 4.

Table 4. Average Texture of Mantou with the Addition of Mackerel Surimi

Puffer Fish Surimi Treatment (%)	Median	Average Texture
A (0%)	**8**	**7,8a**
B (20%)	7	7,5a
C (30%)	7	7,0a
D (40%)	7	7,7a

Note: The same letters after the average treatment number indicate no significant difference according to the 5% level of multiple comparison test.

Taste

Taste is a factor that determines consumer acceptance of food products (Husen, 2022). Even though the assessment of other parameters is better, the product will still be rejected by consumers if it tastes bad (Winarno, 2004). The average taste value of mantou with the addition of mackerel surimi can be seen in Table 5.

Table 5. Average Taste of Mantou with the Addition of Mackerel Surimi

Puffer Fish Surimi Treatment (%)	Median	Average Taste
0%	**8**	**8,0a**
20%	7	7,0a
30%	7	7,2a
40%	7	7,6a

Note: The same letters after the average treatment number indicate no significant difference according to the 5% level of multiple comparison test.

Mantou Proximate Analysis

Proximate analysis is a method used to identify the basic nutritional composition of food and beverages (Suherman *et al*., 2024). Proximate test analysis includes water content, ash content, protein content, fat content and carbohydrate content. The proximate test was carried out on control mantou or without treatment and mantou with the addition of mackerel surimi which was most preferred by panelists with the highest average value, namely in the 40% treatment. The results of the proximate test of mantou are presented in Table 6.

Table 6. Chemical Test Results of Mantou Treatment A Control (0%) and D (40%)

No.	Analysis Parameters	Chemical Analysis Results (%)	
		Mackerel Surimi (0%)	Mackerel Surimi (40%)
1	As much Air	31,15	39,35
2	As much Abu	0,98	1,13
3	As much Protein	8,28	10,49
4	As much Lemak	4,57	5,17
5	As much Carbohydrate	55,02	43,86

Description: Testing per 100 grams of sample

DISCUSSION

Level of Likeability

Appearance

The addition of mackerel surimi to mantou did not significantly affect the appearance of the mantou produced. This means that all mantou with or without surimi treatment were still accepted by the panelists. Table 2 shows that the highest average value was obtained by treatment D (40%), which was 7.9. The characteristics of all treatments had a bright appearance, yellowish white in color, intact and fluffy in shape. The appearance of mantou with the addition of mackerel surimi of 0%, 20%, 30% and 40% can be seen in Figure 1. Sample D (40%) appeared the most prominent because it had a more symmetrical structure, consistent neatness, and a smoother surface compared to other samples. The color of the mantou produced was influenced by the percentage of surimi added. Mantou in treatments 0% and 20% had a whiter color compared to treatments 30% and 40% which tended to be yellowish. The yellowish color of mantou comes from the initial Maillard reaction that occurs during steaming (Nurtsen, 2005), the initial color of the Maillard reaction in the early stages can be yellow or light brown depending on the type of sugar, amino acids and temperature and heating time. The addition of sucrose in the surimi making process causes a brownish color change in the final product due to the amino-carbonyl reaction known as the Maillard reaction (Rosanti *et al*., 2022). The yellowish color is also influenced by the composition of the ingredients such as wheat flour and sugar. Wheat flour from wheat contains natural pigments such as lutein and zeaxanthin which give a yellow color to the final product. The results of research by Paznocht *et al*. (2019), showed that the use of wheat flour can increase the yellow color of steamed bread.

Aroma

The treatment of the level of addition of mackerel surimi did not significantly affect the level of preference for the aroma of mantou. The highest average value of the level of preference for the aroma of mantou was 8.1 in treatment A (0%), followed by treatment C (30%) 7.4 while the lowest was in treatment B (20%) at 6.9, and treatment D (40%) at 7.0. Treatment A (0%) did not have a distinctive fish aroma so it was neutral and familiar. Mantou

with the addition of mackerel surimi had a distinctive fish aroma but was still acceptable to the panelists. As the proportion of surimi increased to C (30%) and D (40%), the distinctive fish aroma became stronger, although the distinctive aroma of mantou was still detectable. This condition caused the level of panelist acceptance of the product to decrease. The distinctive fish aroma in mantou appears due to the constituent ingredients in the form of mackerel surimi. According to Pratama *et al*. (2022), the distinctive aroma of mackerel generally comes from volatile components formed through enzymatic reactions and fat oxidation. Volatile compounds in fresh mackerel meat consist of hydrocarbons, aldehydes, ketones, alcohols, and other compounds. Hydrocarbons are the most abundant compounds with 11 compounds, with pentadecane as the main compound (47.553%). Aldehydes are 6 compounds, with hexanal as the highest (5.7389%), ketones are 4 compounds with 2-decanone (5.6164%), and alcohols are 3 compounds with 1-octanol (1.1981%) and other compounds that were not detected because the amounts were very small. The aroma is also influenced by the ratio of various ingredients, such as the type of flour and sugar, used in the dough (Aryani *et al*. 2018). Volatile compounds such as aldehydes and alcohols can be formed through the phenylalanine metabolic pathway and the Maillard reaction during the steaming process and these compounds contribute to the formation of the distinctive aroma of mantou (Ding *et al*., 2024).

Texture

The treatment of the level of addition of mackerel surimi did not significantly affect the texture of mantou, meaning that all treatments were still preferred by the panelists. The highest average value of mantou texture was 7.8 in treatment A (0%) followed by treatment D (40%) at 7.7, treatment B (20%) at 7.5 and the lowest in treatment C (30%) at 7.0. Mantou in treatments A, D, and B had almost the same texture. However, treatment A had a more hollow texture compared to treatments D and B which had a more compact and elastic texture, but all three were equally soft. Syamsir *et al*., (2022), explained that the added surimi has elastic and strong gel-forming properties when heat treated. The compactness of a product is influenced by the filler, water content, and protein which play a role in binding water (Soekarto, 1985). Treatment C experienced a decrease in texture quality because the top of the mantou had a slightly soft texture and shriveled but was still elastic and soft. This occurs because the level of protein cross-linking is not optimal. Cross-linking that is too high or too low can cause the water holding capacity (WHC) to decrease so that the texture becomes less optimal or even soft. Duan *et al*. (2023), emphasized that high water content in surimi can cause the gel formed to be less dense and elastic, so that the product texture becomes soft if the proportion of surimi is not balanced with the right binder or water regulator.

Taste

The addition of mackerel did not significantly affect the characteristics of mantou or in other words, the panelists still liked mantou in each treatment. The highest average value was in treatment A (0%) of 8.0 which had a soft taste. The second highest value with a difference of 0.1 was obtained by treatment D (40%) of 7.9 which provided a distinctive savory umami taste without changing the sweetness of the sugar added to the mantou recipe. According to Zhao *et al*., (2016), amino acids in surimi such as glutamic acid play an important role in increasing the umami and salty taste of the product. Free nucleotide compounds such as IMP (inosinate monophosphate) can make a major contribution to the umami taste and GMP (guanosine monophosphate) can work synergistically with glutamate to enhance the savory sensation (Yamaguchi & Ninomiya, 2000). Treatments B (20%) and C (30%) provided a more complex combination of flavors due to the interaction of non-volatile compounds in the form of amino acids and peptides with other components such as sugar and flour. This interaction

forms a balanced umami taste with the complexity of sweet and savory flavors without causing degradation or loss of flavor characteristics in the product (Chen *et al*., 2022; Zhang *et al*., 2023). Variations in surimi raw materials can affect taste, but do not always result in significant differences in panelist assessments (Halim, 2024).

Chemical Characteristics

Water Level

The water content increased from control treatment A (0%) to treatment D (40%) by 8.2%. The water content produced from both mantou treatments was still below the maximum limit, meaning that it still met the standards set by SNI 8371-2018, which was 40% (BSN 2018). The increase in water content in mantou increased with the addition of surimi. This happened because the washing process in fish meat caused an increase in water content in surimi. This increase occurred due to hydration of myofibril protein which caused water to diffuse into the protein matrix (Wawasto *et al*., 2018). These results are in line with the results of Widjaya *et al*., (2015) regarding the fortification of surimi manyung in donuts which showed that the water content value at 0% was 23.41% and at 20% treatment was 25.35%.

Ash Level

The ash content value obtained from the results of the study in control treatment A (0%) was 0.98% while the ash content in mantou with the addition of 40% mackerel surimi was 1.13%. The ash content in mantou with the addition of 40% surimi exceeded the maximum limit, meaning that it did not meet the standards set by SNI 8371-2018, which was 1% (BSN 2018). The increase in ash content in the 40% surimi formulation is thought to be due to an increase in the ash content of the added surimi. The ash content in mackerel averages 6.27% (Widiarti & Dur, 2022). Research by Aryani *et al*., (2018), showed that the combination of Siamese gourami flour and wheat flour in mantou produced ash content ranging from 1.73% to 3.99%. These results are higher than this study because the ash content in gourami flour is 18.5%. The ash content in the material indicates the presence of minerals and metal oxygen, so that the burning metal oxygen will form ash (Kaimudin *et al*., 2021). Protein denaturation that occurs during the heating process involves mineral interactions so that minerals are difficult to dissolve (Santoso *et al*., 2006). Minerals in mackerel are calcium, phosphorus and iron which come from fish muscle tissue (Kolanus, 2020).

Protein Level

The protein content in control treatment A (0%) was 8.28% and increased by 2.21% to 10.49% in treatment D (40%). This is because the protein content in the control mantou was only obtained from the mantou dough ingredients without the addition of mackerel surimi. The addition of mackerel surimi can increase the protein content in mantou. Mackerel weighing 100 grams contains 21.30 grams of protein (Mahmud *et al*., 2018). The use of raw materials with high protein content will produce processed products with high protein content, and vice versa (Seftiadi *et al*., 2016). Fish is a source of protein for humans which acts as a building block in protein biosynthesis to replace damaged cell tissue and helps control body metabolism (Aryani *et al*., 2018). The results of this study are in line with Widjaya et al., (2015), that donuts added with mackerel surimi can increase protein levels.

Fat Level

The fat content of mantou in the treatment without the addition of 0% mackerel surimi was 4.57% and the fat content in mantou with the addition of 40% mackerel surimi was 5.17%. The fat content produced from both mantou treatments exceeded the maximum limit set by

SNI 01-3840-1995 concerning Bread, which was 3% (National Standards Agency, 1995). The increase in fat content in each treatment was influenced by the fat content of the ingredients used. In the study by Aryani *et al*., (2018), the addition of mackerel surimi was greater than mantou with the addition of Siamese gourami flour in the 30% treatment, which was 5.33%. The fat content in mackerel surimi was 0.58%, while the fat content of Siamese gourami flour was 8.12% (Lismawarni *et al*., 2017).

Carbohydrate Level

The carbohydrate content decreased by 11.16% from the control treatment A (0%) of 47.64% to 31.21% in treatment D (40%). This decrease occurred because the carbohydrate content was calculated using the by difference method, namely by reducing the percentage of water, ash, protein and fat content in nutrients. Mantou with 40% treatment has a high nutritional content (water, ash, protein and fat content) compared to 0% treatment, resulting in a decrease in the percentage of carbohydrates. These results are in line with research by Nugroho *et al*., (2013), bakpau with high water content and donuts with high fat content can reduce the percentage of carbohydrates.

CONCLUSION

Based on the results of the study, it can be concluded that the addition of mackerel surimi can affect the organoleptic and proximate characteristics of mantou. The results of the hedonic test showed that all treatments were still acceptable to the panelists, with the highest value obtained by A (control) and treatment D (40%) as the treatment with the highest value based on the parameters of appearance, texture and taste among the mantou formulations containing surimi. The average value of treatment D (40%) on the appearance parameter was 7.9 (like), followed by texture 7.7 (like), and taste 7.6 (like). The addition of 40% mackerel surimi to mantou resulted in a water content of 39.35%, ash content 1.13%, protein content 10.49%, fat 5.17%, and carbohydrate 43.86%.

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