



Fish of *Tuing-Tuing (Hirundichthys Oxycephalus)* as Abon Product

Miawati Mansur^{1*}, Muhadjir Suni², Syahrial Manaf³

¹Politeknik Pariwisata Makassar, Jl. Gn. Rinjani Jl. Metro Tj. Bunga No.1, Tj. Merdeka, Kec. Tamalate, Kota Makassar, Sulawesi Selatan 90224, Indonesia

²Politeknik Pariwisata Makassar, Jl. Gn. Rinjani Jl. Metro Tj. Bunga No.1, Tj. Merdeka, Kec. Tamalate, Kota Makassar, Sulawesi Selatan 90224, Indonesia

³Politeknik Pariwisata Makassar, Jl. Gn. Rinjani Jl. Metro Tj. Bunga No.1, Tj. Merdeka, Kec. Tamalate, Kota Makassar, Sulawesi Selatan 90224, Indonesia

*Corresponding author's email : miawatimansur@poltekparmakassar.ac.id

Abstract

This study investigates the development of a new food product, specifically smoked tuing-tuing fish (*Hirundichthys oxycephalus*) abon, and assesses its acceptance among consumers. The objectives of the study purposes to find out the method for producing abon from smoked tuing-tuing fish meat, and to evaluate public preferences and acceptance regarding the final product's characteristic, from the aspect texture, taste, aroma, and the colour of product. The research employs a quantitative methodology that combined with an experimental approach to create and refine the product. Data collection is comprehensive, involving primary sources such as direct observations and experiments, as well as secondary sources. Techniques used include detailed observations, experimental trials, structured questionnaires, and documentation throughout the experimental trial process to gather and analyze data. Eksperimental design as data analysis method is applied to interpret the results with data measurement using hedonic and sensory test. The result showed that smoked tuing-tuing fish can be effectively transformed into a desirable abon product. The final product of abon shows a distinctive brown color, noticeably smoked fish and spice aroma, a dry and non-greasy texture, and a flavorful of fish and savory taste. The hedonic and sensory tests indicate that the product meets high standards in all evaluated characteristics. Specifically, the product received positive feedback from respondent with high scores: 90% for texture, 93.2% for color, 92.6% for flavor, and 92.6% for taste. These scores place the smoked tuing-tuing fish abon in the "Very Like" category, reflecting strong consumer approval. So, it can be concluded that the research successfully demonstrates that smoked tuing-tuing fish can be utilized as a viable ingredient for producing fish abon. The high levels of acceptance and positive response from participants suggest that this product has significant potential in the market. The result underscore the viability of incorporating smoked tuing-tuing fish into new food products, highlighting the practical potential for this innovative approach. This research provides a solid foundation for further development and commercialization efforts, preparing for the introduction of a unique and marketable product.

Keywords: Tuing- tuing fish, *hirundichthys oxycephalus*, abon, experimental, hedonic test, sensory test

1. INTRODUCTION

Tuing-tuing fish or known as flying fish (Ikan Terbang) is one type of fish in the *Exocoetidae* family and is classified as a pelagic fish species that is widespread in tropical waters with water conditions that are not turbid and muddy, such as in the Sulawesi and Maluku regions (Hutomo et al., in Nur et al., 2022). Tuing-tuing fish is one of the leading salted fish commodities in Majene Regency, West Sulawesi because it is one of the fly fish distribution areas with enormous potential in Indonesia and also has fish eggs that are often exported abroad such as Japan, Korea, and Taiwan so that the eggs become a valuable commodity in the international market because they contain very high protein more than fish eggs in general. The people of Majene call flying fish as tuing-tuing fish, because this fish swims by jumping in the sea so that it sounds like "tuing-tuing". Nur et al. (2022) explained that in Majene sea, there are many types of flying fish such as *Cheilopogon spilopterus* and *Hirundichthys oxycephalus*, but the most commonly found type is *Hirundichthys oxycephalus*.



The spawning season of tuing-tuing fish, especially in the sea of Majene Regency, lasts from April to September.

Tuing-tuing fish has a high protein content with a soft and fibrous meat texture. From an economic and social perspective, according to Ningrum *et al.* 2019, tuing-tuing fish has a major influence on the lives of people in Majene, because almost all of the people depend on fishing, processing in the form of drying and salting, smoking and selling tuing-tuing fish. Due to its traditional processing, low public consumption and lack of attraction to tourists and outside communities, tuing-tuing fish is very rarely found in any restaurant and can only be found in certain areas, one of which is the Somba area, Majene Regency. So that people are not too familiar with it, and the export of tuing-tuing fish is still lacking.

To increase the economic value of tuing-tuing fish, it is necessary to do processing that not only improves product quality, but also extends its shelf life. One of the processed fish products that can be developed and of course in demand by the people, especially the people of West Sulawesi, is fish abon. This can be proven by the daily life of West Sulawesi people who make tuna and marlin fish abon as MSME products, and people like to consume fish abon as a practical alternative side dish. The practicality of fish abon allows them to still enjoy nutritious food without having to spend a lot of time in the preparation process. Fish abon is processed fish meat that is chopped or pounded and dried by stir-frying or squeezing using an abon squeezer, then add certain seasonings (Ismail and Putra, 2017). The type of fish used in this study is smoked tuing-tuing fish, if processed through the smoking process, tuing-tuing fish meat will become drier, fragrant and has a distinctive aroma. The use of smoked tuing-tuing fish as the main ingredient can give a new sensation to the taste and aroma of the fish abon produced, it will have a smokey taste and aroma which is certainly very different from fish abon in general. However, tuing-tuing fish has many fine thorns that make it less attractive to the public so it requires a longer processing process and requires accuracy than processing other fish.

Understanding some of the previous facts, formed the assumption that making tuing-tuing fish abon can increase the preservation period of tuing-tuing fish products, in addition to increasing the variety of fish abon side dishes and of course will increase the economic value of tuing-tuing fish itself. Of course, the level of consumer acceptance and preference for fish abon products varies and is one of the main considerations in the commercialization of fish abon. This study aims to determine the process of making smoked tuing-tuing fish abon and to determine the acceptance and level of public preference regarding the final characteristics in the form of texture, taste, aroma and color of smoked tuing-tuing fish abon.

2. RESEARCH METHODOLOGY

The type of research used is quantitative experiment. This research was conducted at the Makassar Tourism Polytechnic Laboratory Kitchen and Mamuju Regency, West Sulawesi in May-July 2024. Data collection techniques used were observation and documentation during the experimental process, experiments, and questionnaires. The population in this study were the people of Mamuju and Makassar. The intended sample was 30 people from Mamuju and Makassar who often consume and/or like fish abon, who became panelists to provide an assessment regarding the acceptability and level of their liking for smoked tuing-tuing fish abon products. The data analysis technique used was descriptive statistical analysis with measurements using hedonic tests and sensory tests. To determine the acceptability and level of favorability of the panelists, a qualitative descriptive analysis of percentages was carried out with the following formula:

a. Sensory Test

The data obtained from the sensory test was then analyzed by averaging to determine the criteria for each aspect of the experimental product results. The steps in calculating the average score are as follows:

- Highest score = 5
- Lowest score = 1
- Total number of panelists = 30

- a) Calculating the maximum number of scores
 Maximum score = number of panelists × highest score
 = 30 × 5 = 150
- b) Calculating the minimum number of scores
 Minimum score = Number of panelists × lowest score
 = 30 × 1 = 30
- c) Calculating the maximum average
 Maximum percentage = $\frac{\text{skor maksimal}}{\text{jumlah panelis}}$
 = $\frac{150}{30} = 5$
- d) Calculating the minimum average
 Minimum percentage = $\frac{\text{skor minimal}}{\text{jumlah panelis}}$
 = $\frac{30}{1} = 1$
- e) Calculating the average range
 Range = average of maximum score - minimum score
 = 5 - 1 = 4
- f) Calculating the mean class interval
 Percentage interval = $\frac{\text{rentang}}{\text{jumlah kriteria}} = \frac{4}{5} = 0,80$

Based on the results of these calculations, a score interval table and criteria for experimental results on smoked tuing-tuing fish abon will be obtained, as follows:

Table 1. Mean Class Interval and Sensory Test Criteria

Aspects	Average Score				
	1,00 ≤ x < 1,80	1,80 ≤ x < 2,60	2,60 ≤ x < 3,40	3,40 ≤ x < 4,20	4,20 ≤ x < 5,00
Texture	Very Oily	Oily	Dry Enough	Dry	Very Dry
Color	Yellow	Brownish Yellow	Brown	Dark Brown	Reddish Brown
Flavor	Not Noticeably Flavorful	Less Noticeably Flavorful	Quite Noticeably Flavorful	Noticeably Flavorful	Very Noticeably Flavorful
Taste	Very Flavorless Fish	No Fish Flavor	Fishy Enough	Fish Flavored	Very Fishy

Source: Data Processing Results, 2024

b. Hedonic Test

To measure the level of favorability of panelists regarding smoked tuing-tuing fish abon products, a percentage model was used. The percentage analysis formula used is as follows:

Ket: % = Percentage score

n = Number of scores obtained

N = Total score (Highest score × number of panelists)

$$\% = \frac{n}{N} \times 100$$

- Highest score = 5 (Very like)
- Lowest score = 1 (Very dislike)
- Number of criteria specified = 5
- Total number of panelists = 30 people

a) Calculating the maximum score

$$\begin{aligned} \text{Maximum score} &= \text{number of panelists} \times \text{highest score} \\ &= 30 \times 5 = 150 \end{aligned}$$

- b) Calculating the minimum score
 Minimum score = number of panelists × lowest score
 = 30 × 1 = 30
- c) Calculating the maximum percentage
 Maximum percentage = $\frac{Skor\ maksimal}{Skor\ maksimal} \times 100$
 = $\frac{150}{150} \times 100 = 100\%$
- d) Calculating the minimum percentage
 Minimum percentage = $\frac{30}{150} \times 100 = 20\%$
- e) Calculating the percentage range
 Range = maximum - minimum percentage
 = 100% - 20% = 80%
- f) Calculating the percentage class interval
 Percentage interval = $\frac{rentang}{jumlah\ indikator}$
 = $\frac{80\%}{5} = 16\%$

Based on the calculation results, the percentage interval table and criteria are obtained as follows:

Table 2. Favorability Interval

Percentage	Favorability Criteria
20,00 - 35,99	Very Dislike
36,00 – 51,99	Do not Like
52,00 – 67,99	Quite Like
68,00 – 83,99	Like
84,00 – 100	Very Like

Source: Data Processing Results, 2024.

3. FINDINGS AND DISCUSSION

3.1 Standard Recipe of Smoked Tuing-Tuing Fish Abon

The recipe for smoked tuing-tuing fish abon is based on modifications from various research sources, journals and books. In order to produce a product that has good characteristics based on aspects of texture, taste, aroma and color, also requires a recipe that is in accordance with the desired standard. Therefore, researchers have determined the standard recipe for smoked tuing-tuing fish abon as follows:

Table 3. Standard Recipe of Smoked Tuing-Tuing Fish Abon

Main Ingredients/Qty		Ground Spices Ingredients/Qty	
Smoked Fish	500 gr	Red Onion	12 cloves
Coconut milk	200 ml	Garlic	15 cloves
Cooking Oil	As needed	Red Chili	2 pieces
Lemongrass	2 sticks	Coriander	3 tbsp
Bay leaves	2 sheets	Turmeric	1 knuckle
Brown sugar	120 gr	Galangal	2 cm
Salt	As needed	Pepper	2 tbsp
Lime leaves	4 sheets		

Source: Data Processing Results, 2024

3.2 Preparation process of Smoked Tuing-Tuing Fish Abon

The process of making smoked tuing-tuing fish abon applied in this study refer to Karyantina (2010), but there are several processes that have been adapted to the use of the main ingredients. The

implementation of these processes refers to the standard production process of fish abon products according to the Regulation of the SNI Agency of the Republic of Indonesia Number 6 of 2019. The manufacturing processes are as follows:

3.2.1 Preparation of Ingredients, Utensil and Equipment

The ingredients are prepared according to the standard recipe used. The ingredients used greatly affect the final result of fish abon, the better the quality of the ingredients used, the better the quality of the fish abon produced. So that the materials used must be of high quality, not damaged, not expired and not rotten so that the resulting product is in accordance with the standards to be achieved. Good utensil and equipment is clean and dry, to avoid damage and product failure during the production process. The specifications of the utensil and equipment used in the experiment of making smoked tuing-tuing fish abon are as follows:

Table 4. Utensil and Equipment

No	Name	Specifications	Usability
1	Bowl	Stainless steel, plastic	Storing ingredients
2	Knife	Stainless steel	Cutting ingredients
3	Cutting Board	Wood	As a base when cutting ingredients using a knife
4	Spoon	Stainless steel	Stirring and picking up ingredients
5	Wok	Stainless steel	Frying or cooking large amounts of food
6	Blender	Glass	Grinding the ingredients
7	Scales	Plastic	Measure the ingredients to be used in the production process as needed
8	Spatula	Wood	Stirring food ingredients during processing
9	Measuring Glass	Plastic	Measuring liquid ingredients
10	Abon Squeezer	Stainless steel	Removing oil from cooked shredded meat
11	Stove	Stainless steel	Cooking food, because it can release fire which plays a very important role in the food processing process.
12	Insert	Stainless steel	Container for cooling the cooked product

Source: Data Processing Results, 2024

3.2.2 Ingredients Weighing

The ingredients that have been prepared, measured and weighed first according to the reference recipe used so that the composition of the ingredients used is in accordance with the reference recipe, in order to get a good final result and reduce the risk of product failure or damage.

3.2.3 Tuing-Tuing Fish Smoking

Smoking is a drying technique to preserve fish by using wood, fuel or charcoal to produce smoke. The tuing-tuing fish is washed and cleaned first, then smoked until cooked and brownish in color.

3.2.4 Tuing-Tuing Fish Flaking

The tuing-tuing fish is first cleaned by removing the head, entrails and scales. After that, separate the fish meat from bones and thorns carefully, because tuing-tuing fish has quite a lot of fine and small thorns, so it requires caution in separating it so that there are no fish thorns during the cooking process, then pounded into shreds or small flakes so that the fish meat does not clump when cooked, and making easier the stirring process. The shredded fish must be free of fish bones to avoid affecting the final result.

3.2.5 Grinding and Sauteing Spices

Grind shallots, garlic, red chili, coriander, pepper, galangal, and turmeric using a blender and a little oil to make the spices more easily crushed. Sauté the grinded spices using a fairly large skillet with a little oil. Cook over medium heat. Add the lime leaves, bay leaves and lemongrass, stirring

until they smell fragrant and the spices dry out a little. Make sure the spices are always stirred so that they don't burn and cook evenly.

3.2.6 Cooking Process of Abon

Pour the coconut milk into the pan with the stir-fried spices, stir until smooth and let it boil. Put the shredded fish meat into the pan containing coconut milk and spices, stirring until smooth and dry (feels light when stirred) for about 45 minutes at 120 ° C, and brownish in color. During the cooking process, the shredded fish should always be stirred to ensure it is evenly cooked.

3.2.7 Resting and Squeezing of Abon

The cooked shredded meat is cooled first, then put into a spinner machine or shredded oil press to remove the oil so that the texture of the shredded meat is dry.

3.2.8 Packaging

The last process is the completion process, that is packaging the Abon. Abon that have cooled and dried are packaged using a closed container or food packaging made from aluminum foil and stored in a clean place so as not to be contaminated with bacteria that can trigger product damage.



Figure 1. Smoked Tuing-Tuing Fish Abon
Source: Authors, 2024

The results of the smoked tuing-tuing fish abon making experiment produced brownish abon with the taste quality of smoked tuing-tuing fish abon spices that are very flavorful and sweet, the taste of fish is very real and not fishy. The aroma quality of the smoked fish and seasoning produced was very real and balanced. The texture of the abon is dry, fibrous and not greasy and there are no fine fish spines. Before being distributed to respondents to be given an assessment, researchers had first conducted interviews with experts, namely culinary lecturers to find out the quality of the product and according to the experts, the experimental results of smoked tuing-tuing fish abon were good.

3.3 Sensory Test of Smoked Tuing-Tuing Fish Abon

The sensory test was conducted to determine the public acceptance of the characteristics of the products produced with 5 different rating scales for each characteristic indicator. The results of the panelists' assessment were collected through a sensory test questionnaire that had been prepared by the researcher. The scores of each indicator of the assessment of smoked tuing-tuing fish abon products were tabulated and calculated using the Microsoft Excel program, then the results were analyzed according to the average class interval value in table

3.3.1 Texture

The texture indicator rating scale of smoked tuing- tuing fish abon used is 5 = Very dry, 4 = Dry, 3 = Dry enough, 2 = Oily, 1 = Very oily.

Table 5. Data from Sensory Test Assessment Results with Texture Indicators

Indicator	Assessment Score										Average	Criteria
	5		4		3		2		1			
	N	%	N	%	N	%	N	%	N	%		
Texture	2	6,66	18	48	10	20	0	0	0	0	3,73	Dry

Source: Data Processing Results, 2024

Table 5 shows that out of 30 panelists, 2 panelists chose score 5 (very dry) with a percentage of 6.66%, 18 panelists chose score 4 (dry) with a percentage of 48% and 10 other panelists chose score 3 (Dry Enough) with a percentage of 20%. After accumulating, the average obtained is 3.73 and it refers to the dry criteria.

3.3.2 Color

The color indicator rating scale of smoked tuing-tuing fish abon used is 5 = Reddish brown, 4 = Dark brown, 3 = Brown, 2 = Brownish yellow, 1 = Yellow.

Table 6. Data from Sensory Test Assessment Results with Color Indicators

Indicator	Assessment Score										Average	Criteria
	5		4		3		2		1			
	N	%	N	%	N	%	N	%	N	%		
Color	16	40	6	16	7	14	1	1,33	0	0	3,56	Dark Brown

Source: Data Processing Results, 2024

Table 6 shows that out of 30 panelists, 16 panelists chose score 5 (reddish brown) with a percentage of 40%, 6 panelists chose score 4 (dark brown) with a percentage of 16%, 7 panelists chose score 3 (brown) with a percentage of 14% and 1 other panelist chose score 2 (brownish yellow) with a percentage of 1.33%. After being accumulated, the average obtained is 3.56 and it refers to the dark brown criteria.

3.3.3. Flavor

The rating scale for the flavor indicator of smoked tuing- tuing fish abon is 5 = Very noticeably flavorful, 4 = Noticeably flavorful, 3 = Quite noticeably flavorful, 2 = Less noticeably flavorful, 1 = Not noticeably flavorful.

Table 7. Data from Sensory Test Assessment Results with Flavor Indicators

Indicator	Assessment Score										Average	Criteria
	5		4		3		2		1			
	N	%	N	%	N	%	N	%	N	%		
Flavor	10	33,3	14	37,3	5	10	1	1,33	0	0	4,09	Noticeably Flavorful

Source: Data Processing Results, 2024

Based on table 7, it can be seen that out of 30 panelists, 10 panelists chose score 5 (very noticeably flavorful) with a percentage of 33.3%, 14 panelists chose score 4 (noticeably flavorful) with a percentage of 37.3%, 5 panelists chose score 3 (quite noticeably flavorful) with a percentage of 10% and 1 other panelist chose score 2 (less noticeably flavorful) with a percentage of 1.33%. After being accumulated, the average obtained is 4.09. The average refers to the criteria of noticeably flavorful.

3.3.4 Taste

The rating scale for the taste indicator of smoked tuing- tuing fish abon used is 5 = Very fishy, 4 = Fish flavored, 3 = Fishy enough, 2 = No fish flavor, 1 = Very flavorless fish.

Table 8. Data from Sensory Test Assessment Results with Taste Indicators

Indicator	Assessment Score										Average	Criteria
	5		4		3		2		1			
	N	%	N	%	N	%	N	%	N	%		
Taste	13	43,3	17	45,3	0	0	0	0	0	0	4,43	Very Fishy

Source: Data Processing Results, 2024

Based on table 8, it can be seen that out of 30 panelists, 13 panelists chose score 5 (very fishy) with a percentage of 43.3%, and 17 panelists chose score 4 (fishy) with a percentage of 45.3%. After being accumulated, the average obtained was 4.43. The average refers to the criteria for very fishy taste.

3.4 Hedonic Test of Smoked Tuing-Tuing Fish Abon

The hedonic test was conducted to determine the level of public liking related to the characteristics of the product produced using 5 rating scales (5 = very like, 4 = like, 3 = quite like, 2 = do not like, and 1 = very dislike). The results of the panelists' assessment were collected through a hedonic test questionnaire that had been prepared by the researcher. The scores of each indicator of the assessment of smoked tuing-tuing fish abon products were tabulated and the average was calculated using the help of the Microsoft Excel program, then the results were analyzed according to the favorability interval value in table 2.

3.4.1 Texture

Table 9. Hedonic Test Assessment Results Data with Texture Indicators

Indicator	Assessment Score										Average	%	Criteria
	5		4		3		2		1				
	N	%	N	%	N	%	N	%	N	%			
Texture	15	50	15	40	0	0	0	0	0	0	4,5	90	Very Like

Source: Data Processing Results, 2024

Based on table 9, it can be seen that out of 30 panelists, 15 panelists chose score 5 (very like) with a percentage of 50%, and the other 15 panelists chose score 4 (like) with a percentage of 40%. After being accumulated, the average obtained is 4.5 with a percentage of 90%. This percentage refers to the criteria of liking very much. After concluding, the results of the panelists' assessment which showed a percentage of 90% liking level with very like criteria, the texture of the shredded tuing-tuing fish abon was highly favored by the people.

3.4.2 Color

Table 10. Hedonic Test Assessment Results Data with Color Indicators

Indicator	Assessment Score										Average	%	Criteria
	5		4		3		2		1				
	N	%	N	%	N	%	N	%	N	%			
Color	20	66,6	10	26,6	0	0	0	0	0	0	4,66	93,2	Very Like

Source: Data Processing Results, 2024

Based on table 10, it can be seen that out of 30 panelists, 20 panelists chose a score of 5 (very like) with a percentage of 66.6%, and 10 other panelists chose a score of 4 (like) with a percentage of 26.6%. After being accumulated, the average obtained was 4.66 with a percentage of 93.2%. This percentage refers to very like criteria.

3.4.3 Flavor

Table 11. Hedonic Test Assessment Results Data with Flavor Indicators

Indicator	Assessment Score										Average	%	Criteria
	5		4		3		2		1				
	N	%	N	%	N	%	N	%	N	%			
Flavor	20	66,6	9	24	1	2	0	0	0	0	4,63	92,6	Very Like

Source: Data Processing Results, 2024

Based on table 11, it can be seen that out of 30 panelists, 20 panelists chose score 5 (very like) with a percentage of 66.6%, 9 other panelists chose score 4 (like) with a percentage of 24% and 1 panelist chose score 3 (quite like) with a percentage of 2%. After being accumulated, the average obtained was 4.63 with a percentage of 92.6%. This percentage refers to the criteria of very like.

3.4.4 Taste

Table 12. Hedonic Test Assessment Results Data with Taste Indicators

Indicator	Assessment Score										Average	%	Criteria
	5		4		3		2		1				
	N	%	N	%	N	%	N	%	N	%			
Taste	21	70	9	24	0	0	0	0	0	0	4,7	94	Very Like

Source: Data Processing Results, 2024

Based on table 12, it can be seen that out of 30 panelists, 21 panelists chose score 5 (very like) with a percentage of 70%, and 9 other panelists chose score 4 (like) with a percentage of 24%. After being accumulated, the average obtained is 4.7 with a percentage of 94%. This percentage refers to very like criteria.

3.5 Discussion

3.5.1 Texture

It was concluded that the results of the sensory assessment of panelists showed an average of 3.73 with dry texture criteria and showed a percentage of 90% liking level with very like criteria.

The dry texture of the abon is influenced by the length of time of the cooking process and the use of coconut milk, which basically has less fat content than cooking oil, so that the abon produced is not too oily. In addition, tuing-tuing fish that has gone through the smoking process certainly has a drier texture and reduced water content. The texture of smoked tuing-tuing fish abon is certainly different from other fish abon, because the meat is soft and fibrous, so there is a little fish meat that is not smooth and tends to clot. Based on the results of the study, the texture of the smoked tuing-tuing fish abon has good results and can be accepted by the public with very like criteria. The texture of the fish abon is also in accordance with SNI and there is no strange texture so it is safe for consumption.

3.5.2 Color

It was concluded that the results of the panelists' assessment showed an average of 3.56 with dark brown color criteria. it showed a percentage of 93.2% liking level with very like criteria.

The dark brown color of the abon is purely influenced by the length of time of the cooking process and the composition of brown sugar used, resulting in a brown color that is considered attractive by panelists. The brownish reaction is called the Maillard reaction, which is a reaction that occurs due to the content of sugar and protein groups in fish meat so that the typical abon color reaction occurs not due to enzymes. In addition, cooking temperature also affects the brownish color produced by abon. In accordance with Mustar's research (2013), during the cooking process, fish abon changes color to brownish. Based on the results of the study, the color of the smoked tuing-tuing fish abon has an attractive appearance and can be accepted by the public with very like criteria. The color of the fish abon is also in accordance with SNI and does not have a strange color, so it is safe for consumption.

3.5.3 Flavor

It was concluded that the results of the panelists' assessment showed a mean score of 4.09 with real aroma criteria, and showed a percentage of 92.6% liking level with very like criteria. The aroma of smoked tuing-tuing fish abon is considered to have a real smokey aroma that comes from fish and a real aroma of spices/spices that is highly preferred by the people.

The aroma assessment of smoked tuing-tuing fish abon is based on the aroma of fish and spices. The real aroma in this abon is influenced by the use of the main ingredient, smoked tuing-tuing fish, which can give a sensation of smokey aroma to the abon and is not fishy because it has gone through a smoking process which of course can reduce the water content in the fish, so that this abon is considered unique because it has a striking difference compared to fish abon in general. In addition, the use of spices and coconut milk also affects the aroma of smoked tuing-tuing fish abon because coconut milk contains *nonylmetylketon* compounds (Mustar, 2013) which have properties that can evaporate so that the cooking process will produce a delicious aroma.

In the cooking process, changes in certain compounds in fat and caramelization of sugar compounds occur, these changes certainly contribute to the appearance of a distinctive aroma inherent in fish abon. Based on the results of the study, the aroma of smoked tuing-tuing fish abon has a unique aroma that is very interesting and real, very popular, and can be accepted by the public with the criteria very like. The aroma of fish abon is also in accordance with SNI, and there is no strange aroma so it is safe for consumption.

3.5.4 Color

It was concluded that the results of the panelists' assessment showed a mean score of 4.43 with very fishy criteria, which means that the taste of smoked fish is very strong, and showed a percentage of 94% liking level with very like criteria.

The taste of smoked tuing-tuing fish abon is certainly influenced by the quality of the ingredients, especially the smokey taste of smoked tuing-tuing fish which gives a distinctive taste and the spices used, such as coconut milk which gives a savory taste, brown sugar which gives a sweet taste, and other spices which also strengthen the taste of smoked tuing-tuing fish abon. According to Mustar (2013), at the abon cooking process, there will be absorption of fat and spices into the material, resulting in a savory taste in fish abon and adding a delicious taste. Based on the results of the study, the taste of smoked tuing-tuing fish abon has a very real fish flavor, very popular and acceptable to the public with very like criteria. This abon flavor is also in accordance with SNI, and there is no strange taste so it is safe for consumption.

The processing of smoked tuing-tuing fish is considered to be developed or diversified by utilizing it as a abon product. This is evidenced by the excellent response of 30 panelists through the assessment of sensory tests and hedonic tests with indicators of texture, taste, aroma and color produced from smoked tuing-tuing fish abon. So that the smoked tuing-tuing fish abon is considered to be consumed and utilized properly according to the results of this assessment.

4. CONCLUSION

The utilization of smoked tuing-tuing fish as a abon product certainly provides a unique sensation, because the resulting abon will emit a smokey aroma and taste also increase the diversity of processed tuing-tuing fish which certainly affects the increase in economic value. The stages of making smoked tuing-tuing fish abon are little different from making fish abon in general, there are only differences in the initial processing of main ingredient, that is smoking and shredding which requires precision due to the fact that tuing-tuing fish has many fine thorns. Based on the results of the sensory test and hedonic test, the average panelist gave a good assessment and really liked the smoked tuing-tuing fish abon product, so it can be concluded that the people can accept and like smoked tuing-tuing fish abon products.

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