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**WATER CONTENT ANALYSIS AND ORGANOLEPTIC TEST ON SMOKED CATFISH IN PASIE PINANG VILLAGE**

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**Abstract**

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Smoking is a method of cooking, flavoring, or preserving food, especially fish meat. The smoking of catfish in Pasie Pinang Village is still done in the traditional way. Smoking is done with coconut fiber, wood and sawdust as fuel, smoked fish is smoked with heat and the smoke from the fuel produces a distinctive taste and aroma in fish products and the color becomes golden and brownish. The purpose of this study was to determine the water content of smoked catfish in Pasie Pinang Village and to determine people's preferences for smoked catfish in Pasie Pinang Village. The panelists used in this research were 35 people consisting of students from the University of Teuku Umar. The results showed that the water content of the three smoked catfish samples varied. Organoleptic test (n=35) in terms of color, taste, aroma, texture and overall, from the three samples tested, the panelists preferred smoked catfish in sample three. The traditional smoking of smoked fish still has a good value on consumer acceptance.

**Keywords:** *smoked catfish, water content analysis, sensory organoleptic analysis*

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## INTRODUCTION

Catfish contains protein and is also rich in phosphorus and high calcium. If you consume catfish, it can help meet phosphorus and calcium in the body. Its main function is to maintain health and strengthen bones and teeth (Jevtić et al., 2015). At the same time reduce the risk of osteoporosis (a condition when bone density decreases).

One of the fisheries commodities favored by the Indonesian people is catfish. This is because the taste of fish meat has a very distinctive taste characteristic (Junianingsih et al., 2014). In order to create products and people's preferences for fish, it is necessary to diversify the processing of fish with the application of appropriate, easy and inexpensive technology, so as to produce products that have good nutritional value and are liked by the community such as smoked catfish (Banović et al., 2016).

Smoked fish is one of the superior products produced from the fisheries sector. One of the villages that produce smoked fish in Aceh Province, West Aceh Regency, Meureubo District is Pasie Pinang Village. The choice of smoked fish as a superior product in the village is because smoked fish is one of the popular traditional products in Indonesia and the raw materials are easily available in the village (Shohibul et al., 2019).

The majority of the residents of Pasie Pinang Village are pond farmers who produce fish, even fish from the ponds in the village are the main side dishes for the villagers (Teo, 2019). There are many fishing activities in Pasie Pinang Village, even those fishing activities become work or income (Ismail et al., 2013). Fish are not only obtained through the process of fishing in rivers, but in Pasie Pinang Village, Mereubo District, West Aceh Regency, using land that was originally a rice field for farming by residents, most of which have been used as ponds for catfish cultivation. According to residents in Pasie Pinang Village, farming is not effective because the village is next to a river. They can be worried when the rain causes flooding, so that the innovation of paddy fields is used as a fish pond (Bin Ibrahim, 2018). This has resulted in most of the Pasie Pinang Village area, which was originally rice fields, now has become a place for catfish cultivation.

The fish pond harvest in Pasie Pinang Village was previously 100% sold by villagers directly to agents who came to the village and to restaurants around West Aceh. Villagers have never sold their own fish to the market or processed it into other foods. These fish (especially catfish) can be processed into various forms of varied and productive food. Therefore, the residents of Pasie Pinang village process catfish into salai fish (smoked fish) and catfish jerky so that they become varied and productive food.

The development of catfish that has been carried out in Pasie Pinang Village, Mereubo District does not only cover the cultivation aspect, but has been developed for the processing aspect. The people of Pasie Pinang Village generally process catfish by smoking or better known as salai fish (Looi et al., 2016). Smoked fish is fresh fish that is treated with weeding, washing with or without soaking in a salt solution, draining, with or without spices and hot smoking which is carried out in a smoking room using wood, coir, or coconut shells (BSN, 2013). According to Rahmad Wahyudi (owner of the smoked fish production site), catfish processed into smoked fish in Pasie Pinang Village averages 40-60 kg/day and will produce 13-20 kg/day smoked fish.

The process of producing smoked catfish in Pasie Pinang Village includes weeding, washing and draining the fish, smoking, packaging, and direct marketing to the market or through orders. The smoked fish production process still uses simple equipment and traditional smokehouses. The use of this traditional smokehouse is considered inefficient because in addition to the limited production capacity, the smoking temperature is not optimal and inconsistent due to the spread of smoke, which consumes a lot of fuel.

Smoked fish in Pasie Pinang village has not been tested in a laboratory, therefore the authors took the initiative to test the water content and organoleptic tests on smoked catfish in Pasie Pinang Village. Moisture test is one of the chemical laboratory test methods that is very important in the food industry to determine the quality and resistance of food to damage that may occur. The purpose of this research is to determine the community's preference for smoked catfish and to determine the

water content of smoked catfish in Pasie Pinang village. accepted by suppliers both conventional stores and modern retail.

### RESEARCH METHOD

This research was conducted at the Organoleptics Laboratory of the Faculty of Agriculture, Teuku Umar University. This research was conducted in December 2021 – February 2022. The study used three (3) samples of smoked catfish (*Pangasius pangasius*) taken from the smoking place of catfish in Pasie Pinang Village. Sampling was carried out in different productions with an interval of 1 week. The stages of processing smoked fish (Pokdakan business) start from the preparation of raw materials where the raw materials are taken from the catfish culture pond in Pasie Pinang village, then the fish enter the weeding and washing stage, the fish are cleaned of scales and stomach dirt on the fish and then the fish washed until clean of dirt and blood that sticks, the fish is then cut into small pieces to facilitate and speed up the smoking time then the fish is put in the spices and soaked for 30 minutes - 1 hour, the fish is then ready to be smoked. Then enter the cooling stage, cooling is done by placing the fish in an open space and then the smoked fish is ready to be packed with PE (Polyethylene) plastic and brought to the organoleptic laboratory, Teuku Umar University for analysis of water content and organoleptic testing (color). smell, texture, taste and overall acceptability). This study uses two test parameters, namely, water content test and sensory analysis (Borges et al., 2019). The tools used for water content analysis are porcelain cup, desiccator, oven and analytical balance (Kumalasari et al., 2021). for the pen organoleptic test, the score sheet (scoring sheet) is a small plate.

### RESULTS AND DISCUSSION

#### A. Water content

Moisture content is a very important parameter in determining the quality of smoked fish produced (Samuel Ayofemi Olalekan Adeyeye, 2019). Low or high moisture content of smoked fish will affect consumer preference for smoked fish (Berhimpon et al., 2018). The results of the analysis of the water content in smoked catfish can be seen in table 1.

**Table 1. Water content of smoked catfish in Pasie Pinang Village**

Smoke Time	Repetition	Water content %	Average
7 hours	P1.1	22,73%	23,11% ± 0,01
	P1.2	24,72%	
	P1.3	21,87%	
9 hours	P2.1	21,37%	22,53% ± 0,01
	P2.2	24,10%	
	P2.3	22,10%	
11 hours	P3.1	17,10%	17,15% ± 0,01
	P3.2	16,52%	
	P3.3	17,84%	

Based on the gravimetric method with three repetitions, it is known that the average value of the water content of the three samples can be seen in the table above. The test results show that the average value of water content in the first sample (one) is 23.11 percent, while the second sample

has an average water content of 22.53 percent, and the third sample is the sample with the smallest water content of 17.15 percent.

Marassebesy (2011), states that heat can cause the water content to decrease, also the smoke component that settles on fish during smoking is antibacterial so that it affects the amount of bacterial growth in the fish smoking process. The length of smoking, the thickness of the fish meat and the type of wood used will affect the moisture content of smoked fish (S A O Adeyeye & Oyewole, 2016). Differences in sample preparation before smoking will also affect the moisture content of smoked fish. Some processors add salt before smoking the fish and it will affect the water content of the final smoked fish product (Mardiah & Fitria, 2018). Salt can absorb food water (hygroscopic) so that it can reduce the water content and water activity (Aw) of foodstuffs.

According to Saporinto (2010), factors that affect the quality of smoked fish include reduced water content to below 40%, the presence of compounds in wood smoke that can inhibit the growth of spoilage bacteria and the occurrence of protein coagulation on the surface of the fish which results in stronger binding tissue. and compact so it is resistant to bacterial attack.

The standard value of smoked fish water content based on SNI (2013) is a maximum of 60%. The results of this study indicate that smoked catfish products in Pasie Pinang Village are still within the standard limits determined by NSI, namely the water content value produced by the average of the three samples is 16.94%.

### B. Organoleptic test (n=35)

Smoked fish is popular because it has a distinctive, savory smell, specific flavor and odor and an attractive color from golden yellow to glossy brown (Adawiyah, 2007). Winarno (2009), states that visual value involves more of the sense of sight and is one of the indicators to determine whether food is accepted or not by consumers, because quality food (tastes good, nutritious, and has good texture) is not necessarily liked by consumers if it looks good. These foodstuffs have an unsightly appearance to consumers

Organoleptic test is a test process that is usually carried out by humans using the five senses, namely the eyes, nose, mouth, hands and ears (Abdullah, 2000). This method is used to assess the level of consumer preference for a product. The panelists used may be individuals who have certain expertise or a group of people who have expertise on a product.

Sensory assessment techniques are starting to develop and are used to assess a new product/product development before it is marketed. Sensory assessment has an important role in sales and marketing, research and development, quality control and production activities (Abdullah, 2000). Organoleptic test of smoked fish products is a method to assess the panelists' preference for smoked fish. Smoked fish is a traditional processed product that is very often found in the community, which is processed traditionally using an oven and a heat source that comes from burning wood. Smoked fish has high protein (Huda et al. 2010) so it can be used as a source of protein for the community.

#### 1. Color

**Table. 2. Comparison of panelists' liking for smoked catfish colors with different smoking times**

Smoked Patin	Color
7 hours of smoking	3,11 <sup>a</sup> ± 1,33
Smoking 9 hours	3,34 <sup>a</sup> ± 0,85
Smoking 11 hours	4,06 <sup>b</sup> ± 0,73

Note: The sample with the same notation means that there is no significant difference at the 0.05 alpha level, based on the results of the Duncan . test.

1 = very dislike

2 = do not like

3 = kinda like

4 = like

5 = kinda like

The results of data analysis in table 1 state that there is no panelist liking for the color of smoked catfish between sample 1 and sample 2, and it is known that there is a significant difference between the panelists' liking for sample 1, sample 2 and sample 3. the time of smoking catfish, the higher the level of the panelists' liking for the color.

The color of smoked fish is influenced by the length of smoking and the type of wood used. According to Skaljic et al. (2018) smoking can give an attractive color, good taste, and aroma to food. Smoking can also act as a preservative, antimicrobial (phenols and formaldehyde) and antioxidants (Alçiçek et al., 2010). The reaction between carbonyl compounds and proteins will play a role in the formation of color on the surface of smoked fish (Isamu et al., 2012). From the samples taken, generally the panelists liked the color of smoked fish with an average value of 3.6.

## 2. Aroma

**Table 3. Comparison of panelists' liking for the smell of smoked catfish with different smoking times**

Patin Asap	Aroma
Pengasapan 7 jam	3,51 <sup>a</sup> ± 0,89
Pengasapan 9 jam	3,37 <sup>a</sup> ± 0,88
Pengasapan 11 jam	2,80 <sup>b</sup> ± 1,08

Note: The sample with the same notation means that there is no significant difference at the 0.05 alpha level, based on the results of the Duncan . test.

The processed smoked fish has a distinctive aroma that is the main attraction for individuals. The results of the organoleptic test in table 3 above concluded that the aroma that the panelists preferred the most was the smell of smoked catfish in sample 1, but there was no significant difference in the level of preference of the panelists based on the aroma indicator between sample 1 and sample 2. smoked starch fish aroma occurred in sample 1 and sample 2 with sample 3.

The aroma and odor of smoked fish is caused by the phenol content in the smoke (Alçiçek et al., 2010). According to Zachara et al. (2017) the components present in smoke give a specific odor that cannot be achieved in foods produced with smoke flavors. Chemical components in smoke will stick to the skin of the fish and enter the flesh of the fish so that it will affect the distinctive odor of smoked fish meat (Alçiçek et al., 2010; Isamu et al., 2012). From the observed samples, generally the panelists gave a good response to the smell of smoked catfish samples with an average value of 3.2.

## 3. Texture

**Table 4. Comparison of panelists' preference for smoked catfish texture with different smoking times**

Smoked Patin	Texture
7 hours of smoking	3,26 <sup>a</sup> ± 0,98
Smoking 9 hours	2,89 <sup>a</sup> ± 1,08
Smoking 11 hours	3,60 <sup>ba</sup> ± 1,03

Note: The sample with the same notation means that there is no significant difference at the 0.05 alpha level, based on the results of the Duncan . test.

Based on the results of data analysis in table 4, the texture indicator of smoked catfish that the panelists liked the most was the texture of catfish in sample 3 and there was no significant difference in the level of preference of panelists on the texture of smoked catfish in sample 2 and sample 3. The difference in the level of preference of panelists on the texture of smoked catfish occurred in sample 1 and sample 2.

Texture value is influenced by smoking time and thickness of fish meat. According to Sigurgisladottir et al. (2001) and Adeyeye et al. (2016) smoking will change the texture of a product so that it becomes harder or dry. The water content released during smoking will affect the texture of the fish meat and the level of consumer preference. Patin fish has a thicker meat so it becomes tougher after smoking. This is different from Catfish, Baung and Sembilang. Sari et al. Texture is one of the main sensory characteristics in most food products (Bozkurt & Bayram, 2006).

#### 4. Flavor

**Table. 5. Comparison of the panelists' liking for the taste of smoked catfish with different smoking times**

Smoked Patin	Flavor
7 hours of smoking	3,23 <sup>a</sup> ± 1,03
Smoking 9 hours	3,71 <sup>b</sup> ± 1,13
Smoking 11 hours	3,66 <sup>b</sup> ± 1,16

Note: The sample with the same notation means that there is no significant difference at the 0.05 alpha level, based on the results of the Duncan . test.

Based on table 5 above, it is explained that there is no difference in the preference of the panelists from the taste indicators in sample 2 and sample 3, and there is a significant difference between the liking of the panelists in sample 2 and sample 3 and the preference of the panelists in sample 1. Based on the taste indicator of the sample the most preferred by the panelists is sample 2, with the average response of the panelists on the indicator of 3.71 on a hedonic scale.

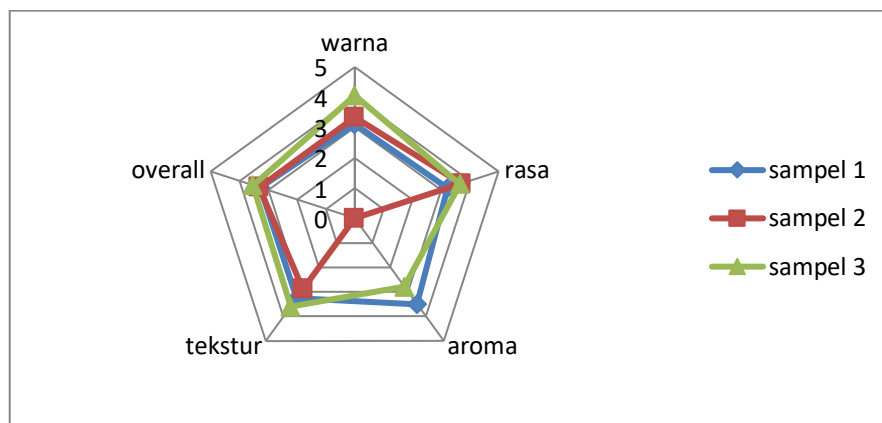
The smoking method and the type of wood used will affect the taste of smoked fish (Essumang et al., 2013). According to Alçiçek et al. (2010) smoking gives a specific taste to fish meat. Treatment before smoking, such as salting, will also affect the taste of smoked fish. In addition, the curing process will also affect the taste of smoked fish products. The delicious taste of smoked fish is also influenced by various volatile compounds that are absorbed into the fish flesh. According to Isamu et al. (2012) differences in fuel sources will affect the organoleptic test of smoked catfish. From the observed samples, generally the panelists liked the taste of smoked catfish samples with an average value of 3.4.

The taste of smoked fish greatly affects the chemical components of the smoke. The difference in taste values in smoked catfish is thought to be due to a reaction between the smoked component (phenol) and the acid that reacts with the fat in the catfish meat. This is in accordance with the opinion of Lawrie (2003), the taste given by smoke varies, the same smoke can produce a different taste with differences in fat in fish meat.

#### 5. Overall rating

Based on the results of the study, the average organoleptic value of catfish can be seen in the graph below.





Graph 1. Comparison of Panelists' Likes of Smoked Catfish with Different Levels of Smoking Time Based on Color, Taste, Aroma and Texture Indicators

The results of data processing on the comparison of the panelists' overall liking (Overall) in graph 1 above can be concluded that overall the most preferred sample by panelists both from the indicators of color, taste, aroma and texture is sample 3, which means the longer the smoking time is carried out. In the processing of smoked catfish, the higher the panelists' liking for the color, taste, aroma and texture of smoked catfish processed.

## CONCLUSION

Analysis of the water content of 3 samples of smoked catfish taken from 3 times of production in Pasie Pinang Village resulted in the following average values: sample one with smoking for 7 hours produced 23.11%, sample two with smoking for 9 hours produced 22.53% and sample three with smoking for 11 hours resulted in an average value of 17.15%. The results of this study indicate that the water content of smoked catfish in Pasie Pinang Village is still within the SNI limit where the Standard Value of smoked fish water content based on SNI (2013) is a maximum of 60%. The results of the organoleptic test can be concluded that overall the most preferred sample by panelists both from the indicators of color, taste, aroma and texture is sample 3 with smoking of 11 hours, which means that the longer the smoking time is carried out in the processing of smoked catfish, the higher the taste. panelists on the color, taste, aroma and texture of smoked catfish.

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