

The acceptance of panelists for processed carp nuggets

Nurul Mukhlisah*, Faizah Mahi, and Riene Yudita

Universitas Indonesia Timur, Indonesia

*Corresponding author's e-mail: nurulmukhlisah@rocketmail.com

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ABSTRACT

Carp is one of the types of freshwater fish that has a high economic value and is easy to cultivate. The people are very familiar with Carp. Carp is one of the types of freshwater fish that is favored by the public because of its delicious meat and is rich in protein. One of the problems when harvesting carp is the high damage to fish due to a lack of understanding of fish quality. Fish processing is one of the ways to prevent fish from rotting. One of the efforts to process fish is to make it into fish nuggets. Nuggets are products that have been heated until they are precooked, and then are frozen. This study aims to determine the acceptability of panelists in processing carp nuggets. This research was conducted from March to April 2022. The manufacturing of carp nuggets was carried out at the Food Technology Laboratory, Faculty of Agriculture, Universitas Indonesia Timur, Makassar. The ingredients that were used in making carp nuggets were carp meat, wheat flour, tapioca flour, salt, garlic, pepper, eggs, water, breadcrumbs, and cooking oil. Based on the results and discussion of the average value of treatment for A1 (100% wheat flour) is 2.8, the average value for treatment for A2 (100% tapioca flour) is 3.3, and the average value of treatment for A3 (50:50) is 3.8 so it can be concluded that the panelists are more accepting of carp nuggets with a treatment of A3 which are 360 grams of carp meat, 45 grams of flour, 45 grams tapioca flour.

Keywords:

Nuggets, Carp, Organoleptic

1. Introduction

One of the biological potentials of fishery resources in Indonesian waters is a carp belonging to the phylum Pisces, genus Cyprinus. Carp is one of the types of freshwater fish that has a high economic value and is easy to cultivate. Carp can be found in every area such as the island of Java, Sumatra, and Kalimantan [1]. Carp (*Cyprinus carpio*) is very popular among Indonesian people. Because of the meat's wonderful, savory flavor and relatively high protein content, carp is one of the freshwater fish commodities that is expanding extremely quickly and is popular with consumers [2]. The problem that is often faced with post-harvest Carp is the high level of damage (fish spoilage) due to a lack of understanding about the quality of the fish. As we know, fish is a food that is easily damaged (rotten). Only in about 8 hours since the fish are caught and landed there will be a process of change that leads to damage. Processing is one way to protect the fish from the decaying process so that it can be stored for a long time until it is time to use it as a food.

Filtering efforts can be carried out in a variety of ways. The availability of practical food ingredients that are ready to cook and consume is currently one of the necessities of the community. Food that is "ready to cook" requires less time to prepare. Nuggets are an example of a ready-to-cook food [3].

A type of ready-to-eat frozen food product is a nugget, which is a food item that has been heated until it is precooked and then frozen. This frozen, ready-to-eat product only needs to be fried for one minute at 150 °C [4]. A type of ready-to-eat frozen



food item is a nugget, which is a food item that has been heated up to the point of being precooked and then frozen. This frozen, ready-to-eat product only needs to be fried for one minute at 150 °C. The original component determines the nugget's texture [5].

Making fish nuggets requires additional ingredients that act as fillers and binders. According to Utiahman et al. [6], in making fish nuggets, ingredients containing carbohydrates are needed as a binding material so that the ingredients are bonded to each other in a dough that is useful for improving texture. The binders that are often used are various types of flour that contain carbohydrates, such as flour from grains, which are wheat flour from wheat, rice flour and glutinous rice from rice grains, cornstarch from corn, and those made from tubers, which are tapioca from cassava, sago flour and sweet potato.

According to Syarbini [7], Wheat flour is the result of milling wheat berry. Generally, wheat flour is used to make various foods such as cakes and bread. Wheat flour contains gluten which can make the food dough thin and elastic [8].

Surawan [9] conducted a previous study on fish nuggets. The making of tuna fish nuggets by using different percentages of flour (10%, 30%, and 50%). The results showed that the best performance and the most preferred by the panelists were tuna fish nuggets with a mixture of 30% flour with a texture of 5.5333 mm.sec⁻¹. Based on this background, this study's objective was to ascertain the acceptability of panelists in processing carp nuggets through organoleptic tests.

2. Materials and Methods

This study was carried out during March and April 2022. The manufacturing of the carp nuggets was carried out at the Food Technology Laboratory, Faculty of Agriculture, Universitas Indonesia Timur, Makassar. The tools that were used must meet the requirements, which are in clean condition, can be used according to their functions and the equipment does not cause chemical reactions such as rusting. The tools that were used in this study were: grinder/blender, steamer, knife, scales, bowls, baking sheets, pans, cutting boards, stoves, spatulas, plates, measuring cups, strainers, and plastic gloves. The ingredients that were used in making carp nuggets were 1,080 grams of carp meat, 1035 grams of wheat flour, 1035 grams of tapioca flour, 30 grams of salt, 150 grams of garlic, 30 grams of pepper, 6 eggs, 600 ml of water, 900 grams of breadcrumbs, 1500 ml of cooking oil. The formulation in this study will be explained in Table 1.

The carp was cleaned and then filleted, which was removing the fish bones, scales and skin and then sliced into small pieces with a size of 2 × 2 cm. The carp meat and other ingredients were weighed. Then the carp meat, garlic, salt, pepper, chicken stock, and eggs, was sliced and then mashed using a blender/grinded. The finely grounded carp meat is mixed with wheat flour, and tapioca flour then stirred until it became a dough and was put in the pan. The dough was steamed at a temperature above 66 °C for 20 minutes. The steamed dough was then cooled. Then the dough was cut using a knife, into four squares measuring 2.5 × 5 cm and 1.5 cm thick. The nugget pieces were then coated with flour adhesive mixed with water and eggs and covered with breading. The nuggets were fried in hot oil for 5 minutes. The fried nuggets were then cooled and ready for organoleptic tests.

Table 1. Treatment for processed carp nuggets

Ingredients	Treatment		
	A 1	A2	A3
Carp Meat	360 g	360 g	360 g
Wheat Flour	90 g	0 g	45 g
Tapioca flour	0 g	90g	45 g
Salt	10 g	10 g	10 g
Garlic	50 g	50 g	50 g
Pepper	10 g	10 g	10 g
Chicken stock	9 g	9 g	9 g
Egg	2 items	2 items	2 items
Water	200 ml	200 ml	200 ml
Wheat Flour	300 g	300 g	300 g
Egg	1 item	1 item	1 item
Breadcrumbs	300 g	300 g	300 g
Cooking oil	500 ml	500 ml	500 ml

Primary source, 2022

Table 2. Category scale for panelists

Organoleptic	Hedonic scale	Numerical scale
Aroma	Typical carp	4
	Quite typical carp	3
	Less typical Carp	2
	Not typical carp	1
Texture	Fine	4
	Quite Fine	3
	Less Fine	2
	Coarse or not fine	1
Taste	Delicious	4
	Quite delicious	3
	Less delicious	2
	Not delicious	1
Hardness	Soft	4
	Quite Soft	3
	Less soft	2
	Not soft or hard	1

Primary source, 2022

Organoleptic Test

An organoleptic test observation is an assessment that uses the senses. According to Gusnadi et al. [10], organoleptic is a test of food ingredients based on preferences and desires for a product. An Organoleptic test, also known as a sense test or sensory test, is a test method using the human senses as the main tool for measuring product acceptance. The type of organoleptic test used is the sample criteria test or hedonic test according to what is faced with a product. Organoleptic assessment is widely used to assess quality in the food industry and other industrial agricultural products. Sometimes these assessments can give very precise results. In some cases, sensory assessment even exceeds the accuracy of the most sensitive tools [11].

This study used the testing by assessing the level of acceptance of the panelists using a hedonic scale. According to Suryono et al. [12], the hedonic test technique is a technique designed to measure the level of desire for a product. The category scale starts from very different because they don't like or dislike it, really don't like it, with the number of categories varying. Then 30 people were asked to give their assessment that they were untrained panelists. Panelists are allowed to rate simple organoleptic properties such as preference level. The level of preference on a scale of 1-4 based on the level. The level of consumer acceptance can be known according to Table 2.

3. Results and Discussion

Organoleptic test or commonly called sensory test or sensory test is a test method using the human senses as the main tool for measuring product acceptance. Organoleptic testing has an important role in the application of quality. Organoleptic testing can give an indication of spoilage, quality deterioration and other damage to the product [13].

The organoleptic test in this study that was conducted to measure the level of panelists' acceptance of carp nugget products. This test was carried out on the aroma, texture, taste, and hardness of carp nugget products. Table 3 shows the average value of the organoleptic test on carp nuggets.

Table 3. Average value of carp nugget organoleptic test

Treatment	A1	A2	A3
Aroma	3.57	3.63	3.43
Texture	2.70	3.17	4.00
Taste	2.90	3.27	3.93
Hardness	2.10	3.23	3.90

3.1. Aroma Organoleptic Test Result

According to Kartika et al. [14], the term "odor" or "aroma" refers to something that may be detected via the sense of smell. Odorous chemicals must have the ability to evaporate as well as be slightly soluble in both water and fat to produce scents.

Aroma or odor is a method of testing preferences for food products. The aroma of food can be assessed by the sense of smell. The delicacy of food is largely determined by the aroma factor. Aroma is the main attraction in determining the delicious taste of the food product itself. Combining taste and odor, aroma or flavor is impacted by simple, hot, cold, and tactile perceptions [15]. It can be seen that the organoleptic test results of carp nuggets based on the distinctive aroma of carp according to the panelists that were included in the typical carp scale - quite typical of carp in the following order: treatment A2 (100% tapioca flour) with an average value of 3.63, treatment A1 (100% wheat flour) with an average value of 3.57 and treatment A3 (50:50) with an average value of 3.43. This indicated that the three treatments still have a typical Carp aroma. According to Winarno [16], Several factors, including the chemical composition of chemicals, their concentration, and their interactions with other ingredients, affect flavor and scent.

3.2. Texture Organoleptic Test Result

Texture is a very important parameter in maintaining the quality of meat and its derivative products. According to Hadiwiyoto [17], the impression of elasticity on the nugget includes texture and involves several aspects including whether it is easy to chew into smaller pieces, and the amount of residue left after chewing.

Based on the table above, it can be seen that the organoleptic test results of carp nuggets are based on the texture of the fineness of carp nuggets on a numerical scale, which are fine-less fine, in the following order: treatment A3 (50:50) with an average value of 4.00, treatment A2 (100% tapioca flour) with an average value of 3.17 and treatment A1 (100% wheat flour) with an average value of 2.70. This showed that the use of different types of flour can produce different textures of fish nuggets when eaten. As well the opinion of Yulianti et al. [18], which states that the higher the concentration of wheat flour and tapioca flour used, the denser the texture of the nugget produced.

The texture of carp nuggets that have the highest score is the addition of wheat flour and tapioca flour in the same ratio. Flour has the function to coat nuggets and as a dough filler. The type of flour used for coating is wheat flour with the addition of water. The commonly used fillers are tapioca flour and sago flour. This is because flour retains more water than wheat flour, rice flour, and corn flour, besides that it also gives a thick and elastic texture [19].

3.3. Taste Organoleptic Test Result

Taste is one of the factors that determine the consumer decisions in accepting or rejecting a food product. With taste, consumers can decide whether to accept or reject the product [20].

Based on the table above, it can be seen that the organoleptic test results of carp nuggets based on the taste according to the panelists are included in the delicious-quite delicious scale in the following order: treatment A3 (50:50) with an average value of 3.93, treatment A2 (100% tapioca flour) with an average value of 3.27 and treatment A1 (100% wheat flour) with an average 2.90. This showed that the use of different types of flour can produce a different taste in carp nuggets. The treatment of carp nuggets with the addition of wheat flour and tapioca flour had the most preferred taste by the panelists. This is in line with what was stated by Winarno [16], that using the proper proportions of ingredients will result in a flavor that is both fascinating and distinct from the flavor of the basic ingredients. The taste becomes more interesting after reacting with other additional ingredients. Taste is the most important factor in deciding whether a product can be accepted or rejected. The chemical makeup of chemicals, their concentration, and their interactions with other ingredients are some of the elements that affect flavor and scent. According to Picauly et al. [21], taste is an important factor of a food product in addition to the color, aroma, texture, and consistency of the ingredients that will affect the taste caused by the food ingredients.

3.4. Hardness Organoleptic Test Result

Based on the table above, the organoleptic test results of carp nuggets based on the hardness according to the panelists were included in the soft-quite soft scale in the following order: treatment A3 (50:50) with an average value of 3.90, treatment A2

(100% tapioca flour) with an average value of 3.23 and treatment A1 (100% wheat flour) with an average 2.10. This showed that the use of different types of flour can produce different hardness of carp nuggets. The treatment of carp nuggets with the addition of wheat flour and tapioca flour had the most preferred hardness by the panelists.

3.5. Standard Deviation and Statistical Test F

Standard deviation is used to measure the amount of variation or distribution of several data values. The lower the value of the standard deviation, the closer to the average, whereas if the value of the standard deviation is higher, the wider the range of variation of the data.

Table 4. Standard deviation

		Descriptive							
		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min.	Max.
						Lower Bound	Upper Bound		
Aroma	A1	30	3.57	.504	.092	3.38	3.75	3	4
	A2	30	3.63	.490	.089	3.45	3.82	3	4
	A3	30	3.43	.817	.149	3.13	3.74	1	4
	Total	90	3.54	.621	.065	3.41	3.67	1	4
Texture	A1	30	2.70	.535	.098	2.50	2.90	2	4
	A2	30	3.17	.461	.084	2.99	3.34	2	4
	A3	30	4.00	.000	.000	4.00	4.00	4	4
	Total	90	3.29	.674	.071	3.15	3.43	2	4
Taste	A1	30	2.90	.481	.088	2.72	3.08	2	4
	A2	30	3.27	.521	.095	3.07	3.46	2	4
	A3	30	3.93	.254	.046	3.84	4.03	3	4
	Total	90	3.37	.608	.064	3.24	3.49	2	4
Hardness	A1	30	2.10	.759	.139	1.82	2.38	1	4
	A2	30	3.23	.430	.079	3.07	3.39	3	4
	A3	30	3.90	.305	.056	3.79	4.01	3	4
	Total	90	3.08	.915	.096	2.89	3.27	1	4

Research on estimating the standard deviation for a small sample uses data simulation. Simulation data is generated from the distribution of the population, which is the topic of research, namely data that is normally and uniformly distributed. The small sample is limited to the number of samples from 2 to 15. The simulation data parameters for each distribution are varied by using several alternative parameter choices. The data from the simulation results are calculated the standard deviation in the usual way and the fast way (Rule of Thumb) and then set aside. The first simulated normal distribution is the normal distribution of data with a mean of 0 and variance. Then these two parameters are varied. The number of samples raised from 2 to 15 subjects. For every n number of subjects, the standard deviation of the usual method and the fast method is taken based on the average of 1000 times of data generation [22]. The standard deviation test can be seen in Table 4. Based on the results of the standard deviation test can be explained as follows: the data shows that the aroma has an average value of 3.54 and standard deviation of 0.621, this means that the data has good variation. The data shows that the texture

has an average value of 3.29 and standard deviation of 0.674, this means that the data has good variation. The data shows that taste has an average value of 3.37 and standard deviation of 0.608, this means that the data has good variation. The data shows that hardness has an average value of 3.08 and standard deviation of 0.915, this means that the data has good variation.

The ANOVA test was conducted by researchers to determine the hypothesis regarding the significance of differences in the existing samples, through the results of organoleptic tests processed by statistical calculations. The sample is declared to have no difference, if it produces a significance value of Sig >0.05, and for a significance value of Sig <0.05, it indicates a significant difference in the sample [23]. The significance test can be seen in Table 5.

Table 5. Significance test value

		ANOVA				
		Sum of Squares	Df	Mean Square	F	Sig.
Aroma	Between Groups	.622	2	.311	.803	.451
	Within Groups	33.700	87	.387		
	Total	34.322	89			
Texture	Between Groups	26.022	2	13.011	78.247	.000
	Within Groups	14.467	87	.166		
	Total	40.489	89			
Taste	Between Groups	16.467	2	8.233	43.588	.000
	Within Groups	16.433	87	.189		
	Total	32.900	89			
Hardness	Between Groups	49.689	2	24.844	87.273	.000
	Within Groups	24.767	87	.285		
	Total	74.456	89			

Hypothesis

H₀: There is no difference in Aroma, Texture, Taste, Hardness based on differences in the three treatments

H_a: There are differences in Aroma, Texture, Taste, Hardness based on differences in the three treatments

Test Statistics

From the ANOVA test or F test, the F value for the aroma count is 803 with a probability value of 0.451. Because the probability is greater than 0.05, the organoleptic model can be used to predict no difference in aroma based on the differences in the three behaviors. The calculated F value for texture is 78.247 with a probability value of 0.000. Since the probability is smaller than 0.05, the organoleptic model can be used to predict the texture differences based on the differences in the three behaviors. The F value for the taste count is 43.588 with a probability value of 0.000. Because the probability is less than 0.05, the organoleptic model can be used

to predict the difference in taste based on the differences in the three behaviors. The calculated F value of hardness is 87.273 with a probability value of 0.000. Since the probability is less than 0.05, the organoleptic model can be used to predict the difference in hardness based on the differences in the three behaviors.

4. Conclusion

Based on the results and discussion above, it can be deduced that the panelists were more accepting of carp nuggets with A3 (50:50) treatment, which are 45 grams of flour and 45 grams of tapioca flour. The aroma of treatment A2 (100% tapioca flour) was favored by the average panelists. From taste, hardness, texture: A3 (50:50) was more favored by the panelists. From the significant test it can be concluded that there are differences in taste, texture, and hardness of the 3 different treatments, but there is no different aroma from the 3 different treatments that have been carried out. The average value for A1 (100% wheat flour) treatment is 2.8, the average value for A2 (100% tapioca flour) treatment is 3.3, and the average value for A3 (50:50) treatment is 3.8. Fish nuggets made from a well-balanced mixture of wheat flour and tapioca flour have a distinct fish flavor, delightful texture, and smooth, soft exterior.

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