



## PREFERENCE LEVEL OF MARINATED *Osteochilus hasselti* FILLET IN SALT SOLUTION SOAKING MEDIA

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### ABSTRACT

This research aimed to determine the level of panelists' preference for marinated *Osteochilus hasselti* fillet for five differences treatment. This research was conducted at the Laboratory of Fisheries Product Processing at the Faculty of Fisheries and Marine Sciences, Padjadjaran University, which began from April 2019 to May 2019. The research method was carried out experimentally consisting of 5 different soaking times as a treatment namely for 70 minutes, 80 minutes, 90 minutes, 100 minutes, and 110 minutes with 20 semi-trained panelists as examiner (replications). The observation parameters in this study were the rendement of *Osteochilus hasselti* fillet, the appearance of *Osteochilus hasselti* fillet with photograph, organoleptic test, and pH test. The method of preference analysis used Friedman and Bayes Test. Fillet rendement, the appearance and pH test were analyzed descriptively. The most preferred product by panelists was marinated *Osteochilus hasselti* fillet with a soaking time of 80 minutes that has a shiny grayish-white appearance with a pH value of 6,3.

**Keywords :** Marinated, *Osteochilus hasselti* Fillet, pH, Soaking Time, Levels of Preference.

### 1. INTRODUCTION

*Osteochilus hasselti* that well-known as Nilem is one of the aquacultural commodity of freshwater fish that concentrated in java, especially in West Java [2]. Nilem are Indonesian endemic freshwater fish that lived in rivers and swamps. The body shape of nilem is similar to a goldfish since nilem is the one of Cyprinidae family. The meat have a specific taste and more savory compared to other freshwater fish because *Osteochilus hasselti* meat contains more glutamic acid. The glutamic acid is formed naturally due to the feeding habit that consuming natural food, namely phytoplankton and zooplankton [21]. Finding out how to increase the shelf life of post-harvest fisheries products is really needed both processing and preserving [1].

One of meat processing method is marinating. Marinating is the process of soaking the meat in the marinade ingredients, before further processing. Various marinade ingredients, namely sugar, table salt (*NaCl*), sorbate salt, phosphate salt and benzoate salt, are useful for increasing food safety and shelf life of the meat. Other marinade ingredients are acids (vinegar, wine, lemon juice), edible oils (olives, almonds) and seasonings [18].

Sodium phosphate salt can help improve the ability of meat to water binding, thereby reducing cooking losses during cooking and maintaining juiciness in meat products after cooking. Marinade selection is an important key to produce meat dishes quality [18].

The quality of fish meat is generally assessed using sensory methods on organoleptic characteristics. The assessment will affect consumer decision making related to the level of preference [14].

## 2. MATERIALS AND METHODS

The equipment used in this marinated *Osteochilus hasselti* fillet making process, namely: basin, fillet knife, cutting board, scales, jars, filters, pans, and stoves. The tools used in organoleptic testing were plates as a place to presented the samples, assessment sheets and stationery. Tools for pH testing, namely measuring glass, scales, pestle and mortar, spatula, and pH meter. The main ingredient used was fresh Nilem (*Osteochilus hasselti*) obtained from Cianjur, Indonesia.

The procedure of making modified marinated *Osteochilus hasselti* fillet according to Rahmadina 2018 as follows [12]: The *Osteochilus hasselti* fish was cleaned and then phased and then washed with cold water, the brine solution was weighed as much as 5% of the total weight of the fillet, the salt was dissolved with distilled water and stirred until homogeneous. The meat-brine ratio by 1: 1.5. The fillet put into the jar which already contain brine, the jar was closed and stored in a refrigerator at 5<sup>o</sup> - 10<sup>o</sup>C for 70 minutes, 80 minutes, 90 minutes, 100 minutes, and 110 minutes. Marinated *Osteochilus hasselti* fillet was drained then fried for 5 minutes each.

This research was conducted on April 2019 - May 2019 at the Laboratory of Fisheries Product Processing at the Faculty of Fisheries and Marine Science, Padjadjaran University with an experimental method consisting of 5 treatments with 20 semi-trained panelists as replications. The preference test results were statistically analyzed using the Friedman Test and Bayes Test as well as the pH test and the appearance of the fillet before and after immersion were analyzed descriptively.

### 2.1 Fillet Rendement

The formula for the percentage of fillet rendement [9] is as follows:

$$\text{illet Rendement} = \frac{\text{Final meat weigh}}{\text{Weight of whole fish}} \times 100\%$$

### 2.2 Fillet Surface appearance

Observation of the appearance surface of the fillet by using a descriptive methods that describe the appearance of the fillet surface before and after soaking. Photographing was using a phone camera. The surface appearance of the fillet was more highlighted [5].

### 2.3 Hedonic Test (Preferred Test)

Hedonic test is a test that aims to determine the level of consumer preferences for a product. There were 20 panelists in the hedonic test. Tests on the level of preference include appearance, aroma, taste and texture. Consumer preference values, namely: 9 (really like); 7 (like); 5 (neutral / ordinary); 3 (don't like); and 1 (very don't like) [16].

### 2.5 PH Test

Procedure for pH testing of modified marinated *Osteochilus hasselti* fillet according Liviawaty 1999 as follows [5]: pH was measured by taking 10 grams of fish meat and adding 20 ml of distilled water and then crushed until homogeneous. The suspension was put into the beaker glass, the pH was then measured with a pH meter. Before measuring the pH meter was standardized first using a standard buffer solution of pH 7 and pH 4. Measurement of pH was done by inserting the electrodes, which have been rinsed in distilled water and dried with a tissue into suspension until the pH meter reading was constant. Measurement of fillet meat pH was repeated three times in each sample.

### 2.6 Data

Analysis of organoleptic test was using the two-way analysis of the *Friedman* test with *Chi-square* test. If the value of  $H_c < \chi^2 \alpha$  (K-1), then  $H_0$  was accept and  $H_1$  was rejected, otherwise if the value of  $H_c > \chi^2 \alpha$  (K-1), then  $H_0$  was rejected and  $H_1$  is accepted. If  $H_1$  was accepted, the treatment give a significant difference and the test can be continued to determine the median value and to find out the difference between treatments with multiple comparison test [17].

The method used to determine the selected product was the *Bayes* method. The *Bayes* method is one of method that could be used to analyze the best decision-making of alternative numbers to aim the producing gains that considering various criteria [8]. The results obtained were discussed descriptively.

### 3 RESULTS AND DISCUSSION

#### 3.1 Fillet Rendement

*Osteochilus hasselti* used in this study were 14,000 grams with a weight range of 130 - 200 grams / head or about 5-7 heads / kg. The fish was killed by putting it in a Styrofoam box that has been filled with curry ice for about 30 minutes. Then after the fish died, it was phased out and scaled the weight of the results of the phloating process using a scale. The fillet meat produced was 3,300 grams so that the rendement of *Osteochilus hasselti* fillet produced was 23.57%. The rendement of a fillet depends on the type of fish, the shape and age of the fish [5]. *Osteochilus hasselti* produce fillet rendement ranging from 20% - 30%.

#### 3.2 Value of pH

pH value of marinated *Osteochilus hasselti* fillet was presented in Table 1.

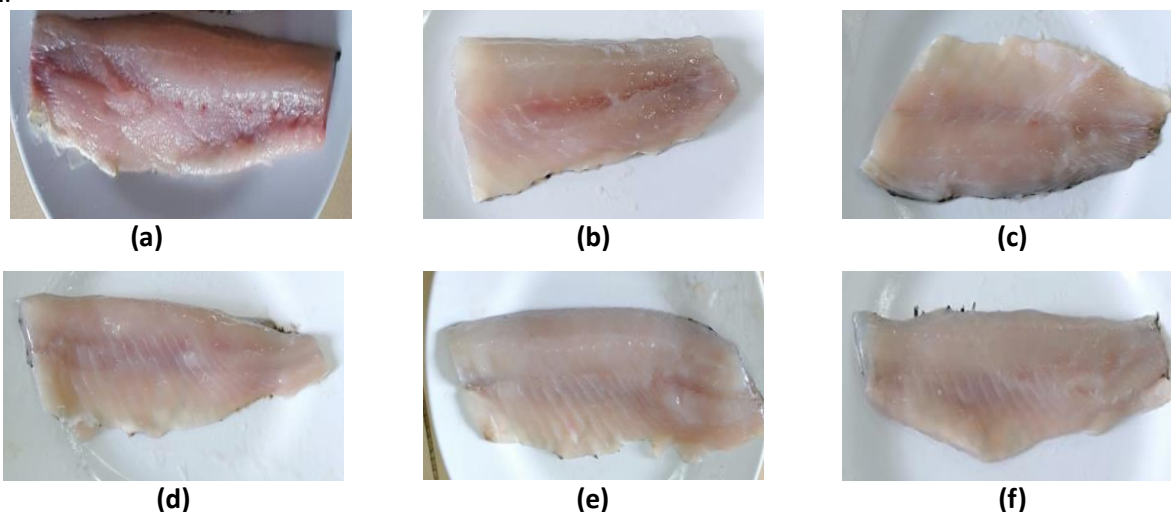
**Table 1.** pH Value of Marinated *Osteochilus hasselti* Fillet

Treatment	Repitition			average
	I	II	III	
70 minutes	6.3	6.4	6.4	6.4
80 minutes	6.2	6.3	6.3	6.3
90 minutes	6.3	6.2	6.3	6.3
100 minutes	6.2	6.3	6.3	6.3
110 minutes	6.2	6.3	6.3	6.3

The pH value of the marinated *Osteochilus hasselti* fillet has insignificant difference results. It has average value range of 6.3 to 6.4. Marinated *Osteochilus hasselti* fillet that soaked in salt solution for 70 minutes has the highest value of 6.4, while marinated *Osteochilus hasselti* fillet that soaked in salt solution for 80, 90, 100, and 110 minutes has the same pH value of 6.3. This was appropriated consistent with research on the effects of traditional marinating on bacterial and chemical characteristics in the frozen rainbow trout fillet suggesting that the marinated rainbow trout fillet with marinating mixture has a pH value of 6.3 [7]. The pH of the fish after death will decrease until it reaches a value of 6. The change in pH value decreases in corresponded to the formation of lactic acid produced from the glycolysis process [5].

#### 3.3 Fresh *Osteochilus hasselti* Fillet Surface Appearance

The changes of *Osteochilus hasselti* fillet surface appearance before and after soaking with salt solution are presented in Figure 1.



**Figure 1.** The appearance of *Osteochilus hasselti* fillet surface

(a) Before soaked, (b) soaked for 70 minutes, (c) soaked for 80 minutes, (d) soaked for 90 minutes, (e) soaked for 100 minutes, (f) soaked for 110 minutes.

Based on the results, the appearance changes of *Osteochilus hasselti* fillet before and after being soaked with a salt solution had a significant difference. However, the difference in the soaking time for each treatment had insignificant appearance difference. The appearance of the *Osteochilus hasselti* fillet before soaking has a white with flushy pink and shining then turns grayish white and brilliant color after being soaked with salt solution. Preservation of meat before and during the processing process usually occurs using the soaking method in the condiment solution (marinated), one of which uses salt [15]. The salt used can cause the formation of gray color in the muscle of the meat. Besides salt as a preservative also has a positive effect on the occurrence of oxidation [3]. The color changes that occur in the fillet are very complex. The change in color of the fillet is influenced by the pH of the meat, the formation of methmyoglobin, oxygen content, mineral / pigment concentration and drying or decreasing humidity [5].

### 3.4 Hedonic Test (Preferred Test)

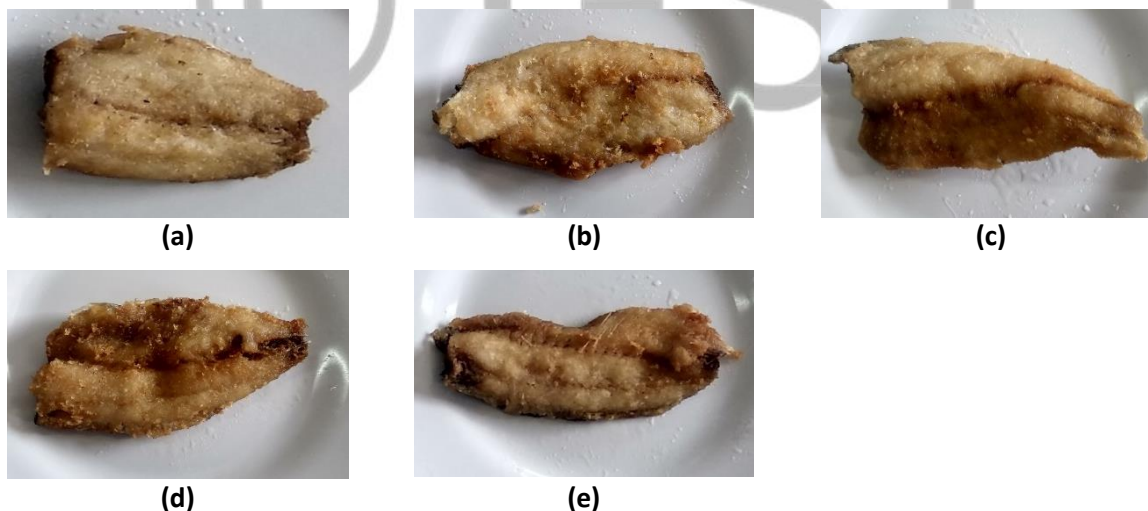
#### A. Appearance

Appearance is the first parameter seen in a product [16]. The observations of the appearance of the marinated *Osteochilus hasselti* fillet are presented in Table 2 and Figure 2.

**Table 2.** Average Value of Marinated *Osteochilus hasselti* Fillet Appearance

Soaking Time (Minutes)	Median	Average Appearance Value
70	7	6.80 ab
80	7	7.20 b
90	7	7, 10 ab
100	7	6.30 ab
110	5	5.60 a

Note: The average number of treatments followed by the same letter shows insignificant difference according to the multiple comparison test 5% level.



**Figure 2.** Appearance of Marinated *Osteochilus hasselti* Fillet

(a) Soaked for 70 minutes, (b) Soaked for 80 minutes, (c) Soaked for 90 minutes, (d) Soaked for 100 minutes, (e) Soaked for 110 minutes.

Based on the panelist evaluation of the marinated *Osteochilus hasselti* fillet appearance it was known that all treatments were included in the neutral category and were preferred by panelists with median values of 5 and 7. Marinade that produced resulting from all treatments had a neat and intact form. Marinade with 70 minutes soaking treatment had a yellowish color, 80 minutes treatment had golden yellow, 90 minutes treatment had yellow brownish color, 100 minutes treatment had golden brown color and 110 minutes had brown color. Statistical test results friedman showed the appearance of marinated *Osteochilus hasselti* fillet soaked in salt solution for 80 minutes was significantly different from the

appearance of marinated *Osteochilus hasselti* fillet soaked for 110 minutes.

The color of fish meat is most determined by the content of myoglobin as the main pigment in fish meat. Color changes in fish meat is determined by the level of oxidation. Because salt is a prooxidant, salt greatly influenced the color changes in fish meat, both in terms of levels and the duration of salting [22]. This oxidation process is closely related to the browning reaction at the time of cooking. The longer soaking time the higher level of oxidation which causes the color of the meat will darken after experiencing the cooking process [10]. The darker the color of marinated *Osteochilus hasselti* fillet, the product will be less preferred by the panelists. In this case, marinated *Osteochilus hasselti* fillet which was soaked for 80 minutes was the most preferred color (golden yellow). Therefore, soaking time was very important in the level of oxidation of methyoglobin caused differences in the color of fish meat after cooking.

## B. Aroma

Assessment aims to determine the deliciousness of the product based on the sense of smell. Based on panelist's evaluation of marinated *Osteochilus hasselti* fillet aroma the average value ranged from 5.10 to 6.70. Marinated *Osteochilus hasselti* fillet with soaking time of 80 minutes has the highest average value of 6.70 while the lowest average value of marinate aroma was found in marinate treatments that was soaked for 90 minutes with a value of 5.10. The results of observing the aroma of marinate *Osteochilus hasselti* fillet presented in Table 3.

**Table 3.** Average Value of Marinated *Osteochilus hasselti* Fillet Aroma

Long Soaking (Minutes)	Median	Average value
70	7	6.50 a
80	7	6.70 a
90	5	5.10 a
100	5	6.30 a
110	7	6.20 a

Description: Number the average treatment followed by the same letter showed insignificant difference according to the multiple comparison test level of 5%.

Statistical test results showed that all treatments gave results were insignificantly different in the aroma. All treatments showed a median value of 5 and 7 which were in the neutral category and preferred by panelists. The aroma that arises in fishery products comes from volatile and non-volatile compounds. High and low volatile and non-volatile compounds are determined by the way and processing techniques carried out on fishery products [11]. Long soaking on marinate with salt solution did not affect the aroma of the product. Salt soaking process at high levels can inhibit spoilage bacteria and help fermentative bacteria which are halophilic in changing compounds of fishery products including volatiles [6]. Long soaking time did not have a significant effect on the aroma of marinate [18]. Fat oxidation can cause rancidity. Although the oxidation of fat can lead to rancidity, otherwise if the process was not continued it will produce a scent which preferred by consumers [18].

## C. Texture

The purpose of texture assessment was to determine the level of panelist acceptance of the marinated *Osteochilus hasselti* fillet texture. The results of marinated *Osteochilus hasselti* fillet texture is presented in Table 4.

**Table 4.** Average value of Marinated *Osteochilus hasselti* Filet Texture

Long Soaking (Minutes)	Median	Average Value
70	7	6.5 ab
80	7	7.4 b
90	7	6.7 ab
100	6	5.8 a
110	5	5.9 ab

Description: Number the average treatment followed by the same letter showed insignificant difference according to the multiple comparison test level of 5%.

Based on the panelist's assessment, the texture of marinated *Osteochilus hasselti* fillet average value ranged from 5.80 to 7.40. Statistical test results revealed that all treatments included in the neutral category and preferred by panelists with a median value of 5, 6, and 7. *Friedman* test results showed that the texture of marinated *Osteochilus hasselti* fillet that

soaked in salt solution for 80 minutes was significantly different from texture of marinated *Osteochilus hasselti* fillet that soaked for 100 minutes. Marinade that has been soaked for 80 minutes has the highest average value with a value of 7.40 with a more dense and tender texture than other treatments. The lowest average value of marinated *Osteochilus hasselti* fillet texture was found in marinade treatment with soaking time for 100 minutes with a value of 5.8 with a dense texture, but rather hard. The longer fish meat was soaked in a salt solution, the more water coming out of the material will make the fish meat lose more water in the cooking process which caused the texture to be harder [11]. In this case, the product of marinated *Osteochilus hasselti* fillet which was preferred by the panelists has a dense and soft texture.

Salt has hydrophilic characteristic which means it can absorb water well. The water contained in fish meat was absorbed by salt so that in the frying process, the water content in fish meat will be less, which made the texture of fish meat became more crispy. The process of marinating with salt solution will make the meat texture increase become denser because the addition of salt causes salt diffusion into the meat where the muscle of the fish absorbs salt and the water content in the muscle decreases [4].

#### D. Taste

Assessment was done by directly tasting marinated *Osteochilus hasselti* fillet by treating the difference in soaking time. The results of taste of marinated *Osteochilus hasselti* fillet is presented in Table 5.

**Table 5.** Average value of Marinated *Osteochilus hasselti* Fillet Taste

Long Soaking (Minutes)	Median	Average value
70	5	5.9 a
80	7	7.0 a
90	7	6.5 a
100	7	6.4 a
110	7	6.9 a

Description: Number the average treatment followed by the same letter showed insignificant difference according to the multiple comparison test level of 5%.

Based on the panelist's assessment marinated *Osteochilus hasselti* fillet taste average value ranged from 5.90 to 7.0 (Table 9). Statistical test results revealed that all treatments included in the neutral category and preferred by panelists with a median value of 5 and 7. The difference in the average value of the hedonic taste test that occurred between treatments was due to the different levels of salt diffusion in meat, the longer soaking time then the level of diffusion (absorption) of salt in fish meat was higher and made the taste more savory typical of marinade products. Statistical test results showed that all treatments did not give significantly different results on the taste of marinated *Osteochilus hasselti* fillet. This happens because usually a significant difference in taste was shown when the using of salt amount was done differently while in this study the salt amount used in each treatment was the same. Spacing of soaking time used in this study was too narrow (10 minutes), it made the absorption of salt solution to fish meat was not too significant so it produced a relatively similar taste in each treatment. The taste that arises in fishery products comes from non-volatile compounds with free amino acids. Amino acid content in fish with some processing has decreased, due to bacterial activity, changes in pH, oxygen, and the heating process [11]. The savory taste in salt marinade products was produced by the reaction of proteolytic enzymes produced by halophilic bacteria simplified the proteins into amino acids, especially glutamic acid which have a great role in the formation of savory flavors in food [12]. When glutamate was bound to protein molecules, glutamate does not give a savory taste (umami) to food, but protein hydrolysis during fermentation, aging, maturation and heating processes can release the free glutamic acid [19].

#### 3.5 Decision Making Using the Bayes Method

Decision making on alternative weight values of the criteria for appearance, aroma, texture, and taste of marinated *Osteochilus hasselti* fillet was carried out by multiple comparison tests (*Pairwise Comparison*). Paired comparison test data on the appearance, aroma, texture, and taste criteria was obtained from 20 panelists. The completion of the pairwise comparison results was done by manipulating the matrix to determine the criteria weights. The results of the calculation of the weighted criteria appearance, aroma, texture, and flavor marinated *Osteochilus hasselti* fillet presented in Table 6.

**Table 6.**Value of Marinade Nilem Fillet Weight Criteria

Criteria (s)	Weight Criteria Value
Appearance	0.14
Aroma	0.13
Texture	0.15
<b>Taste</b>	<b>0.58</b>

Based on the calculation of the weight criteria on appearance, aroma, texture, and taste of marinated *Osteochilus hasselti* fillet, the results showed that the taste criteria had the highest value with the value of the criteria weight up to 0.58. Furthermore, it was followed by texture parameters, namely the criteria weight value of 0.15. and the weight value of the appearance and aroma criteria of 0.14 and 0.13. This showed that the taste criteria have the most influence on the evaluation of the marinated *Osteochilus hasselti* fillet. This also showed that although the other parameters had more good ratings but if the taste of marinade was not preferred by panelists then the product will be rejected or unacceptable. Appearance, aroma, texture, and tasted criteria of marinated *Osteochilus hasselti* fillet presented in Table 7.

**Table 7.** Rate Decision Matrix of Marinated *Osteochilus hasselti* fillet Using Bayes Method

Treatment (Minutes)	Criteria				Alternative value	Values of Priority
	Appearance	Aroma	Texture	Taste		
70	7	7	7	5	5.85	0.179
80	7	7	7	7	<b>7.00</b>	<b>0.215</b>
90	7	5	7	7	6.73	0.207
100	7	5	6	7	6.58	0.202
110	5	7	5	7	6.42	0.197
Weight	0.14	0.13	0.15	0.58	32.58	1.00

Based on the calculation using bayes method it was revealed that the marinated *Osteochilus hasselti* fillet that soaked for 80 minutes got the highest alternative value of 7.00, followed by marinated *Osteochilus hasselti* fillet that soaked for 90 minutes by 6.73, followed by marinated *Osteochilus hasselti* fillet that soaked for 100 minutes by 6.58, then followed by marinated *Osteochilus hasselti* fillet that soaked for 110 minutes by 6.42, and marinated *Osteochilus hasselti* fillet that soaked for 70 minutes was 5.85. marinated *Osteochilus hasselti* fillet soaked in salt solution for 80 minutes was the most preferred marinade by panelists.

### 3.6 Recapitulation of Observation

The overall results of observations of the marinated *Osteochilus hasselti* fillet are presented in Table 8.

**Table 8.** Recapitulation of Observation Results of the Marinated *Osteochilus hasselti* Fillet

Parameter(s)	Duration of soaking				
	70 Minutes	80 Minutes	90 Minutes	100 Minutes	110 Minutes
<b>Hedonic Test</b>					
Appearance	6.8 ab	7.2 b	7, 1 ab	6.3 ab	5.6 a
Aroma	6.5 a	6.7 a	5.1 a	6.3 a 6.3 a	6.2 a
Texture	6.5 ab	7.4 b	6.7 ab	5.8 a	5, 9 ab
Taste	5.9 a	7.0 a	6.5 a	6.4 a	6.9 a
<b>Bayes Method</b>					
Alternative Value	5.85	7.05	6.43	6.28	6.48
<b>Test pH</b>					
Average pH	6, 4	6.3	6.3	6.3	6.3



Based on the overall results of observations, the marinated *Osteochilus hasselti* fillet with a soaking time of 80 minutes was the selected product that most preferred by panelists. The results of *Bayes test* showed the treatment of marinated *Osteochilus hasselti* fillet with soaking time for 80 minutes had the highest alternative value compared to other treatments, which was 7.05 with the most influential taste criteria on the marinated *Osteochilus hasselti* fillet assessment.

Organoleptic test showed that marinated *Osteochilus hasselti* fillet with soaking time for 80 minutes has the highest average value on each characteristic compared to other treatments. The average value of marinated *Osteochilus hasselti* fillet with soaking time for 80 minutes of each characteristic are appearance worth 7.20, aroma 6.70, texture 7.40, and taste 7.00.

## Conclusion

Based on the results of research that has been done marinated *Osteochilus hasselti* fillet products was the most preferred product by panelists. Marinated *Osteochilus hasselti* fillet soaked in salt solution for 80 minutes with characteristics of golden yellow appearance, solid and soft texture, distinctive aroma and no fishy smell, savory and saltiness that not overwhelming with a median value of appearance, aroma, texture, taste of 7 each (liked) and pH 6.3.

## References

- [1] Afrianto, E and E. Liviawaty. 1989. *Fish preservation and processing*. Kanisius, Yogyakarta.
- [2] Hermawan, A. and I. Jubaedah. 2010. Study of Nile Fish Cultivation (*Osteochilus hasselti*) in Conservation of Fish Resources (Study in Tasikmalaya Regency, West Java Province). *Journal of Fisheries and Maritime Education*. 4 (1): 1-10.
- [3] Ira. 2008. Study of the Effect of Various Salt Content on the Content of Omega-3 Essential Fatty Acids of Salted (*Rastrelliger Kanagurta*) Salted Dried Fish. *Thesis*. Sebelas Maret University School of Agriculture. Semarang.
- [4] Jeyasanta K. Immaculate, S. Prakash and J. Patterson. 2016. Wet and dry salting processing of double spotted queen fish *Scomberoides lysan* (Forsskal, 1775). *International Journal of Fisheries and Aquatic Studies*. 4 (3): 330-338.
- [5] Liviawaty, Evi. 1999. Effects of Filet Making Time On Some Characteristics of Red Tilapia (*Oreochromis niloticus*). *Thesis*. Padjadjaran University. Bandung.
- [6] Majid, Abdul, T. W. Agustini and L. Rianingsih. 2014. Effect of Differences in Salt Concentration on Sensory Quality and Volatile Compound Content in Anchovy Terasi (*Stolephorus sp*). *Journal of Fisheries Product Processing and Biotechnology*. 3 (3): 17-24.
- [7] Maktabi, S., M. Zarei and M. Chadorbaf. 2015. Effect of Traditional Marinating on Bacterial and Chemical Characteristics in Frozen Rainbow Trout Fillets. *Journal of Food Quality and Hazards Control*. 2: 128-133.
- [8] Marimin. 2004. *Decision Making Techniques and Applications of Multiple Criteria*. PT Grasindo. Jakarta.
- [9] Maryani, A. 2001. Effect of Soaking Time in Seasoning on the Quality of Patin Fish Fillet Jerky. *Thesis*. Bogor Institute of Agriculture, Bogor.
- [10] Nurilmala, M. 2013. Studied of the Structural Changes on Myoglobin in Tuna Meat discoloration. *Dissertation*. Tokyo: The Graduate School of Agricultural and Life Sciences, The University of Tokyo, Tokyo.
- [11] Pratama, R. I., I. Rostini and M. Y. Awaluddin. 2013. Fresh composition of carp (*Cyprinus carpio*) flavored compounds and their steaming. *Journal of Aquatics*. 4 (1): 55-67.
- [12] Rahmadina, Ranti. 2018. Analysis of Marinate Salt Preference for Several Types of Fresh Fish. *Thesis*. Faculty of Fisheries and Marine Sciences, Padjadjaran University, Jatinangor.
- [13] Rahmani., Yunianta., And E. Martanti 2007. Effect of Wet Salting Method on Characteristics of Cork Salted Fish (*Ophiocephalus striatus*). *Journal of Agricultural Technology*. 8 (3): 142-152
- [14] Sari, D. P. 2018. The Quality of Nile and Nile All Female Fish (*Osteochilus hasselti*) Hybrids Fresh Based on Organoleptic, Physical and Chemical Characteristics. *Thesis*. Padjadjaran University. Jatinangor.
- [15] Setiani, Bhakti Etza., V. P. Bintoro., B. Dwiloka and A. Hintono. 2014. Determination of Curing Meat Color in Meat and Processed Meat Products. *Research Report*. Diponegoro University. Semarang.
- [16] Soekarto. 1985. *Organoleptic Assessment for the Food Industry and Agricultural Products*. Bhatara Aksara. Jakarta.
- [17] Sudrajat, M. 1999. *Non-Parametric Statistics*. Faculty of Agriculture, University Padjadjaran. Jatinangor.
- [18] Syamsir, E. 2010. Recognizing Marination. <http://scientists.blogspot.com>. (February 16, 2019).
- [19] Tariq, AS, F. Swastawati and T. Surti. 2014. The Effect of Difference in Salt Concentration on the Raising of the Mackerel (*Rastrelliger neglectus*) on the Content of Glutamic Acid Giving Tasteful (Umami). *Journal of Fisheries Biotechnology Processing and Products*. 3 (3): 104-111.
- [20] Tumbelaka, R. A, A. S. Nainu and F. A. Dali. 2013. Effect of Salt Concentration and Salting Time on Hedonic Value of Dried Salted Milkfish (*Cahnos chanos*). *Scientific Journal of Fisheries and Maritime Affairs*. 1 (1): 48-54.
- [21] Wijayanti, D. R 2002. The Effect of Aromatase Inhibitor on Nile Gender (*Osteochilus hasselti* CV) Results of Gynogenesis. *Thesis*. Bogor Institute of Agriculture, Bogor.
- [22] Wodi, M. I. S., Trilaksani W and M. Nurilmala. 2014. Changes in Myoglobin in Big Eye Tuna During Temperature Storage Chilling. *Jphpi*. 17 (3): 215-224.