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THE EFFECT OF THE LONG HEATING PROCESS ON FAVORITE LEVEL OF PRESTO HAMPAL FISH (Hampala macrolepidota)

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ABSTRACT

Hampal fish is one type of fish that lives in public waters (such as the Cimanuk river) and has the potential to be developed as a consumption fish. This fish has many spines and bones, and in terms of processing has not been utilized properly, for that it needs to be processed in a different way where one of them can be done using presto techniques. The purpose of this study was to set a warming time to make the hampal fish presto most preferred by panelists. This research was conducted in Fishery Products Processing Laboratory, Faculty of Fisheries and Marine Sciences, Universitas Padjadjaran and Food Technology Laboratory, Faculty of Engineering, Pasundan University in July 2019. The research method used was an experimental method with 3 warm-up time treatments of 60 minutes, 90 minutes, and 120 minutes with 20 panelists as repeats. Observations were made on the level of fondness which included appearance, aroma, taste and texture by semi-trained panelists. The results showed that the treatment with a heating time of 120 minutes was the most preferred treatment by panelists compared to other treatments with an average appearance value of 7.1, aroma 7.5, texture 7.8, and taste of 7.9. Proximate test results for presto hampal fish with a treatment of 120 minutes is water content of 36.38%; protein 25.64% ; fat 9.27% and ash 3.43% mg/100g.

Keywords*: *Hedonic, Hampal, Organoleptic, Presto, Proximate

1. INTRODUCTION

Jatigede Reservoir has an area ± 4122 ha and is located in Sumedang Regency, West Java. This reservoir was built by stemming the Cimanuk River and is a multifunctional reservoir, another function of Jatigede Reservoir is as a tourism sector and catch fishery sector (Fitriani 2013). There are many fish in Jatigede Reservoir that have not been utilized by the surrounding community such as hampal fish. Fish fishing in this reservoir is not optimal because most people have a livelihood as farmers.

Hampal fish (Hampala macrolepidota) is one type of fish that lives in public waters (such as the Cimanuk river) and has the potential to be developed as a consumption fish, although it is not yet an endangered type of fish, this fish needs attention because in some locations its existence has been greatly reduced (Sjafei et al 2001). According to Zilfasani (2017), people usually process hampal fish by frying or burning, for that it is necessary to process hampal fish in another way where one of them is by using presto technique.

According to Arifudin (1988) in Susanto (2010), bandeng presto or soft thorn milkfish is one of the processed milkfish, with the advantages of bones and spines from the tail to the soft head so that it can be eaten without causing disturbance of thorns in the mouth. Saparinto et al (2006), said that it does not close the possibility that fish other than milkfish can be processed into soft thorn fish, for example hampal fish.

According to Djariah (2008), modernly the processing of soft thorn milkfish uses autoclave for cooking. The principle of using autoclave on the use of soft thorn milkfish is to use high pressure and temperature. The processing uses high temperatures (115°-121°C), and at a pressure of 1.5 atmospheres. This high temperature and pressure is achieved by using an autoclave or on a household scale with a pressure cooker for 1-2 hours (Arifudin 1983 in Susanto 2010).

According to Widyarini (2014), there are different influences on the heating time of fish presto such as fat content, protein, calcium and also affect the taste, aroma, texture, appearance, and overall level of liking. Based on this background, it is necessary to conduct research on the long-lasting influence of the heating process on the favorite level of hampal fish presto.

2. MATERIALS AND METHODS

2. 1. Tools and research materials

The Equipment used in the process of making presto hampal fish are: pressure cooker, knives, electric scales, basins, stoves, spoons, swallows, plastic containers, cameras, blenders, plastic buckets. Tools used in organoleptics and proximate testing are as follows: Tools for organoleptic tests, which are plates as samples presentations, grading sheets, and stationery. Tools for chemical tests (water content, protein and fat), namely glassware (Erlenmeyer, Burette, volumetric pipette, pipette drops, pumpkin size, etc.), volumetric measurement instruments, blenders, Aluminum Cups, desicators, destructors, condensers, Kjeldahl flasks, mortar, analytical balance, oven, and electric heater. The raw materials used are fresh fish from Jatigede Reservoir, if the raw materials used are not good in its freshness will affect the taste, appearance and smell of the product produced crackers. The research was conducted in June-July 2019 in Fishery Production Processing laboratory of the Faculty of Fisheries and Marine Sciences Padjadjaran University, and the proximate is carried out in the Food Technology Laboratory of the Faculty of Food, University of Pasundan. A the formulation of hampal fish presto is presented in Table 1.

Table 1. Modification of the composition of the presto seasoning of hampal fish

Ingredients/ seasoning	Weight / quantity (g)
Onion	120
Garlic	60
Ginger	30
Tumeric	45

Galangal	30
Coriander	13
Pecan	10
Water	750
Orange leaves	3
bay leaf	145
Kitchen salt	30
Citronella	7
Seedless acid	5
flavoring	7

The research method used is experimental method. Organoleptic value of hampal fish presto was analyzed by non parametric statistical method consisting of 3 treatments and 20 semi-trained panelists as repeats. The treatment in this research is about heating time, with 3 treatments as follows:

A: Warm-up time 60 minutes.

B: Heating time 90 minutes.

C : Heating time 120 minutes.

Organoleptic testing with hedonic test (favorite level test) using 20 semi-trained panelists as a repeat (Soekarto 1985). Panelists in this research are STUDENTS of FPIK UNPAD who have gained knowledge about organoleptics in the course of Integrated Quality Management, and have been explained in advance about the product of hampal fish presto so that it has experience in the assessment of organoleptic characteristics. The most preferred products by panelists will be carried out proxy tests to find out the content of water, ash, protein and fat.

Preparation phase

The preparation stage begins by collecting tools and materials that will be used until mixing the materials, for the stages are: Tools and materials are collected in one place, Tools and materials are washed thoroughly, Tool dried after washing, The material is peeled off after washing, Materials are weighed using digital scales, The ingredients are mashed using a blender, The ingredients are mixed and stirred evenly.

Implementation stage

Stages of handling or preparation starting from fish hampal purchased from traders to the preparation of fish for the next processing, the stages are: Hampal fish purchased from traders in Jatigede Reservoir;Fish are put in a coolbox to be further taken to the FPIK processing laboratory, The fish is removed from the coolbox and then carried out the handling of the fish in the sink, The contents of the fish's stomach and gills are removed until there are

no offal left in the body of the fish, The fish is washed thoroughly after disposing of its innards, Fish drained after washing and prepared for processing.

Completion stage

The process of processing presto hampal fish in a modern way using presto pot (Aditya 2008) as follows: Hampal fish is put in the seasoning mixture, The fish is left in the seasoning mixture for 30 minutes, The presto pot is prepared for use, such as the administration of water into a saucepan as high as the boundary of the pot and the giving of a banana leaf base on the inside of the pot, The fish is arranged into a presto pan after the fertilization process, The remaining seasoning is poured into the top of the fish that has been arranged in a saucepan, The presto pot is tightly closed after the fish is arranged in it, The presto pot is put on the gas stove and starts turning on the gas stove, The gas stove is turned off when it is in accordance with the old treatment of the presto cooking process of hampal fish and left until it cools or until the distinctive sound of the presto pan stops sounding, The presto pot is opened the lid, removed the fish, and placed on the prepared container, Presto hampal fish prepared for further hedonic testing by panelists and proximate testing.

2.2. Observed parameters

Parameters observed in this study are organoleptic test (taste, aroma, appearance and texture) and proximate test (moisture content, ash, protein and fat).

2.3. Hedonic Test

This test aims to find out the response of panelists to hampal fish presto products based on organoleptic characteristics that include appearance, aroma, taste, and texture. Based on his level of preference, this hedonic test was conducted with 20 semi-trained panelists.
The panelist's favorite level score values ranged from 1 to 9, namely:

- 1 = Very dislike
- 3 = Dislike
- 5 = Neutral/ regular
- 7 = Likes
- 9 = Very liked

The rejection limit for this product is if the product tested obtains a value of > 5, then the product is declared accepted by panelists (Soekarto 1985 in Lailiyana 2012). The hedonic test assessment questionnaire can be found in Appendix 2.

2.4 Proximate Test

A) Moisture content

The principle of water content analysis is the process of evaporation of water from a material by heating. Chemical level testing is carried out in several stages, as follows:

$$\text{Moisture Content (\%)} = \frac{B1-B2}{B} x\ 100$$

Description:
B = weight of sample (g)
B1 = weight (sample + cup) before drying (g)
B2 = weight (sample + cup) after drying (g)

B) Ash content

The principle of ash content analysis is the process of burning organic compounds so that inorganic residues are obtained called ash. Measurement of ash levels is determined by gravymetry. Ash content testing procedure, namely:

$$\text{Ash Content (\%)} = \frac{Berat\ Abu\ (g)}{Berat\ Sampel\ (g)} x\ 100\%$$

C) Protein content

The principle of protein content analysis and total nitrogen is the process of nitrogen release from proteins in the material using sulfuric acid with heating. Determination of total nitrogen and protein content using the micro method Kjeldahl. The procedure for analyzing protein levels and total nitrogen is as follows:

$$\text{Protein (\%)} = \frac{(VA-VB)HCl\ x\ NHCl\ x\ 14{,}007\ x\ 6{,}25\ x\ 100\%}{W\ x\ 1000}$$

Description:
VA=ml HCl for sample titration
VB =ml HCl for titration blanko
N = normality of the standard HCl used
14,007 = atomic weight of Nitrogen
6.25 = nitrogen-protein conversion factor for fish and byproducts
W = sample weight (gram)

D) Fat content

The principle of fat content analysis is extraction, namely the separation of fat from the example by circulating the fat palarut into the example, so that other compounds can not dissolve in the solvent. The method used in fat analysis is the soxhlet extraction method. Fat content testing procedure, namely:

$$\text{Fat content (\%)} = \frac{Berat\ Lemak\ (g)}{Berat\ Sampel\ (g)} x\ 100\%$$

2.7. Data Analysis

Data of chemical measurement results (protein content, water content, fat content, ash content, and carbohydrate content) were analyzed descriptively presto hampal fish most preferred compared to the value of Indonesian National Standard (SNI) for presto / milkfish presto.

The data obtained from the panelists was further analyzed using non parametric analysis conducted for organoleptic testing using friedman test two-way variant analysis and with Multiple Comparason test. The statistics used in friedman's test are defined by the following formula (Sudrajat 1999):

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

Description:
X^2 = Friedman test statistics
b = Replay
k = Treatment

⟦Rj⟧^2 = Total rank of each treatment

If there is the same number of correction factors (FK) with the following formula:

$$Correction\ Factor = 1 - \frac{\sum T}{bk\ (k^2 + 1)} \qquad X^2 = \frac{X^2 1}{FK}$$

The significant value of X^2 observation price can be known by using critical prices with db= k-1 ; a= 0.05.
The decision rules for testing hypotheses are:
X^2_0 = treatment does not make a real difference to the level of a = 0.05
X^2_1= treatment gives a noticeable difference at the level of a= 0.05
If the price of $X^2 < X^2_{(a(k-1))}$, then X^2_0 is accepted and $X^2_1$is rejected, and if $X^2 > X^2_{(a(k-1))}$, then X^20 is rejected and X^2 is accepted. If X^2_1 is accepted, then the treatment gives a noticeable difference and the test is continued to know the median value that is not the same or to know the difference between treatments by using multiple comparason with the following formula:

$$|\mathrm{Ri} - \mathrm{Rj}| \ \leq\ \mathrm{Z}\ \left\{\left[\frac{\mathrm{a}}{\mathrm{k(k-1)}}\right]\right\}\sqrt{\frac{\mathrm{bk\ (k+1)}}{6}}$$

Description:
|Ri-Rj| = difference in rank amount of each treatment
Ri = average rating of the 1th sample
Rj = average rating of the jth sample
Z = value in table Z for multiple comparison
a = experiment wise error
b = number of repeats
k = the number of treatments.

3. RESULT AND DISCUSSION

3.1. Hedonic Test Presto Ikan Hampal

Organoleptic testing in the food industry, especially for processed fishery products has a very important role. Hedonic test aims to determine the response of panelists to organoleptic characteristics of hampal fish presto products consisting of appearance, aroma, texture, and taste based on hedonic scales 1 – 9 (1: very dislike, 3: dislike, 5: ordinary / neutral, 7: likes, and 9: very like) with a acceptance limit of >5 meaning that if the product has a value equal to or greater than 5 then the product can be accepted or liked by panelists (Soekarto 1985 in Lailiyana 2012). Hedonic test data can be found at Appendix 3.

A. The Appearance

The visibility assessment aims to find out the acceptance of panelists who are judged from the appearance of the shape and color of the hampal fish presto. The results of observations on the appearance of hampal fish presto are presented in Table 2.

Table 2. Appearance Test Result Hampal Fish Presto

Treatmen	Median	Average
60 minutes	8,0	8,0 a
90 minutes	8,0	8,0 a
120 minutes	7,0	7,1 b

Description : The number followed by the same letter shows no real different results according to the double comparison test at the level of 5%.

Based on the results of the panelist's assessment of visibility (Table 2) the heating time of 60 minutes (8.0 a) is no different from the heating time of 90 minutes (8.0 a). While the value of visibility at a warm-up time of 120 minutes (7.0 b) differs noticeable from the heating time of 60 minutes (8.0 a) and 90 minutes (8.0 a). According to Lawrie (2003), natural heating temperature can affect the conversion rate of pigments. The results of the study of hampal fish presto on the treatment of long heating time of 60 minutes and 90 minutes resulted in a brilliant and clean appearance and color, but there was a color change during the heating time of 120 minutes. Heat is very influential on food pigments, usually causing discoloration in foodstuffs (Winarno 1980 in Riyanto et al 2013). Based on the results of the study it was seen that the median value for the treatment of long-time warming presto hampal fish > 7 which means the product of hampal fish presto is preferred by panelists. The duration of the warm-up time at the treatment is 60 minutes and 90 minutes the appearance of the president of the brilliant hampal fish, intact and not slimy. Long-term use of high temperatures can cause non-enzymatic browning reactions in fish due to reactions between proteins, peptides, and amino acids with the result of fat decomposition (Sipayung et al 2014). According to Saparinto (2007), the criteria for the quality of the appearance and color of fish presto processed products are whole fish and not broken, smooth, no cuts or blisters, clean, no foreign objects, no deposits of fat, salt or other impurities, specific colors, brilliant, moldy, and not slimy. Brilliant meat incisions, specific types, no milking along the spine, and abdominal walls of whole meat. The appearance of hampal fish presto each treatment is presented in Figure 1.

(a) (b) (c)

Figure 1. The appearance of Hampal Fish Presto Every Treatment from Left to Right with a Heating Time of 60 minutes, 90 minutes and 120 minutes.

B. Smell

Aroma is the smell of food products, the smell itself is a response when volatile compounds of a food enter the nasal cavity and are felt by the olfactori system. Volatile compounds enter the nose when humans breathe or inhale them, but can also enter from the back of the throat during a person's meal (Kemp et al., 2009). Aroma assessment aims to find

out the assessment of panelists who are judged from the aroma of hampal fish presto. The results of observation of the aroma of hampal fish presto are presented in Table 3.

Table 3. Aroma Test Results Fish Hampal Presto

Treatment	Median	Average
60 minutes	8,0	7,2 a
90 minutes	8,0	7,5 a
120 minutes	8,0	7,9 a

Description : The number followed by the same letter shows no real different results according to the double comparison test at the level of 5%.

Based on Table 3, the median value for the entire treatment of the length of time presto warming hampal fish is 8 which means the hampal fish presto product is preferred by panelists. Statistical test results showed that the length of time presto warming hampal fish does not affect the aroma of presto hampal fish, it is caused because the aroma of the resulting hampal fish presto has no difference. The highest average aroma value is indicated by the duration of the heating time of 120 minutes (7.9 a) although statistically no different from the heating time of 60 minutes (7.2 a) and 90 minutes (7.5 a).

Sensory tests with aroma attributes were shown to determine the panelist's level of preference for the aroma of hampal fish presto with different heating times. The length of heating causes the perestation process of all spices, so that the aroma is better at the time of processing (Palupi et al 2007). Aroma is the smell of foodstuffs that determine the delicacy of the foodstuff (Winarno 2002).

The longer the heating time of hampal fish presto, the aroma content in the fish presto will increase, because the content of essential oils contained in the seasonings are garlic, coriander, and turmeric. According to Djumarti et al (2004) the exact length of heating time will affect the absorption of spices into the meat. The aroma of hampal fish presto comes from the raw material of decomposed hampal fish (garlic, coriander, and turmeric) in the processing because there is a reaction to decomposition of protein and fat compounds into volatile compounds due to the degredation of foodstuffs by heat. Spices can affect the aroma, color and taste of food and can sometimes mask un desired aromas (Fitri 2018).

C. Texture

Texture assessment aims to find out the level of acceptance of panelists to the thesis presto hampal fish. Observation of texture on hampal fish presto is very important. This is because texture is one of the things that distinguishes fish presto from other fishery products. Observation results of hampal fish presto tesktur presented in Table 4.

Table 4. Texture Test Result Fish Hampal Presto

Treatment	Median	Average
60 minutes	7,0	6,1 a
90 minutes	7,0	6,8 b
120 minutes	7,0	7,8 c

Description : The number followed by the same letter shows no real different results according to the double comparison test at the level of 5%.

Based on Table 4 it appears that the median value of the texture of hampal fish presto is 7 which means that the hampal fish presto is preferred by panelists. Statistical test results showed that the treatment of heating time length of 60 minutes (6.1 a), 90 minutes (6.8 b) and 120 minutes (7.8 c) differed very noticeable. This means that the length of time presto

warming hampal fish greatly affects the texture of the hampal fish presto. Panelist assessment of hampal fish presto thesis with 120 minutes (7.8 c) treatment is preferred because it has the best texture with the criteria of compact, dense, and fairly dry hampal fish presto. Then followed by the treatment of a long warm-up time of 90 minutes (6.8 b) and 60 minutes (6.1 a). The use of heat with the right time will cause the water contained in fish meat to evaporate so that it will affect the tissue texture of fish meat (Ratnasari 2009). The heating time process at the 120-minute treatment is preferred by panelists where the bones and spines of the fish become soft. While in the 60-minute treatment the texture is less preferred because the fish bones are still hard. According to DeMann 1997 in Widyarini (2014), texture is most important in soft foods and crispy foods. The long heating process in the hampal fish presto makes the bones and spines of the fish soft.

Anshori et al. (2004), said that the pressure used in the process of eating fish presto is pressure derived from the accumulation of hot steam heated for a long time and works on a closed system so that the pressure is able to soften the bones and spines of fish. According to Soesetiadi and David in Djumarti et al (2004) the softening of thorns and the tenderness of meat in fish is influenced by the temperature and pressure used, so that the fish spines become brittle and easily destroyed even though the shape is still the same as the original. According to Saparinto (2007), fish presto quality criteria for texture category are compact, dense, quite dry, not watery, and tough.

D. Flavor

The taste of a product affects the level of consumer acceptance. Although other parameters are good, if it feels unlikable then the product will be rejected (Soekarto, 1985). The results of observation of taste of hampal fish presto products produced with different heating times are found in Table 5.

Table 5. Flavor Test Result Fish Hampal Presto

Treatment	Median	Average
60 minutes	7,0	6,2 a
90 minutes	7,0	7,6 b
120 minutes	8,0	7,9 b

Description : The number followed by the same letter shows no real different results according to the double comparison test at the level of 5%.

Based on Table 5 it appears that the median value of all the treatment of long-time warming presto hampal fish is > 7 which means the hampal fish presto product is preferred by panelists. The panelist's assessment showed that the lowest taste average value was 60 minutes (6.2) and the highest score on the 120-minute (7.9) treatment. Taste supports the important role of receiving a product by consumers. Taste characteristics can be influenced by several factors including the amount of salt added, spices, sugar and fat / oil after the product is cooked / fried flavor will appear (Hangesti, 2006). The highest assessment by panelists on taste at the 120-minute (7.9) treatment had very tasty, savory and specific criteria for fish presto. While the 90-minute (7.6) treatment is less preferred because the seasoning has not been fully cooked and at the 60-minute (6.2) treatment it is very unlikable because it tastes bland. This is due to the difference in the length of heating in the hampal fish in the presto and the addition of spices so that the taste becomes preferred by panelists. A longer heating time will increase the level of favorite taste of hampal fish presto. The highest taste score results in an assessment that tends to be preferred by panelists compared to other treatments. According

to Palupi et al., (2007), the length of cooking causes the process of peresapan all spices are getting better and the taste is getting better.

3.3. Decision-making by *Bayes* Method

The data of comparison test pairs of hampal fish presto from the 20 panelists presented in Appendix 8. The result of the pairing comparison is done by manipulation of the matrix to determine the weight of the criteria. The weight of the appearance criteria, aroma, texture, and taste of the hampal fish presto are presented in Table 6.

Table 6. Weight Value of Hampal Fish Presto Criteria

Criteria	Weighting Criteria
Appearance	0,08
Smell	0,15
Taste	**0,62**
Texture	0,15

Based on the results of calculations on the weight of the criteria of appearance, aroma, tesktur, and taste of hampal fish presto with a difference in the length of heating time obtained results that showed that the taste has a greater value compared to other criteria. This proves that the length of time of warming has a noticeable influence on the assessment of the taste of hampal fish presto because if the taste of the hampal fish presto is not liked then the product will be rejected by the panelists. The results of calculation of the weight of criteria and determination of the best treatment taking into account the criteria of appearance, aroma, texture, and taste of hampal fish presto are presented in Table 7.

Table 7. Presto Hampal Assessment Decision Matrix by Bayes Method

Treatment	Criteria				Alternate value	Priority value
	Appearance	Smell	Taste	Texture		
60 minutes	8	8	7	7	7,23	0,33
90 minutes	8	8	7	7	7,23	0,33
120 minutes	7	8	8	7	7,77	**0,35**
Weighting	0,08	0,15	0,62	0,15	22,24	1,00

Based on calculations with bayes method obtained results that the presto hampal fish with a warming time treatment of 120 minutes has an alternative value and the highest priority value is 7.77 and 35%. Presto hampal fish with a warming time treatment of 120 minutes is the best treatment most liked by panelists

3.4. Proximate Test Presto Ikan Hampal

Proximate test is conducted to find out the nutritional content of hampal fish presto with different heating time treatment of each treatment. Proximate tests conducted are water content, ash content, protein content, and fat content.

A. Moisture Content

The principle of water content analysis is the process of evaporation of water from a material by heating. Heating with a high temperature makes the water content in a material reduced (Asmawati et al 2019). Data of water content test results can be seen in Figure 3.

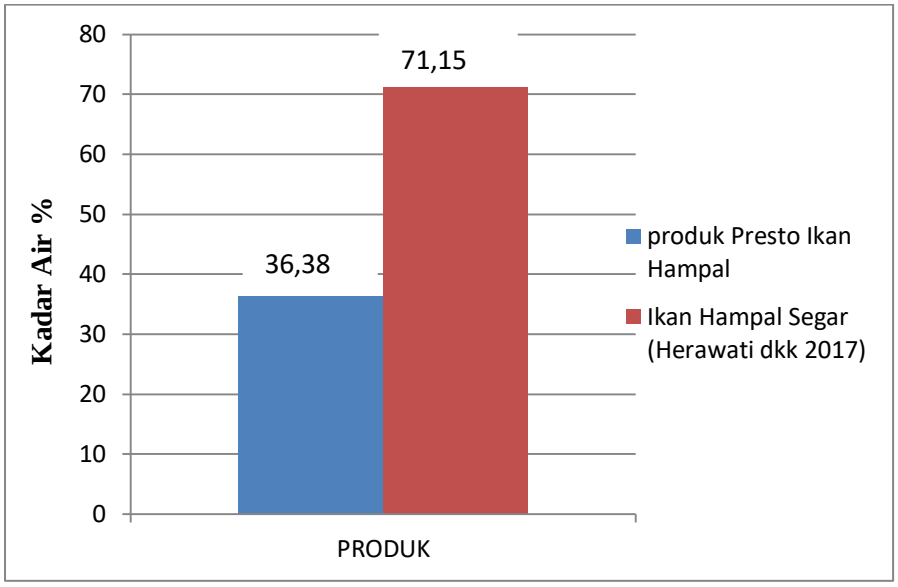

Figure 3. Comparison graph of water content of presto hampal fish

Based on the results of water content test obtained that the water content of presto hampal fish is as much as 36.38% while the water content of fresh hampal fish is 71.15%. There is a decrease in the water content of hampal fish presto, caused by a long heating process with high temperatures and pressure causing a certain amount of water from the material (Ikan Hampal) evaporates so that the water content in the material is reduced. It is supported by Gaman and Sherrington (2004), that heating causes the water contained in food to evaporate, whereas According to Susanto (2010), that the heating will affect the amount of water content in the processed material. The decrease in fish water content during heating is caused by the body of the fish releasing a certain amount of water due to the heating process.

B. Ash Content

Ash is an inorganic residue of the combustion or oxidation process of organic components of foodstuffs (Winarno 2008). Ash content describes the amount of unburned minerals into vaporizing substances. Ash content of a foodstuff indicates the total mineral contained in the foodstuff. Total ash content is part of the proximate analysis used to evaluate the nutritional value of a foodstuff. Most foodstuffs, which are about 96% consisting of organic matter and water, the rest consists of mineral elements that are organic substances or known as ash content. (Hutomo et al. 2015). Data of ash content test results can be seen in Figure 4.

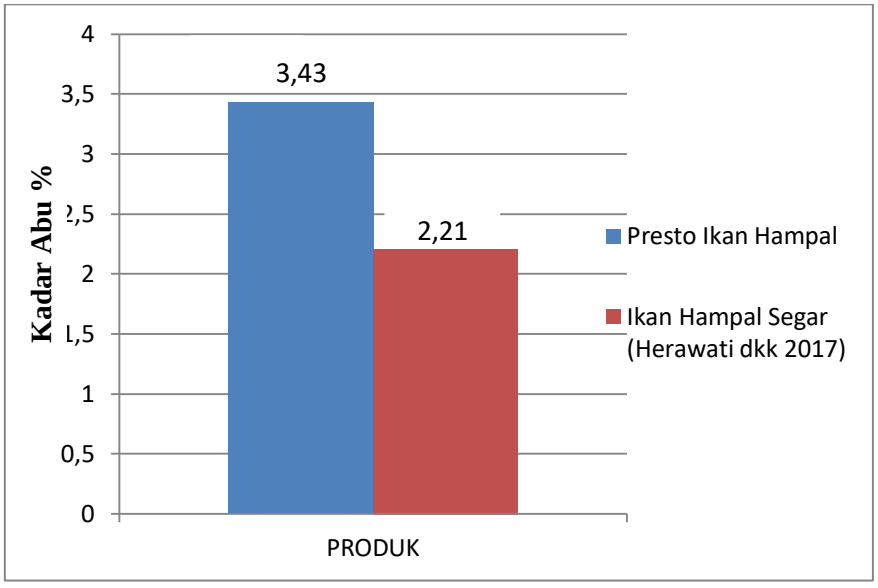

Figure 4. Comparison graph of the percentage of ash content of presto hampal fish

Based on the results of ash content test obtained that presto hampal fish has ash content of 3.43% while fresh hampal fish has ash content of 2.21%. In Figure 4 it can be seen that the longer the heating can affect the ash content of hampal presto produced where the longer the process of sedder, the more meat components come out (water, fat, protein and minerals). The increase in ash content of hampal fish presto due to the length of heating used is also increasing which is inversely proportional to the decreasing water content.

C. Protein Content

Protein is one of the substances contained in foodstuffs that are very important and useful for the human body, because it serves as a building and regulatory substance in the body. According to Winarno (2008), protein is a source of amino acids containing elements C, H, O and N that are not possessed by fats or carbohydrates. The test results of protein levels can be seen in Figure 5.

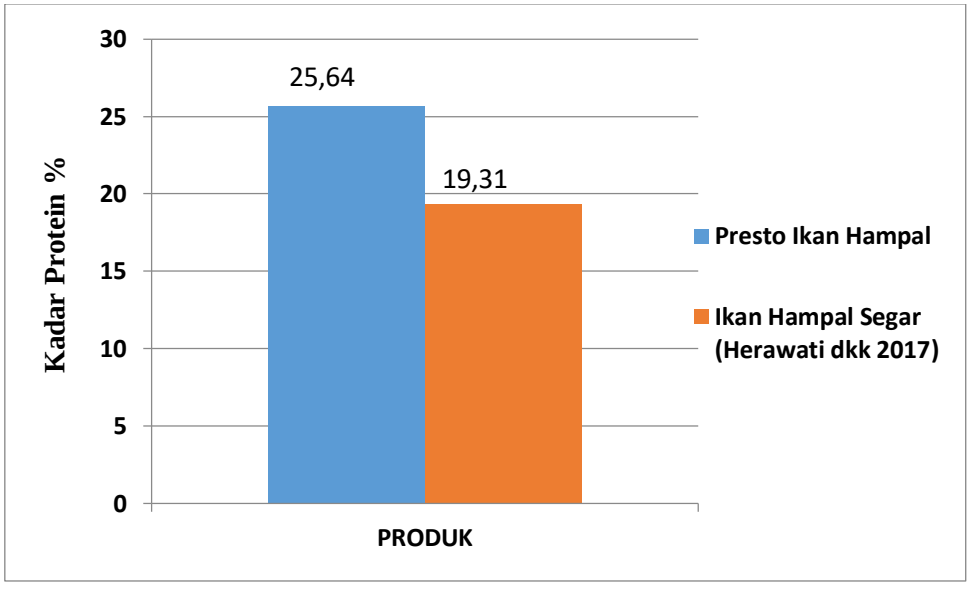

Figure 5. Comparison graph of percentage of protein content of hampal fish presto

Presto hampal fish has a protein content of 25.64% while the protein content of fresh hampal fish is 19.31%. This indicates that protein levels increase in the presto hampal fish, the increase in the value of this protein content because the longer the time and the high temperature of heating will increase the protein levels of the presto hampal fish. According to Adawyah (2007), the decreased water content will cause the protein content in foodstuffs to increase. The use of heat in food processing can decrease the presentation of water content resulting in an increased percentage of protein levels. The protein content of hampal fish presto has increased, this is due to the processing process using salt and the use of high temperatures due to the release of water from fish meat that causes the protein to be more concentrated. According to Kusnandar (2010), that the increase in protein composition is followed by a decrease in water content in foodstuffs. The presence of heating process will cause the structure or commonly called protein denaturation. According to Suharjo (1998), the main function of salt is to stimulate natural taste, cause high osmotic pressure and lower water content so that proteins are more concentrated.

D. Fat Content

Fat is one of the main nutritional components as an energy contributor. The amount of energy possessed by fat is even much greater than protein or carbohydrates. However, in the field of food industry the excess fat content can cause oxidation of fat until finally that causes rancidity. In the field of food, fat can provide a savory taste so that it is liked by consumers (Hutomo et al 2015). The results of fat content test can be seen in Figure 6.

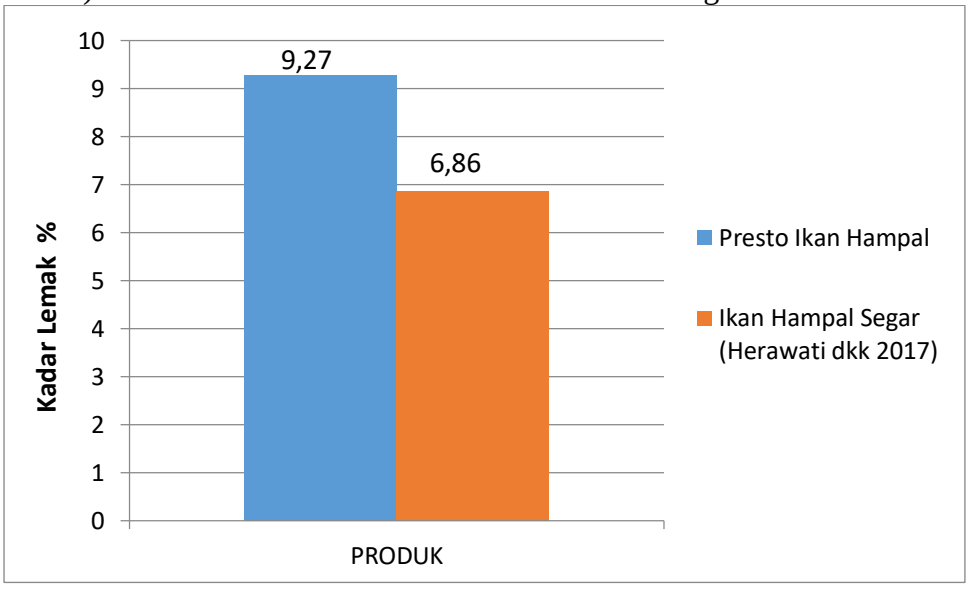

Figure 6. Comparison graph of fat content of presto hampal fish

Based on the fat content test results obtained that the presto hampal fish has a fat content of 9.27% while fresh hampal fish has a fat content of 6.86%. The results showed that the length of time warming increases the fat content value of presto hampal fish. According to Rahayu et al (1992), fish fat content is inversely proportional to its water content. Fish with a high fat content usually have a lower water content. Fat content of hampal fish presto increases along with the decrease in water content of hampal fish presto.

In Figure 6 can be seen the length of time the heating produces high fat content, from this result it is suspected that the use of a long enough heating time will be able to damage the fat composition of the presto hampal fish. According to Zuhra et al (2012), stated that the increase in fat content with a high temperature can be caused by a decrease in water content

so that the percentage of fat content increases. While high fat levels can occur as a result of damage to fat due to relatively high temperatures. Fat is a compound that is formed as a result of esterification reaction between glycerol and fatty acids. The administration of high heat in fat will result in the disconnection of double bonds in the fat, so that the fat will be decomposed into glycerol and fatty acids.

4. CONSLUSION

Based on the results of the study, it can be concluded that the presto hampal fish with all treatments is still favored by panelists. Presto fish with a warming time treatment of 120 minutes produces the most preferred hampal fish presto panelists. The weight of the criteria is 8%, the aroma is 15%, the taste is 62%, and the texture is 15%. Proximate test results of hampal fish presto with 120 minutes treatment for water content of 36.38%, ash content of 3.43%, protein content of 25.64%, and fat content of 9.27%.

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