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FORTIFICATION OF SQUID INK FOR SIMPING BASED ON INTEREST LEVEL

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ABSTRACT

This research aims to find out the percentage of squid ink additions to the simping that panelists like most based on organoleptic characteristics. This research was conducted on Fisheries Product Processing Laboratory at the Faculty of Fisheries and Marine Sciences, Padjadjaran University, Research Laboratory of Biological Resources and Biotechnology, LPPM IPB in February to April 2020. The research method used was an experimental method with five treatments of adding squid ink, with the concentrate 0%, 0.5%, 1%, 1.5% and 2% of squid ink with 20 panelists as the repetition. Based on the results of research on the level of preference of squid ink simping based it can be concluded that interest level the addition of squid ink for all treatments is preferred by panelists, but the treatment of adding squid ink by 1% has an alternative value (7.00) higher than other treatments with 2.93% water, 2.60% ash, 4.85% Lipid, 10.62% protein, rendement value 0.25%

Keywords : *Fortification, Levels of* preference, *Simping, Squid Ink*

INTRODUCTION

Indonesian waters have considerable potential marine resources, including large pelagic fish, small pelagic fish, shrimp, lobster and squid. According to statistical data from the Ministry of Marine Affairs and Fisheries, the export yield of squid in the January 2015-April 2019 period increased by 17.72%. The specific characteristic of the squid is the presence of melanin-rich ink sacs (Derby 2014). Squid ink contains grains of melanin or black pigment. Natural melanin is melanoprotein which contains 10-15% protein, so it is a good source of protein because it is as good as the protein content in meat (Astawan 2008).

So far many people think that squid ink is useless so that if processing squid, the shell and ink bag are discarded because the black color produced makes the product look unattractive, even though squid ink has many benefits and benefits for the health of the body (Agusandi 2013). Squid ink is used as a flavor enhancer

and as a natural dye, besides that squid ink has health properties (Sasaki *et al* 1998). Squid ink (*Loligo* sp) Is used for natural coloring and enhances flavor and taste, besides that the color produced from the pigment can also increase the benefits of food and has properties to prevent various diseases (Astawan 2008). One of the products that can be added with squid ink is simping.

Simping is a type of food whose main ingredients are made from a mixture of tapioca flour, wheat flour, salt, coconut, and kencur which is made in a thin round shape (Febriany 2016). Simping is an industrial commodity which is one of the leading products in Purwakarta Regency, West Java. Therefore, this food is always hunted as souvenirs by people who visit Purwakarta Regency. One of the ways to increase the nutritional content of hoops is by fortification of the product.

Agricultural Technology Research Center (2016), fortification is the addition of one or more nutrients (nutrients) into food with the aim of increasing nutrient consumption so that nutritional status increases. It is hoped that the addition of squid ink will affect the level of consumer acceptance, so to find out this it is necessary to carry out an organoleptic test with a hedonic test (preference) for simping so that it is necessary to know what percentage of added squid ink on the simping is still interested by panelists.

MATERIALS AND METHOD

MATERIALS AND TOOLS

The materials used in this research are squid ink, tapioca flour, wheat flour, coconut milk water, kitchen spices (salt and MSG) and the tools used in this research are simping maker, digital scales, knives, bowl, cutting boards, scoops, scissors, plates and glasses.

RESEARCH METHOD

The research method used was an experimental method with five treatments of adding squid ink, with the concentrate 0%, 0.5%, 1%, 1.5% and 2% of squid ink with 20 panelists as the repetition. The first step is to take squid ink and calculate the yield of squid ink, then proceed with making hoops and perform an organoleptic test based on the level of preference (hedonic test) which includes (appearance, texture, aroma and taste), as well as chemical tests (protein content, levels water, ash content and lipid content).

PREPARATION AND CALCULATION OF SQUID INK RENDEMEN

First, the squid to be used is prepared in a clean container. Second, the ink bags are taken from the body of the squid by gently pulling it out by hand, then separating it in a clean container. Third, the ink in the squid bag is taken by applying pressure by the fingers slowly, then the ink that comes out is collected in a clean container, The last one, the squid ink was weighed according to the treatment, namely 0.5%, 1%, 1.5% and 2% and each stored in a clean container. The yield is an important value in product manufacturing. The yield is the ratio of

the dry weight of the product produced to the weight of raw materials (Yuniarifin *et al* 2006). The results of the calculation of squid ink with an average weight of 37.25 g / head produced squid ink with an average weight of 0.3 g / head with a body length of between 8 cm and 13 cm. The yield of squid ink produced was 6.38 grams from the weight of 2500 grams of squid which resulted in a yield of 0.25% squid ink.

PROCEDURE FOR MAKING SIMPING SQUID INK

The process of making simping squid ink according to Nawawi (2002) is modified. Put tapioca flour, wheat flour, salt, coconut milk water into the container then stir. Add squid ink according to the treatment then stir again for 5 minutes until all ingredients are mixed. Bake in molds at 100 ^{o}C for ± 1 minutes until cooked.

ORGANOLEPTIC TEST

Organoleptic test to determine the nature or taste factor and food acceptability. The organoleptic test conducted was a test of preference, aroma, texture, and appearance. The organoleptic test was carried out by giving an example of each different aid presented by giving an example, then the panelists gave an impression on the hedonic scale by being given a random 3 digit code.

CHEMICAL TEST

The chemical characteristics discussed were the most understood by panelists and controls (0%). Chemical characteristics include air content, ash content, protein content and lipid content according to AOAC (2005).

DATA ANALYSIS

The data from the measurement results of chemical testing and physical testing were analyzed descriptively comparatively. Descriptive method, namely the results of research and analysis are described in a scientific writing in the form of a narrative, then from the analysis that has been carried out a conclusion is drawn. Organoleptic test data were analyzed using Friedman's two-way analysis of variance with the Chi-Square test.

RESULTS AND DISCUSSION

SIMPING FAVORITE LEVEL

The results of the favorite test observations are carried out on the characteristics of organoleptics are the appearance, aroma, texture and taste of simping.

Table 1. Organoleptic Characteristics of Simping Based on Addition of Squid Ink

Squid Ink Concentration (%)	Appearance Value	Aroma Value	Texture Value	Taste Value
0	7,4 c	6,8 b	6,9 b	6,5 b
0,5	7,6 c	6,1 b	7,3 b	6,4 b
1	6,4 bc	6,5 b	7,3 b	6,7 b
1,5	5,5 ab	6,7 b	7,1 b	6,6 b
2	4,1 a	5,5 a	5 a	5,2 a

APPEARANCE

The results of the hedonic test observations on the appearance of the simping with the addition of squid ink are presented in Table 1. Based on the panelists' assessment of the appearance of the simping, it was found that the addition of squid ink to the simping had an average appearance range from 4.1 to 7.6. The appearance of the squid ink simping at 0.5% treatment has the highest average value, namely 7.6 (preferred), with the appearance of a yellow-brown simping color. The appearance of the simping treatment 2% has the lowest average value of 4.1 (neutral), with the appearance of a gray color.

This is because the addition of squid ink causes the resulting color to be darker or to a darker black color because squid ink contains natural melanin so that the color is darker. The results obtained indicate that the panelists prefer the 0.5% treatment with yellow-brown color than the 2% treatment which results in a gray color. The addition of squid ink only affects the color of the simping. This is because the addition of squid ink causes the resulting color to be darker or darker black because squid ink contains natural melanin so that the color is darker (Agusandi 2013). The appearance of the simping is presented in Figure 1.

Tanpa Penambahan Tinta Cumi
Perlakuan 0%

Penambahan Tinta Cumi
Perlakuan 0,5%

Penambahan Tinta Cumi
Perlakuan 1%

Penambahan Tinta Cumi
Perlakuan 1,5%

Penambahan Tinta Cumi
Perlakuan 2%

Figure 1. Simping Appearance Based on Treatment Addition of Squid Ink

The brownish yellow color of the squid ink simping treatment was influenced by thereaction *Maillard.* Reactions *Maillard* often occur in food products during heating. The *maillard* reaction is a reaction between the amino group of a free amino acid peptide chain or protein residue and the carbonyl group of a carbohydrate when both are heated (Sarastuti *et al* 2015). The addition of squid ink only affects the color of the simping. This is because the addition of squid ink causes the resulting color to be darker or darker black because squid ink contains natural melanin so that the color is darker (Agusandi 2013).

AROMA

Aroma is one of the factors that will determine consumers to choose products because aroma can attract consumers' attention to these food products (Bakhtiar *et al* 2019). The results of statistical test *Friedman* showed that the squid ink did not significantly influence the panelists' acceptance of the resulting simping

aroma. Based on the level of preference, all treatments were still favored by the panelists because the average aroma value of all treatments was still above the product rejection value limit. Product reject limit is less than five. Based on thestatistical test *Friedman*, the treatment without the addition of squid ink (0%) to the addition of 1.5% squid ink treatment showed a significantly different aroma with 2% treatment. The treatment without adding squid ink (0%) to the addition of squid ink treatment of 0.5%, 1%, 1.5% and 2% was still favored by panelists.

Based on the panelists' assessment of the aroma it was found that the addition of squid ink to the simping had an average aroma range of 5.5 to 6.8. Aroma of simping at 0% treatment or control had the highest average value of 6.8, while the aroma of simping2% treatment had the lowest average value of 5.5. This is supported by the research of Vioni (2017), the increase in the concentration of squid ink, which causes the resulting aroma to be more pronounced because the squid ink has a fishy aroma but does not sting so that panelists prefer to add less, the addition of squid ink. up to 2% squid is still preferred by panelists. According to Martinus (2012) *in* Perdania *et al* (2018), aroma is caused by thereaction process *maillard*, where the browning (reaction *maillard*) during roasting produces a distinctive and preferred product aroma. Statistical test results showed that squid ink did not give real results on the level of panelist acceptance of the aroma of simping produced.

TEXTURE

According to Winarno (2002), texture is a characteristic of a product and the main criterion in estimating food quality. Based on *Friedman* test shows that the addition of carrot flour to the brains has an effect on the level of texture preference so that atest is carried out*Multiple Comparison*. Based on the multiple comparison test, it shows that 0%, 0.5%, 1.5%, and 2% treatment is significantly different from the 1% treatment. Based on the texture parameters of the brains, all treatments were still accepted by the panelists with a median value between 5 and 7, which means they are included in the neutral to preferred category. This value indicates that the product is accepted and liked by the panelists.

The crispness factor (texture) determines whether a dry product is preferred or not. The texture of food products depends on the ingredients used, especially the protein content (Syahrul *et al* 2010). The highest average value is found in the treatment of 0.5% and 1% has an average value of 7.3 with a median value of 7, while the lowest average value is found in 2%, which is 5 with a median value of 5. The added scissors squid ink produces a crunchy texture rather dense, this is due to the gluten content found in wheat flour. According to Sudha *et al* (2007), gluten is a component that plays a role in strengthening texture.

TASTE

Taste is a very decisive factor in the panelist's final decision to accept or reject a food, because although other parameters are good, if it has a taste that is not liked, the product will be rejected (Soekarto 1985). Therefore, taste is an important factor in a consumer's final decision to reject or accept a product (Silviani 2015). The results of thestatistical test *Friedman* showed that the addition of squid ink had a significant effect on the panelist acceptance rate of the resulting biscuit flavor. Based on the level of preference, all treatments were still favored by the panelists because the average appearance value of all treatments was still above the product rejection value limit. Product rejection limit is a value below five.

Based on the parameters of taste to simping, all treatments were still accepted by the panelists with a median value range between 5 to 7, which means they are included in the neutral to preferred category. The highest average value was found in the 1% treatment, which was 6.7 with a median value of 7, while the lowest average value was found in the 2% treatment, are 5.2 with a median value of 5 typical flavors of dominant squid ink. The savory taste caused by the hoop comes from the squid ink. According to Okozumi and Fuji (2000), squid ink contains glutamic acid which causes a savory taste in squid ink.

The scalding that arises in each treatment depends on the concentration of added squid ink. The higher the concentration given, the distinctive taste of the squid ink will be dominant, but up to 2% treatment, the simping flavor is still preferred. This is consistent with the statement of Winarno (2002), that several factors can influence taste, including chemical compounds, temperature, concentration and other taste interactions. According to DeMan (1997), the taste caused by food products can come from the food itself as well as from substances added from outside during the process, so that it can cause a sharp taste or vice versa is reduced.

CHEMICAL TEST

The chemical characteristics discussed were the most understood by panelists and controls (0%). Chemical characteristics include water content, ash content, protein content and Lipid content according to AOAC (2005).

Table 2. Chemical Composition of the Best Treatment Simping

No.	Chemical Composition of Simping	Chemical Test Results (%)	
		0%	1%
1.	Water Content	2,93	2,93
2.	Ash Content	2,81	2,60
3.	Lipid Content	5,85	10,62
4.	Protein Content	4,93	4,85

WATER CONTENT

Based on the results of the chemical test observations, the water content of the simping in the treatment without the addition of 0% squid ink was 2.93% and the water content in the treatment of adding 1% squid ink was 2.93%, this shows that the level water at 0% and 1% treatment is stable or does not change. The water content value of the simping meets the water content which refers to SNI SNI 01-2886-2000 snacks with a maximum limit of 4%.

According to Lestari research (2019), foods with a high water content will make the taste of a food item less or seem bland and foods with a low water content will make the texture harder. This is related to one of the main characteristics of snacks which are crunchy because crunchiness is the acceptable limit for the texture of snacks and this property is directly related to the moisture content.

ASH CONTENT

Based on the results of the chemical test observations, it was found that the simping ash content in the treatment without the addition of 0% squid ink was 2.81% and the simping ash content in the treatment of adding 1% squid ink was 2.60%. This shows that with the addition of squid ink the ash content decreased by 0.21%. According to Setyawati *et al* (2014), it is hoped that it will affect the increasing content of organic matter.

Organic materials contain quite important food substances, namely protein, lipid, vitamins and carbohydrates. This is consistent with the research of Sudarmadji *et al* (1997), which states that the decrease in ash content can be influenced by the material and the way the ingredients are mixed. The ash content with the addition of squid ink was 1% less than the 0% treatment, but the difference in levels was 0.21%, so it cannot be said to be a significant change. This means that the squid ink does not affect the ash content of the product (Lestari 2019).

LIPID CONTENT

According Winarno (2004), also serves as a source of lipid flavors and gives a soft texture to the product. Based on the results of the chemical test observations, it was found that the lipid content of squid in the treatment without the addition of 0% squid ink was 4.93% and the lipid content in the treatment of adding 1% squid ink was 4.85%. This shows that with the addition of squid ink the lipid content decreased by 0.08%. The results of the lipid content in the hoops indicated that the addition of squid ink tended to decrease. According to Windsor (2001) *in* Pratama (2014), lipid content is also influenced by the cooking process during roasting. Protein will coagulate if the material is heated so that a lot of water and lipid comes out (Pratama 2014).

PROTEIN CONTENT

Based on the results of the observations it was obtained that the simping protein content in the treatment without the addition of 0% squid ink was 5.85% and the simping protein content in the 1% addition of squid ink treatment was 10.62%, this shows that with the addition of ink protein content increased by 4.77%. The increase in protein content was due to the high protein content in the squid ink. The higher the squid ink concentration given the higher the protein content value.

According to Mukholik (1995), squid ink contains 10.88% protein consisting of essential and non-essential amino acids. According to Okozumi and Fujii (2000), squid ink melanoproteins contain essential amino acids, which are predominantly lysine, leucine, arginine and phenylalanine. The dominant levels of non-essential amino acids are glutamic acid and aspartic acid.

According to Almatsier (2006) *in* Hidayati (2016), protein quality is determined by the type and proportion of amino acids it contains, high-quality protein is protein that contains all the essential amino acids in proportions suitable for growth. Thelevel of measured protein values can be influenced by the amount of water content lost (dehydration) of the material (Pratama *et al* 2014).

CONCLUSION

Based on the results of the research, the sample of simping with 1% additional concentrate of squid ink, is the sample that got the highest interest after organoleptic test. The Chemical characteristic of simping with this addition is 2.93% of water, 2.6% ash, 4.85% lipid, and 10.62% protein.

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