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Making Marination of Swallow Shrimp *(Penaeus merguiensis)* with Different Seasoning Processing

Pembuatan Marinasi Udang Swallow *(Penaeus merguiensis)* dengan Pengolahan Bumbu yang Berbeda

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ABSTRACT

Shrimp is one of the most popular types of seafood. Processed in any way, such as fried, steamed, baked, or made into a salad, shrimp is still delicious to eat. Marinating is the process of soaking meat in a marination before it is further processed. This study aims to determine the level of consumer acceptance of the manufacture of swallow shrimp marinade with different spice processing based on the hedonic test and to determine the nutritional content of the best value from the hedonic test of shrimp marinade with different spice processing. The shrimp marinade research method was divided into three stages. The first stage is sample and material preparation, the second stage is making shrimp marinade and the third stage is hedonic and proximate testing of the marinade. The research treatment design used was a completely randomized design (CRD). The results of the study obtained the best value from the hedonic test of shrimp marinade with the criteria of appearance = 6.30, aroma = 6.46, texture = 6.46 and taste = 5.85. The results of the test of the nutritional content of the marinade were based on the best value of the hedonic test results, namely water content = 73.61%, ash content = 5.45%, fat content = 0.31, protein content 19.26%, and carbohydrate content 1.38.

Keywords: *Hedonic Test, Marinated, Proximate Test, Swallowed shrimp.*

ABSTRAK

Udang termasuk salah satu jenis makanan laut yang digemari banyak orang. Diolah dengan cara apa saja, seperti digoreng, dikukus, dibakar, maupun dijadikan *salad*, udang memang tetap enak untuk dikonsumsi. Marinasi adalah proses perendaman daging di dalam marinade, sebelum diolah lebih lanjut. Penelitian bertujuan untuk mengetahui tingkat penerimaan konsumen terhadap pembuatan marinasi udang *swallow* dengan pengolahan bumbu yang berbeda berdasarkan uji hedonik dan mengatahui kandungan gizi terbaik dari hasil uji hedonik marinasi udang dengan pengolahan bumbu yang berbeda. Metode penelitian marinasi udang dibagi menjadi tiga tahap. Tahap I preparasi sampel dan bahan, tahap II pembuatan marinasi udang dan tahap III pengujian hedonik dan proksimat marinasi. Rancangan perlakuan penelitian yang digunakan adalah rancangan acak lengkap (RAL). Hasil dari penelitian diperoleh nilai terbaik dari uji hedonik marinasi udang dengan kriteria kenampakan = 6,30, aroma = 6.46, tekstur = 6,46 dan rasa = 5,85. Hasil uji kandungan gizi marinasi berdasarkan nilai terbaik hasil uji hedonic yaitu kadar air = 73,61%, kadar abu = 5,45%, kadar lemak = 0,31, kadar protein 19,26% dan kadar karbohidrat 1,38.

Kata Kunci: Marinasi, Udang swallow, Uji Hedonik, Uji Proksimat

INTRODUCTION

Shrimp is one of the most popular types of seafood. Shrimp are processed by all means, including fried foods, steamed foods, fried foods, and salads, and are still delicious. Even shrimp are often used as an additional ingredient in other foods such as crackers, bakwan, and shrimp paste. Shrimp contains a

small count of nutrients, but you can see that it is very high, from protein, calcium, iodine to omega 3 fatty acids. Novrihansa, *et. al.* (2016), to date, shrimp continue to be the largest prima donna in the marine products trade, with a commercial value of 21% compared to other marine products. Swallow shrimp is also the main exporter for Indonesia, and the sales of shrimp are 50,000 shrimp.

Swallow shrimp has advantages over other fish products. One of its characteristics is its high nutritional value. That is, shrimp have a relatively high protein content, and shrimp contains vitamins A and B1, calcium, and phosphorus (Warintek, 2003). However, marine products are products that deteriorate very rapidly or are perishable. Therefore, it is necessary to implement storage and processing methods that maintain the shelf life of fish without reducing the nutritional value of the fish. In addition to extending shelf life and maintaining nutritional value, the purpose of processing foods is to add flavor, keep them juicy (not dry) during further processing, and keep the meat tender. Marinated is one of the marine products processed to extend shelf life, add delicious flavors and keep the product juicy.

Marinated was the dipping of meat in the marinade before further processing. Marinated is a common name for flavored liquids used as marinades for meat (including chicken and seafood) and is commonly used to flavor or soften meat. First marinades were made to preserve fish. The fish are soaked in a simple marinade in the form of saltwater, creating a unique flavor that is different from the original fish and extending the shelf life.

The city of Tanjung Balai itself is one of the regions on the east coast of North Sumatra. Where the Tanjung Balai waters still merge with the Asahan waters, it is often said that the Tanjung Balai Asahan waters make up the majority of Tanjungbalai's population as fishermen. One of the catches that fishermen often produce is seafood. Also, in an interview with fishermen in and around Tanjungbalai by Yusfiani et.al (2021) who live on the banks of the river, it is known that there is a group of people who can eat small raw shrimp. I am. Fresh, with spices, without spices. Against this background, we conducted research on marinated shrimp, determining consumer acceptance in the processing of various spices, and determined the nutritional value of shrimp marinated with various spices.

MATERIAL AND METHODS

The ingredients for marinade are shrimp, red pepper, cayenne pepper, garlic, vinegar, soy sauce, lime, distilled water, K2SO4, Cu2SO4, pp indicator, H2SO4, 0.1N HCl, 30% sodium hydroxide 0.1N, n-hexane. The tools used in this study were knives, cutting boards, containers (cymbals), jugs, scales (Adventures Dhaus), Erlemeyers (Pyrex), desiccators (Pyrex), ovens (Memmer), fat extractors, distillation flasks, processing beakers, filter paper, sprite, spatula, gloves and mask.

The research method for making marinated shrimp can be divided into three stages. The first step is the preparation of samples and materials, the second step is the production of marinades of shrimp, and the third step is the pleasurable and direct test of marinades.

Phase I research was the phase of sample and material preparation. In this phase, all materials and tools used are pre-prepared to facilitate the process of conducting the survey. The swallow shrimp used in this study was a small swallow shrimp of approximately ± 3 g / head.

Phase II research is the phase of making shrimp marinade. The process of making marinated shrimp refers to the study by Yusfiani et.al (2021): Hedonic Test, which is related to the study of marinated shrimp soy sauce. Table 1 shows the configuration of the process for making marinated shrimp.

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Table 1. Composition of marinated shrimp

Material	Treatment		
	P_1	P_2	P_3
Swallow	225 gr	225 gr	225 gr
Red chili	100 gr	100 gr	100 gr
Cayenne pepper	9 gr	9 gr	9 gr
garlic	75 gr	75 gr	75 gr
salty soy sauce	133 ml	133 ml	133 ml
vinegar acid	15 ml	15 ml	15 ml

The process of making shrimp marinade begins with separating the shell and shrimp meat, then washing the shrimp meat with clean water, dehydrating it, and weighing it according to the treatment composition. Prepare spices such as red pepper, cayenne pepper, garlic, soy sauce, and vinegar, make seasonings, and then weigh them by processing P1 (chopped seasoning), P2 (high-quality seasoning), and P3 (extracted seasoning). Then add the spices separated according to the treatment to the washed shrimp and stir until the spices are evenly dispersed with the shrimp. Then place the seasoned shrimp in a small jar and store the refrigerator for 1x24 hours. The marinade stored in the refrigerator is ready for testing.

The next study is a Phase III study, which is an important study from the total research results. This study tests marinated shrimp made from the results of Study II. Two tests were conducted in this study: a hedonic test (recommended) designed to determine the level of consumer acceptability of marinated shrimp and an immediate test to determine the nutritional value of marinated shrimp increase.

Hedonic (Preference Test)

This study is a research phase for testing the quality of marinated shrimp products. The quality of marinated products is checked by hedonic check or preference check. Hedonic tests are based on likes and dislikes, using grades based on the level of the scale included in the rating sheet. The evaluation result of the evaluation sheet is calculated using SNI formula 01.23462006. The formula for SNI01.23462006 to calculate the panelist's preference level for a product is

$$.\bar{x} = \frac{\sum_{i=1}^{n} xi}{n}$$

$$S^2 = \frac{\sum_{i=1}^{n}(xi - \bar{x})^2}{n}$$

$$P(\bar{x} - (1{,}96.s/\sqrt{n})) \leq \mu \leq (\bar{x} + (1{,}96.s/\sqrt{s})) \cong 95\%$$

Information:

N	=	panelist
S^2	=	Information on average quality value
1,96	=	Standard deviation coefficient at 95%
$\bar{x}$	=	Average value
xi	=	The quality value of panelists/ number of panelists
S	=	The standard deviation of standard values

Panelists are required to evaluate the preference test. In this study, a panel of 30 untrained panelists was used to evaluate the preference test.

Proximity Test

This study is a pilot study stage for measuring the nutritional content of shrimp marinades. Moisture content (Association of Official Analytical Chemists (AOAC), 2005), ash content (AOAC, 2005), fat content (AOAC, 2005), protein content (AOAC, 2005). And Carbohydrate Content (Winarno, 1986)

The data was processed using a fully randomized design (CRD) using analysis of variance (ANOVA), the data obtained were processed in tabular form, was described and conclusions were drawn.

Completely randomized design mathematical model:

$$Yij = \mu + Ai + \epsilon ij$$

Information :

Yijk : Observation of main factors at level-i, test-j and additional factors at level-k

μ : General Average

Ai : Main Effect on level - i

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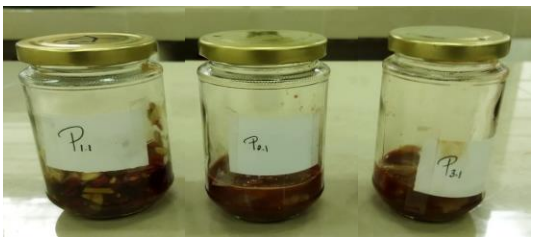
ϵij : Effect of Error I on Main Factors at i and j test

ϵijk : Effect of error II on Main Factor at level-i, test-j and additional factors at level-k

RESULT AND DISCUSSION

Characteristics of Marinated Shrimp

Marinated is to soak the meat in the marinade and then process it further. The characteristics of marinades are aimed at determining the highest quality of the three treatments (chopped spices, ground spices, and spice extracts) that can make tasty and tender shrimp meat. Marinated shrimp is evenly dispersed by treating a variety of spices, from raw material preparation to shell separation, cleaning, chopping, blending, mixing, filtration to prepare spices, and mixing raw materials and spices. Stir and store in a freezer for 1x24 hours in a bottle. Below is a photo of a marinated shrimp with different seasonings.



P1 P2 P3

Figure 1. Marinated shrimp different spice P1. Minced spice; P2. Fine spice; P3 Spice extract

Observing the characteristics of shrimp marinades with different seasoning treatments based on Figure 1, marinades have characteristics such as chopped brown seasoning color, ground seasoning, and extract color. The flavor of the finished marinade is typical, but the taste of marinated shrimp is tender, like non marinade shrimp. The next process is to test the consumer's preferred level or hedonic and proximity tests to show the nutritional content of the shrimp marinade.

Hedonic test

The hedonic test is a sensory used to determine the magnitude of quality differences between several similar products by assessing or evaluating specific characteristics of the product and to determine the degree of product preference. It is a test of sensory analysis. The test was conducted on a panel of 30 people. The purpose of this test is to use a score sheet to measure the level of preference for a product, and the parameters or criteria tested are appearance, odor (scent), texture, and taste.

The first thing that comes to mind when looking at a product is its appearance, color, shape, and so on. Consumers usually prefer products that look more attractive. Appearance is important for many foods, both raw and processed. Appearance also plays an important role in the acceptance of food by consumers. Figure 2, shows the results of a hedonic appearance test performed on shrimp marinated with various spices.

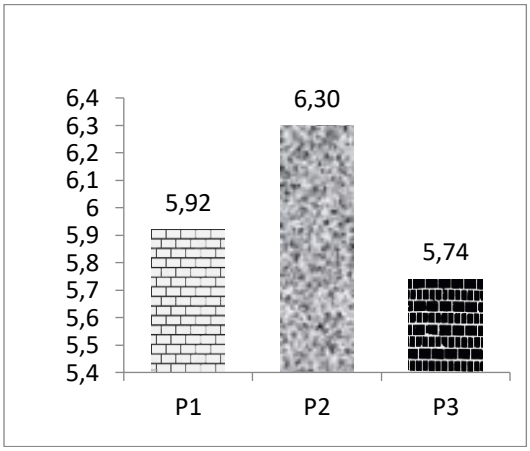


Figure 2. Appearance value of marinated hedonic test of swallow shrimp

Based on Figure 2, hedonic test scores for marinated shrimp using a variety of spice treatments (chopped spices, ground spices, and spice extracts) with an appearance criterion ranging from 5.74 to 6.30. Shrimp marinated appearance appraisers preferred a medium / neutral scale range. The results of the statistical test showed that various seasoning factors for marinated swallow

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shrimp had a significant effect of (< P more than 0.05 in appearance score).

Shrimp marinated with various spices look dark brown like the color of mangosteen. This is because soy sauce was added. Soy sauce can add a rich flavor to a dish and make it brown. The color intensity produced is strongly influenced by temperature, oxygen, amino acid types, and reducing sugars (Winarno, 2004).

Odor

The scent is the scent of food, and the scent itself is the reaction when volatile compounds from the food enter the nasal passages and are perceived by the sense of smell. Volatile compounds enter the nose when inhaled or inhaled by humans, but can also enter through the back of the throat when eaten (Kemp et al., 2009). Smell sensations are used to determine the smell and aroma of food. Aromas are highly subjective tastes and odors that are difficult to measure because of the different sensitivities and tastes of different people. You can recognize them, but they have different tastes. Setyaningsih (2010) Humans use the nose as a tool for perceiving taste and smell. The smell is called long-distance taste because you can feel the deliciousness of food that you have never seen by just smelling it from a distance. Figure 3, shows the results of the hedonic flavor test of shrimp marinated with various spice processing.

Based on Figure 3, hedonic test score for shrimp marinade using various spice treatments (chopped spices, ground spices, extracted spices) with aroma criteria ranging from 5.74 to 6.46. Panelists of shrimp marinade flavors liked the medium-scale range and normal/neutral. The results of the statistical test showed that various seasoning factors in the marinated swallow shrimp had a significant effect (P in appearance score greater than 0.05).

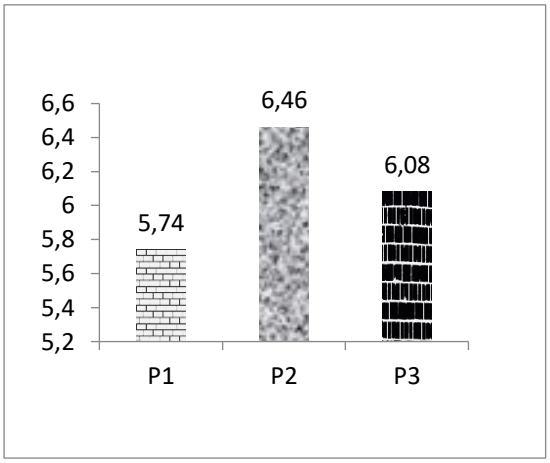

Figure 3. Flavor value of marinated hedonic test of swallow shrimp

Hedonic test results showed that different spice treatments (chopped spices, ground spices, extracted spices) showed different flavor values for marinated shrimp. Using ground spices to make shrimp marinades has the highest hedonic test score of 6.46, while has the lowest hedonic test score in the processing of spices chopped at 5.47.

The flavor made from ground spices is stronger than chopped or extracted spices because it is not determined by just one ingredient, but by the combination of its constituent ingredients and excellent processing methods. In addition, the scent caused by spices is because all the ingredients of the spice are blended into a unique scent. In addition to the characteristic flavor of the spices added to the marinated shrimp, the flavor produced by the marinated shrimp is believed to be from soy sauce. The formation of typical flavors of marinated shrimp. According to Astuti (2009), the aroma is the sense of smell produced by the stimulation of compounds. In the fermentation process, the microorganism *Saccharomyces rouxii* isolated from the moromi (soy sauce production stage) is the main yeast involved in the flavor formation of soy sauce.

Texture

The texture is a sensation of pressure that can be observed by mouth (when chewing, chewing, swallowing) or by

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touching with a finger (Kartikaetal. InHimawati, 2010). Tactile sensation is used to determine if the texture is good. Touch or touch perception occurs on almost the entire surface of the skin. Its sensitivity is not uniform across regions. The fingertips have a special sensitivity, which is very useful for product and product evaluation. Figure 4 shows the results of a hedonic texture test performed on shrimp marinated with various spices.

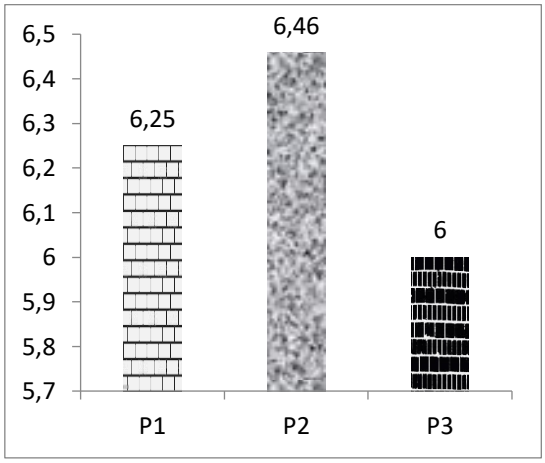

Figure 4. Texture value of marinated hedonic test of swallow shrimp

Range panelists scoring to texture on shrimp meat marinated with various spices (chopped spices, ground spices, extracted spices) is about 6.00 to 6.46. That is, the texture of the shrimp meat marinated by different seasoning treatments based on the hedonic scale is slightly preferred by the panelists to be normal/neutral, resulting in a soft shrimp meat texture. The marinade itself is done as a marinade of meat and is used to add flavor and tenderness to the meat. The results of the statistical test showed that various seasoning factors in the marinated swallow shrimp had a significant effect (P was < rather than 0.05 in appearance score).

The highest textured hedonic test score for marinated shrimp was 6.06 obtained when processing ground spices, and the lowest hedonic score for marinated shrimp was 5.75, which was rated by 30 panelists. Obtained based on. The softness of shrimp is thought to be due to the addition of ingredients such as soy sauce and vinegar. In the process of making marinades, many changes have been made to acid and spice-based marinades. Acid acts as a meat tenderizer and spices act as a seasoning.

When soy sauce is added to marinated shrimp, a natural protease enzyme produced by active microorganisms is produced during the fermentation process, and the enzyme contained in the soy sauce softens the meat of the shrimp. Syamsir (2011) to speed up the process of tendering meat, some commercial marinades add enzymes to the marinade formula.

The enzyme added is a protease enzyme, which, like acids, can cut meat proteins (fibers) into shorter peptide forms and make the meat softer.

In addition to the ingredients added when tendering shrimp meat, it is believed that low temperatures are used for 24 hours when marinating, as low temperatures can inhibit the development of microorganisms, including pathogenic microorganisms increase a bid. Syamsir (2011) requires a marinade process, which takes more than an hour, to be carried out at a low temperature (refrigerator or refrigerator) with a maximum temperature of 4 ° C to control the growth of microorganisms, including pathogens. At low temperatures, the marinade can be done for 2 days.

Taste

Taste is an indicator for determining food and drink as delicious, sweet, salty, and bitter. According to Winarno (2002), taste mainly utilizes the five senses of the tongue, and taste is used to judge taste by tasting food and drink.

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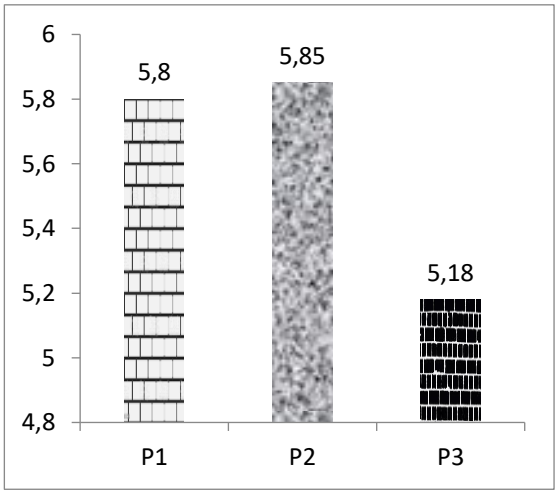

Figure 5. Taste value of marinated hedonic test of swallow shrimp

Hedonic test values for shrimp marinade using various spice treatments (chopped spices, ground spices, extracted spices), based on Figure 5 with a taste criterion of 5.18-5.85. Panelists' ratings for the taste of shrimp marinades ranged from medium to normal/neutral. The results of the statistical test showed that different seasoning factors had a significant effect on the marinated swallow shrimp (P < rather than 0.05 in appearance score).

The hedonic test score for shrimp marinades performed in three treatments was 5.85 for the highest hedonic test score when processing pureed spices and the lowest hedonic test score for processing the extract. It is 5.18. For panelists, it is better to process and marinated ground spices, and the spices stand out on the tongue, so marinated shrimp seems to be more delicious. Suryono, et. In, al (2013), the flavor of the ingredients is derived from the ingredients themselves and is influenced by the ingredients added during processing. Not only can taste the shrimp marinade with spices, but you can also add soy sauce to increase the taste, so adding soy sauce seems to be delicious.

Soy sauce, which is made by fermenting protein-rich plant and animal components with saltwater, becomes an amino acid-rich soy sauce among the amino acids of glutamic acid, and mixes with the salt to which this amino acid is added to have a lot of umami. Yusfiani's Nasmuru, (2021) Fermented Sauce Shrimp, is rich in amino acids and tastes different from Soy Sauce, so produces flavor umami and is recognized as a dark brown containing glutamic acid increase.

Proximity Test

To develop a food ingredient, it is necessary to know the properties of each major element contained in the food ingredient. A commonly used method is a rough analysis of nutrient content, including water, ash, protein, and fat content (Taufik, 2011). The proximity tests performed in this study were based on the highest overall score of the pleasure tests performed. Table 2 shows the results of an approximation test of the nutritional components of swallow shrimp processed from ground spices.

Table 2. Nutritional value of marinated shrimp treated with ground spices

No	Parameter	Nutritional Value
1	Moisture content	73,61 %
2	Ash Content	5,45 %
3	Fat	0,30 %
4	Protein	19,26 %
5	Carbohydrate	1,38 %

Based on the results of the hedonic tests performed, the best results from the three treatments (chopped spices, ground spices, extracted spices) were marinated in the ground spice treatment. Next, the best values from the hedonic test results were tested for the nutritional content of the marinated shrimp. Nutrient content tests performed include water, ash, protein, and fat content, but for carbohydrates, the difference is used.

Moisture Content

Moisture content is the difference in the weight of the material before and after heating. The moisture content of materials placed outdoors reaches equilibrium with the humidity of the surrounding air. The water content of this material is called the balanced water content (Sudarmadji, 1989). Based on

Table 2. The nutritional value of marinated shrimp tested with the water content parameter is 73.61%.

As a result of the investigation conducted, the water content is, which is slightly lower than the water content reported by Ngginak (2013), and the water content of shrimp meat is 76.3%. The results showed that the water content of the shrimp meat was created by the infiltration process with the addition of ground spices. Kuntoro (2007) found that the decrease in water content is caused by osmotic pressure, the exchange of water between cells and the environment due to concentration differences.

Ash content

Ash is a mixture of minerals or minerals found in foods. The principle of direct ash is to oxidize all organic matter at a high temperature of about 500600 ° C and weigh the material remaining after the combustion process (Sudarmadji, 1996). Foods are mainly composed of organic substances and about 96% water, the rest are composed of minerals. This mineral element is also known as mineral or ash. The process of burning organic matter burns, but inorganic matter does not, so it is called ash (Winarno in Fakhrudin, 2009).

Based on Table 2, the nutritional value of processed shrimp marinade ground spices is 5.45%. Test results for the nutrient content of the ash in the shrimp marinade are higher than the nutrient content of fresh shrimp, 3.7% (DKPI, 2018). The high ash content of the shrimp marinade is thought to be due to the reduced water content of the shrimp marinade and the increased ash content. Winarno (1995) reduces the water content in foods to an increase in ash concentration. Sugeng (2004), because animal-derived foods are high in ash, this is because contains some minerals, of which contains calcium, iron, phosphate, etc. This is because it contains.

Fat Content

Fat is found in almost all foods that contain a variety of ingredients. However, fat is often intentionally added to foods for a variety of purposes. Fat is a non-polar water-insoluble compound, and fats and oils have important functions in food processing. (Kusnandar, 2010). Animal fats contain a lot of sterols called cholesterol, but vegetable fats are generally in liquid form because they contain plant sterols and more unsaturated fatty acids.

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Protein Content

Proteins play an important role in emulsion systems. Protein is a natural emulsifier contained in meat ingredients. Proteins are also used as binders because they have a part that can bind to water (lipophilic) and a part that can bind to fat (lipophilic). The amount of protein extracted and its solubility is strongly influenced by the physical properties of the resulting product. Protein is very important to the body as it is not only an energy source but also a building block and regulator.

The nutritional value of the processed shrimp marinade with ground spices was tested at 19.26%. The results of the studies carried out resulted in lower water content than the water content reported by Helmi (2021), which has a protein content of 21% in fresh shrimp meat. The decrease in the protein content of marinated shrimp is thought to be due to the addition of vinegar, as the protein content may change naturally with the addition of vinegar. Sudarmadji et al (1989) discovered that proteins have the following naturally and easily changing

properties: Heat, acids, bases, organic solvents, pH, salts, heavy metals, radioactive rays, proteins, etc. are also easily subject to physical changes to observe coagulation (insoluble) or compression.

Carbohydrate

Carbohydrates are a group of compounds composed of the elements carbon (C), hydrogen (H), and oxygen (O). From a nutritional point of view, carbohydrates are an important class of compounds as they are the most economical and widely used energy source. Most foods produced around the world are made up of carbohydrate-rich foods.

Based on Table 2, the approximate test result for the carbohydrate content of marinated shrimp was 1.38%. Carbohydrate test results for shrimp marinated with refined spices were higher than the carbohydrate value of fresh shrimp, 0.1%. The high carbohydrate content of marinated shrimp is due to the low nutrient content of marinated shrimp compared to the nutrient content of fresh shrimp. Carbohydrate content depends on the reduction factor, as carbohydrate content is calculated using the difference: water content, protein content, fat content, and ash content minus 100.

CONCLUSION

Conclusions can be drawn based on the results of studies on shrimp marinades with different seasoning treatments.

1. The best value of the hedonic test results performed with shrimp marinade using various spice processing (chopped spices, ground spices, extracted spices) is the refined spice-treated shrimp marinade, which is the appearance of the hedonic test. The value is 6.30, the flavor is 6.46, the texture is 6.46, and the marinated shrimp has a flavor score of 5.58.
2. Based on the best values obtained from the results of the conducted hedonic tests, the nutritional value of shrimp marinated with ground spices is 73.61% water content, 5.45% ash content, 0.31% fat content, protein. The content is 19.26%, the nutritional value of carbohydrates. It is 1.38%.

Based on studies conducted on marinated shrimp with various seasonings, suggestions can be made to test pH and cooking losses.

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