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The Effect of Adding Carrageenan Flour *Eucheuma cottonii* on the Level of Preference of Yellowtail Fish Otak-Otak

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Abstract

Otak-otak is a processed product that is well known to the public. The fish used in making otak-otak are generally sea fish. Carrageenan has now become a commonly used and popular ingredient in food processing, but its use in making otak-otak is still limited. This research aims to improve the quality of yellowtail fish otak-otak by adding carrageenan flour because carrageenan has gel properties which can improve the characteristics of fish otak-otak, including texture, aroma, taste and appearance. The main raw materials used are yellowtail fish and tapioca flour, with variations in the addition of carrageenan flour as a treatment with different concentrations consisting of treatments A(0%), B(0,5%), C(1%) and D(1,5%). The data collection method involves subjective assessment in the form of

sensory tests by semi-trained panelists, who assess the aroma, taste, appearance and texture of the otak-otak. The level of liking is measured on a scale from very like to very dislike. The results of the analysis using the Friedman test showed that the highest level of taste preference was found in treatment D with the addition of 1,5% carrageenan flour, namely 6,6, the highest level of taste preference was achieved in the same treatment, namely 7,2. The treatment with the addition of 0,5% carrageenan flour obtained the highest appearance rating, namely 7,1, while the highest level of texture preference was achieved in a similar treatment of 6,7. This research contributes to understanding how the addition of carrageenan can improve the quality of yellowtail fish otak-otak, with the finding that.

Keywords: Otak-Otak, Carrageenan Flour, Organoleptic Test, Yellowtail Fish

Introduction

Indonesia is a country where most of the territory is in the form of oceans so that it has a lot of extraordinary wealth potential from the marine and fisheries sector, one of which is yellowtail. Yellowtail is a fish with a fairly high economic value. This fish is widely marketed both in whole form and in the form of fillets. Body parts that can be used from yellowtail fish are meat, skin, viscera, bones, and scales. Collagen from yellowtail fish skin contains protein structures $\alpha 1$, $\alpha 2$, β and γ with molecular weights of 125, 113, 170-181, and 208 KDa (Astiana and Nurjanah 2016) ^[5]. Yellowtail fish also has a fairly high protein content of 22.3 g from 100 g BDD fish (Indonesian Food Composition 2017) ^[12].

According to Agustini *et al.* (2006) ^[1], otak-otak is a diversification of processed fish products in the form of gel made from fish meat mixed with tapioca flour and other spices such as salt, sugar, garlic, onion, and pepper. Diversification is the development of a processed fishery product that aims to produce new forms with higher economic value. With diversification, yellowtail fish can be more favored by many people, add flavor, and can extend the shelf life of the yellowtail fish.

One of the processed seaweed products is carrageenan. Carrageenan comes from the seaweed *Eucheuma cottonii*. *Eucheuma cottonii* species is a producer of kappa-carrageenan which has sturdy and strong gel properties but is easily syneresis (Setijawati *et al.* 2014) ^[8]. Carrageenan of the type *Eucheuma cottonii* has a complex compound arrangement of polysaccharides consisting of a number of galactose units and 3,6 anhydrogalactose both sulfate-containing and not with bonds α 1,3,2-D galactose and β 1,4-3,6 anhydrogalactose alternately (Zatnika 1993) ^[17]. Carrageenan is a hydrophilic linear sulfated galactane. This polymer is a repeat of disaccharide units. This sulfated galactant is classified according to the presence of 3,6-anhydrogalactose (DA) units and the position of the sulfate group. The characteristics of fish otak-otak can be improved by carrageenan which is widely used by food industry players to improve the products produced, because carrageenan can function as an emulsifying agent, a basic ingredient for making gels, stabilizers, ingredients that increase viscosity. The use of

carrageenan has recently begun to increase in the food industry and tends to become a trend of processing using carrageenan (Agustini *et al.* 2015)^[2].

Research Methods

Time and Place

This research will be carried out in October 2023 at the Processing Laboratory of the Faculty of Fisheries and Marine Sciences, Padjadjaran University, Sumedang, West Java.

Materials and Tools

The main raw materials used are yellowtail fish and tapioca flour. Other additional ingredients are, carrageenan flour, flavoring, salt, pepper, eggs, cold water, cooking oil, onions, onions and garlic. The tools used are choppers, knives, pans, spoons, scales, pots, plastic bowls and cutting boards.

Making Fish Otak-otak

The formula for making otak-otak with the addition of carrageenan flour used is the result of modifications with 4 treatments and steps for making fish otak-otak, namely fish in fillets then washed to keep the remaining dirt on fish clean, then fish that have been in the fillets are mashed using a chopper, then put other ingredients such as onions, garlic, onions, flavoring, salt, pepper, tapioca flour as much as 100 grams per treatment, carrageenan flour, eggs, and a little water. The first treatment did not add carrageenan flour or 0% because as a control treatment, in the second treatment carrageenan flour was added as much as 0.5%, the third treatment as much as 1% and the fourth treatment as much as 1.5%, then wait until the dough is well mixed, after that the dough is shaped oval and put into a pot containing boiling water to boil, if it floats to the surface of the water, The otak-otak are removed and drained, then fried in hot oil until golden yellow.

Data Collection and Analysis Techniques

Data collection techniques in this study were carried out through hedonic tests. The hedonic scoring test method is used to determine the level of preference of the brain - the brain of yellowtail. Favorability rating attributes include aroma, appearance, taste, and texture. The scale to measure the level of liking is very dislike (1), dislike (3), mediocre (5), like (7), very like (9). The research panelists were 20 semi-trained panelists for students of the fisheries study program at Padjadjaran University, class of 2021.

The data analysis technique in this study uses the Friedman test and is presented in the form of graphs on each panelist's assessment attributes.

Results and Discussion

Aroma

Aroma is an important factor in determining the level of consumer acceptance of foodstuffs. According to Asikin and Kusumaningrum (2016)^[4], aroma is one of the main attractions in the characteristics of a food product. Aroma determines a lot of the deliciousness of foodstuffs, so aroma is one of the determining factors for the quality of a food ingredient. In many cases the aroma, smell and taste of food can be attributed to the presence of one or several compounds that can make an impression. This is in line with the opinion of Winarno (2004)^[13] who states that the aroma of food in many ways determines whether or not food is

delicious or not, even the aroma or smell is more complex than the taste and sensitivity of the sense of smell, usually higher than the sense of taste, even the food industry considers it very important to the smell test because it can quickly provide assessment results whether the product is liked or not. The aroma of food determines the deliciousness of the foodstuff. Food aroma is also one of the important indicators in determining the quality of foodstuffs. Generally, consumers will like food if it has a distinctive aroma that does not deviate from the normal aroma.

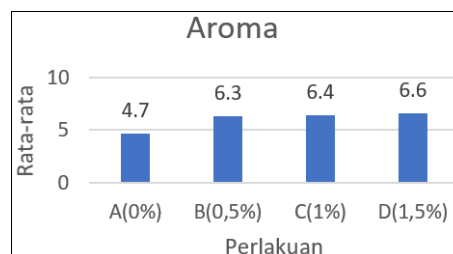


Fig 1: Graph of hacyl organoleptic test against aroma

The results of organoleptic tests on aroma showed that, the average value given by panelists to the aroma of otak-otak added carrageenan flour had values ranging from 4.7 to 6.6 and descriptively panelists rated dislike to like. The highest favorability was found in treatment D (1.5%) at 6.6 and the lowest favorability in treatment a (0%) at 4.7. (Fig 1). The aroma of food can determine the deliciousness of the ingredients or food products. Food aroma is also one of the important indicators in determining the quality of food ingredients (Agustini *et al.* 2015)^[2]. According to Wibowo (2004), the aroma of fish otak-otak is influenced by the content of fish meat. Fish meat gives a distinctive aroma to the otak-otak by the presence of compounds such as aldehydes, ketones, lactones, metals and dimethyl hydroxy furanone that affect the aroma and taste of fish otak-otak. The addition of too much flour in making otak-otak, meatballs, and empek-empek affects the distinctive aroma of fish.

Taste

Taste is one of the main factors in determining the deliciousness of food. Taste is a determining factor in the attractiveness of receiving a food product by consumers. Unwelcome flavors tend to be rejected by consumers even though the color, aroma, and texture factors of a product are preferred. Although a food product has good nutritional value but the taste is unacceptable, the target of improving community nutrition cannot be achieved (Winarno, 1997)^[14].

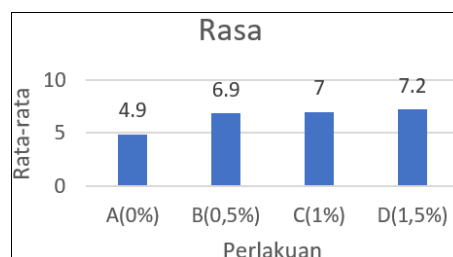


Fig 2: Graph hacyl organoleptic test of taste

The results of organoleptic tests on taste showed that the average value given by panelists to the aroma of otak-otak

added carrageenan flour ranged from 4.9 to 7.2 and descriptively the panelists rated dislike to very, very like. The highest favorability was found in treatment D (1.5%) which was 7.2 and the lowest favorability in treatment A (0%) which was 4.9 (Fig 2). The taste in fish otak-otak is influenced by components or ingredients contained in the fish otak-otak such as protein. Suryaningrum *et al.* (2002) [11] said that the taste of food is influenced by the components contained in food such as protein, fat, and carbohydrates. More taste tests involve the sense of the tongue which can be known through the solubility of food ingredients in contact with the taste nerve.

Texture

Texture is one of the most important determining factors in product quality. This is related to the taste at the time of chewing the food (Soewarno, 2001) [10]. Texture is included in the Respondent's assessment. The chewy texture of otak-otak, not too sticky, legit, and but easy to chew is preferred by consumers.

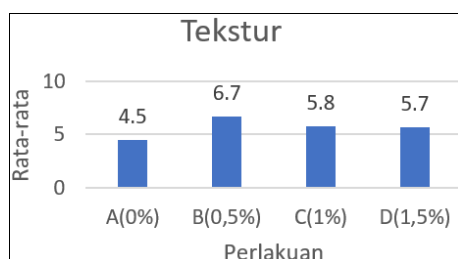


Fig 3: Graph of organoleptic test results against texture

The results of organoleptic tests on brain-brain texture showed that the average value given by panelists to the taste of lanting added carrageenan flour had values ranging from 4.5 to 6.7 and descriptively the panelists rated neutral likes to very very likes. The highest level of preference for lanting texture was found in treatment B (0.5%) with a value of 6.7 and the lowest preference was found in treatment a (0%) with a value of 4.5. Based on Ariffianto's (2010) research in Sitepu *et al.* (2020) [9], carrageenan can increase the binding power of water so that it can improve and affect the texture of a product. Carrageenan gives a chewy texture to the processed product, this results in a large concentration of carrageenan can cause the texture of a product to be rather hard. Added by Wiraswanti *et al.* (2008) [16] in their research that the effect of carrageenan addition treatment is significantly different from the fish ball products produced. This happens because carrageenan is able to produce a fairly good texture. Carrageenan is used in order to improve the texture of a product. Carrageenan is able to cause interaction with charged macromolecules such as proteins, so that it can affect viscosity increase, gel formation, precipitation and stabilization.

Appearance

According to Soekarto (1985) in Amalia (2002) [3], although appearance does not determine the level of consumer liking absolutely, appearance can affect the level of consumer acceptance. Products with neat, good, and intact shapes are definitely preferred by consumers compared to products that are less neat and not intact. Appearance includes color, shape, homogeneousness/uniformity, size, surface properties (smooth, rough), appearance, clean/dirty.

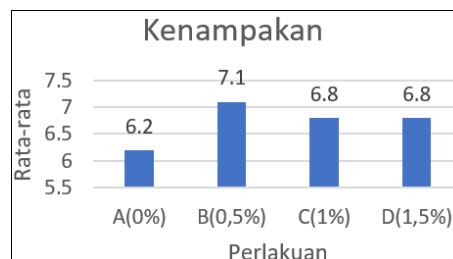


Fig 4: Graph hresult of organoleptitst k on appearance

The results of organoleptic tests on the appearance of the brain showed that the average value given by the panelists on the appearance of the otak-otak of yellowtail fish added carrageenan flour had values ranging from 6.2 to 7.1 and descriptively the panelists rated neutral likes to very very likes. The highest level of liking for the appearance of yellowtail fish otak-otak was found in treatment B (0.5%) with a value of 7.1 and the lowest favorability was found in treatment A (0%) with a value of 6.2. It is suspected that this happens because carrageenan can affect the appearance of fish otak-otak. This is in agreement with the results of Santoso's (2007) [7] research, namely treatment with the addition of carrageenan concentrations can affect the appearance of fish sausages. This is because carrageenan is able to increase the strength of the gel so that it can cause the appearance of sausages more compact, dense, and contained.

Conclusion

The value of the favorability level of yellowtail fish otak-otak with the addition of different concentrations of carrageenan flour, namely treatment A 0% (control), B 0.5% (0.5 grams), C 1% (1 gram), and treatment D 1.5% (1.5 grams) on the most preferred aroma characteristics is treatment D with an average value of favorability of 6.6. The highest level of taste preference found in treatment D has an average of 7.2. The highest level of liking for appearance was found in treatment B with an average score of 7.1. The highest level of liking for texture was found in treatment B which had an average of 6.7.

Saran

Further research needs to be done to find enough concentration to produce aroma, taste, color and texture so that the otak-otak can be preferred.

Thank You Speech

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