



Addition of Tenggiri Fish Head Flavour Powder on Favourite Level of Crackers

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

This study aims to determine the appropriate level of addition of tenggiri fish head flavor powder so that the most preferred cracker product was produced. The research was carried out at the Padjadjaran University fish processing product laboratory from September 2019 to January 2020. The method used was the experimental method with four treatment of adding powder tenggiri fish head flavor 0%, 7.5%, 10%, and 12.5% with 20 semi-trained panelists as replicates. The parameters observed in this study include tests based on organoleptic characteristics including color, aroma, texture, and taste. Data analysis of the level of cracker favourite used non-parametric statistics with a two-way analysis of the Friedman chi-Square test and continued with Bayes method to determine the treatment of adding the best flavor powder to crackers. The results of this study showed that the addition of tenggiri fish head flavor powder influenced the level of cracker preference. Adding 10% flavor powder produces the most favourite crackers.

Keywords: Flavor powder; tenggiri fish head; crackers; favourite level.

1. INTRODUCTION

Marine fish consumption increases every year. In 2014 it was 38.14 kg / cap / year, in 2015 it was 41.11 kg / cap / year, in 2016 it was 43.94 kg / cap / year and in 2017 it was 46.49 kg / cap / year [1]. Tenggiri is a pelagic fish that can be found in various areas of the ocean but in Indonesia, it is mostly found in Gorontalo. The tenggiri fish belongs to the Scomberomorus clan which is related to tuna, tuna, mackerel, and mackerel [2]. Tenggiri is an economical fish that is used as an export commodity or to fulfill domestic needs. The protein content in mackerel fish is 18%-22%, fat content 0.2%-5%, carbohydrate content 5% and water content 60%-80% [3].

Increased consumption of tenggiri is followed by an increase in the processing of tenggiri. Most fish processing processes only utilize meat, resulting in a lot of fish waste being wasted even though the waste has protein potential that has not been utilized optimally. Fishery waste that includes the head, skin, bones and internal organs can pollute the environment if left wasted even though from the waste part such as the head it still contains protein, omega 6, and omega 9 [4].

Processing of tenggiri fish waste, especially fish head is still limited. An alternative that can be done for the utilization of tenggiri fish head is processed into flavor powder. Tenggiri fish head potential to be processed because the head is the largest contributor to solid waste that is 18% while other components such as fish skin by 4% and fish bones 8% [1].

Flavor is a food additive that can emphasize and give flavor to food. Safer flavors are consumed, a type of natural flavor that is made using ingredients that are safe and nutritious for consumption such as fish heads, supplementary spices, and fillers [5].

The development of the flavor industry from seafood (seafood) in Indonesia seems increasingly in demand, this is evidenced by the number of foods that are added to seafood flavor. Some types of food added with seafood flavor include extruded products (snacks), broth, instant noodles, and instant noodle seasoning [3].

Utilization of tenggiri fish head flavor powder can be applied to making crackers. So far, the flavor

used in making crackers is still dominated by flavor synthesis. The addition of tenggiri fish head flavor powder in the manufacture of crackers not only gives a distinctive taste but can also add to the nutrition. Besides, the addition of flavor powder will also affect the organoleptic properties of crackers which in turn have an impact on their liking. Therefore it is very important to know the exact level of addition of tenggiri fish head flavor powder so that the favourite cracker product is obtained.

2. EXPERIMENTAL DETAILS

2.1 Making Tenggiri Fish Head Flavor

The making of tenggiri fish head flavor powder is the first 3 kg fish head cleaned and weeded. The clean head is then mixed with herbs which include salt, onion and garlic and water in a ratio of 1: 2 in a pan. The herbs added can also enrich taste of the flavor. Head boiled for 120 minutes at a temperature of 85°C-100°C. The resulting broth is filtered and the filtered liquid broth is mixed with maltodextrin as much as 15% and stirred until a paste is formed. The resulting paste is smeared on a baking sheet and put in an oven for the drying process. After the flavor is dried mashed with a blender [6].

2.2 Making Crackers

All ingredients including tapioca flour, salt flour, garlic and flavor powder according to the treatment (0%, 7,5%, 10% and 12,5%) are mixed while pouring hot water little by little until a dough is formed. The smooth dough is bounced off a cylinder and steamed for 60 minutes. After steaming, the mixture is cooled for 18 hours in a refrigerator. cold dough is sliced with a thickness of 2-3 mm and dried in the sun for 2-3 days. dry crackers are fried and ready to be served.

2.3 Research Methods

This research was conducted at the Fisheries Product Processing Laboratory, Faculty of Fisheries and Marine Sciences, Padjadjaran University in September 2019 until January 2020. The method used in this study is an experimental method consisting of four treatments with 20 semi-trained panelists. The number of panelists for the semi-trained panel category must consist of 15-25 people who have previously been trained for know certain properties [7]. Following the treatment given,

Treatment A: Addition of 0% flavor powder,
Treatment B: Addition of 7.5% flavor powder,
Treatment C: Add 10% flavor powder and
Treatment D: Addition of 12.5% flavor powder to the raw material of crackers used.

Addition of flavor powder to crackers by mixing.

2.4 Data Analysis

Data obtained from observations of the level of color, taste, aroma and texture of crackers were analyzed by non-parametric statistics by using the two-way analysis of Friedman's variance with a Chi-Square. This test is used to test several paired samples, where several samples tested are more than two, with a minimum of ordinal data scale [8]. If there were significant differences followed by using multiple comparison analysis (*Multiple Comparison*) to determine differences between treatments. Furthermore, to determine the best treatment by comparing the four parameters used the Bayes method.

3. RESULTS AND DISCUSSION

3.1 Favourite Level of Crackers

3.1.1 Color

The results of observations of the level of color preference for crackers from various treatments the level of addition of tenggiri fish head flavor powder are in the following Fig. 1.

Based on Friedman analysis with a 95% degree of confidence, it can be seen that the calculated X^2 (4.76) < X^2 Table (7.81), the level of addition of tenggiri fish head flavor powder did not significantly affect the level of preferred color crackers produced. Color differences that occur in each treatment are generally still acceptable to panelists, so the impression of joy is still relatively the same. The change in color in crackers is thought to be due to the color effect of the flavor powder and frying time. Color change in crackers is caused by a Maillard reaction which can cause brown color and increased mineral content [9]. Maillard reaction can also occur during the frying process. Maillard reaction is a reaction between reducing sugars and primary amine groups that can produce a brown color called melanoid (Melanoid) [4].

3.1.2 Aroma

The results of observations of the level of aroma favourite for crackers from various treatments the

level of addition of tenggiri fish head flavor powder are in the following Fig. 2.

Based on Friedman's analysis with a 95% confidence level, it can be seen that the calculated X^2 (7.03) < X^2 Table (7.8), the level of addition of tenggiri fish head flavor powder did not significantly affect the preferred level of aroma crackers produced. This means that the aroma of crackers arising from crackers resulting from the addition of different levels of flavored tenggiri fish head flavor gives the impression that is relatively the same, equally liked.

The average value of the preferred level of aroma crackers obtained from various levels of addition of tenggiri fish head flavor powder ranged from 5.1 (neutral) to 6.3 (neutral). The average value of the lowest level of aroma cracker preference was obtained from the addition of tenggiri fish head flavor treatment by 0%, which was 5.1 (neutral), where the panelists gave an ordinary response to the aroma in these crackers. The average value of the highest level of aroma cracker preference was obtained from the addition of 10% and 12.5% of tenggiri fish head flavor treatment, which was 6.3 (neutral), where the panelists gave an ordinary response to the aroma in these two crackers. In the boiling process, the tenggiri fish head is destroyed which causes the tenggiri fish head to be perfectly contracted, as according to [10], in the manufacture of crushed shrimp head broth causing the shrimp head to be extracted completely. Destroying the material can increase the effectiveness of extraction due to cell damage thereby facilitating the release of flavor compounds.

3.1.3 Texture

The results of observations of the level of texture favourite for crackers from various treatments the level of addition of tenggiri fish head flavor powder are in the following Fig. 3.

Based on Friedman's analysis with 95% confidence level, it can be seen that the calculated X^2 (12.1) < X^2 Table (7.8), the treatment level of the addition of tenggiri fish head flavor powder has a significant effect on the level of preference of the resulting crackers texture. This means that the impression of preference for the texture of crackers resulting from various treatments is relatively similar.

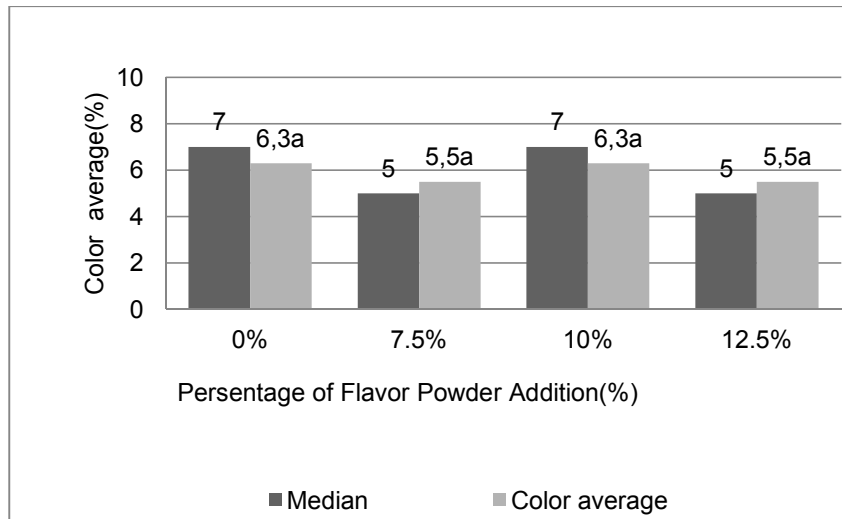


Fig. 1. Favourite level of crackers color

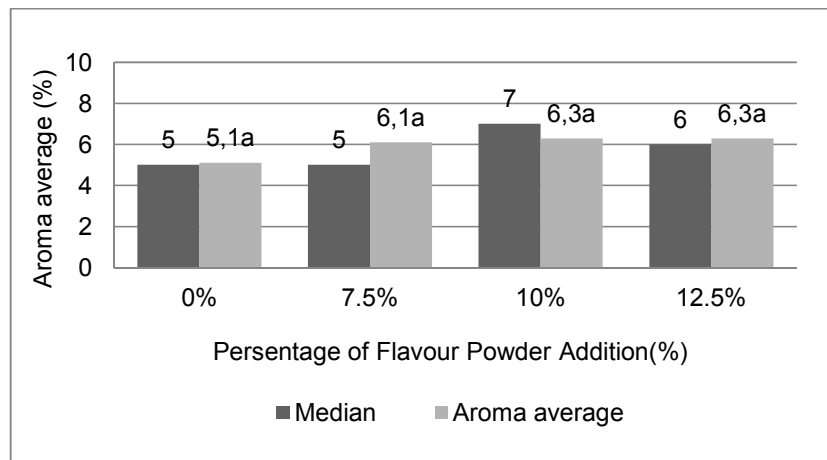


Fig. 2. Favourite level of aroma

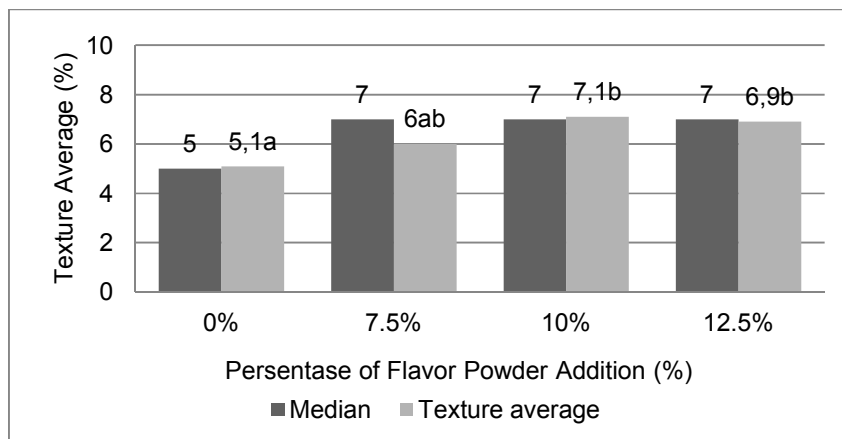


Fig. 3. Favourite level of crackers texture

The average value of the preferred level of cracker texture obtained from various levels of flavoring of tenggiri fish head flavor is 5,1 (neutral) -7,1 (likes). The average value of the lowest texture preference level was obtained from crackers with the addition of flavored tenggiri fish head flavor 0%, which was 5.1, where panelists gave a normal response to the texture of these crackers. The average value of the highest preference level was obtained from crackers with the addition of 10% tenggiri fish head flavor powder which is 7.1 where the panelists responded favorably to the texture of these crackers. Whereas the other treatments have almost the same average value which is included in the neutral category. The descriptive cracker texture obtained from the two treatments is crispy only at the 0% treatment which is harder than the 10% treatment.

The more added flavor of tenggiri fish head flavor, the harder the cracker texture is. Something similar happened to crackers with the addition of milk bone meal [2]. The texture of the cracker is influenced by the amount of water, in the process of making the cracker dough it must be in the proportion of flour with the addition of balanced flavor powder. The addition amount of different flavor powder concentrations results in a different texture.

3.1.4 Taste

The results of observations of the level of taste favourite for crackers from various treatments the level of addition of tenggiri fish head flavor powder are in the following Fig. 4.

Based on Friedman's analysis with a 95% confidence level, it can be seen that the calculated X^2 (8.75) < X^2 Table (7.8), the treatment level of the addition of tenggiri fish head flavor powder has a significant effect on the preferred level of texture crackers produced. This means that the impression of the taste level of cracker taste resulting from various treatments of the level of addition of flavored tenggiri fish head flavor is relatively similar.

The average value of the level of preference for the taste of crackers is obtained from the various levels of addition of flavored tenggiri fish head powder 5 (neutral) - 7.1 (likes). The average value of the lowest taste preference level is obtained from crackers with the addition of flavored tenggiri fish head powder at 0%, which is equal to 5, where the panelists gave a normal response to the taste in these crackers. The

average value of the highest preference level was obtained from crackers with the addition of 10% tenggiri fish head flavor powder which is 7.1 where the panelists responded favorably to the texture of these crackers. As for the treatment of 12.5% has an average value of 7 (likes) and two other treatments 0% and 7.5% have an average of 5.5 and 6.5 entered into the neutral.

The more the level of addition of tenggiri fish head flavor powder to a certain extent, the more panelists like it because crackers have a less firm taste, with the addition of flavor powder can further emphasize the taste in crackers. However, too much addition of flavor powder to the product will reduce the acceptance of crackers. According to [11] the savory taste in flavor can be caused by the presence of free amino acids that form flavors such as glycine, alanine, lysine which can cause delicious taste.

The taste can be affected by heating or processing which causes a decline (degradation) of the compiler of the taste and physical properties of food [11]. The purpose of steaming is to improve the taste, texture, nutritional value, and digestibility. The advantage of doing steaming is that it can soften the whole meal. Besides being caused by flavor and steaming powder, the taste in crackers is also influenced by seasonings added such as salt and garlic which can help reinforce the taste in crackers.

3.2 Decision Making by Bayes Method

Decision making by Bayes method is decision making by considering the weight of criteria and median values . Data on the results of weight criteria for color, aroma, texture, and taste are presented in Table 1.

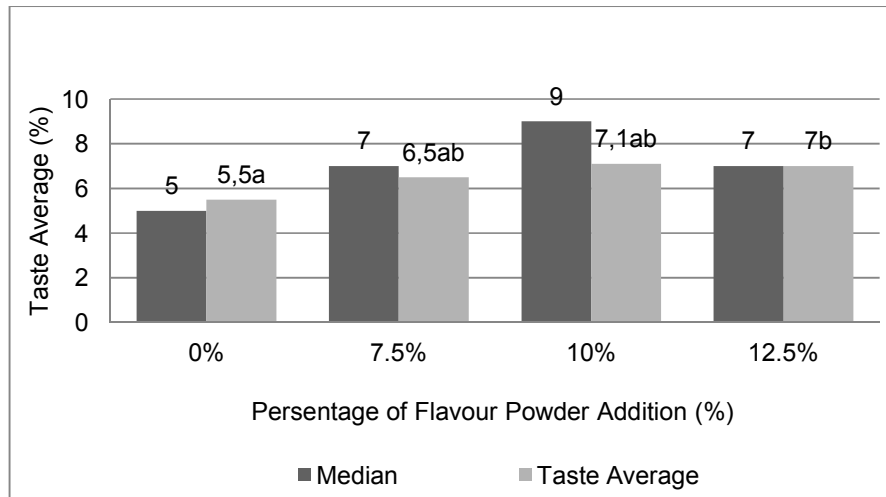
Table 1. Weight of criteria for crackers

Criteria	Weight of criteria
Color	0,16
Aroma	0,12
Texture	0,30
Taste	0,44

Based on the calculation of the weight criteria on the color, aroma, texture, and taste of tenggiri fish head flavor powder crackers, the biggest weight criteria fell to taste that is equal to 0.44 pair other criteria, aroma to 0.12, texture to 0.30, and color taste to .16. This shows that the taste criteria are the most influential criterion for the assessment of tenggiri fish head flavor powder

Table 2. Matrix decision assesment of head flavor powder crackers tenggiri fish head

Treatment	Criteria				Alternative value	Priority value
	Color	Aroma	Texture	Taste		
A	7,00	5,00	5,00	5,00	5,31	0,20
B	5,00	5,00	7,00	7,00	6,43	0,24
C	7,00	7,00	7,00	9,00	7,88	0,30
D	5,00	6,00	7,00	7,00	6,55	0,25
Criteria Value	0,16	0,12	0,30	0,44	26,19	1,00

**Fig. 4. Favourite level of crackers taste**

crackers. If the taste in the crackers cannot be accepted by the panelists even though other criteria namely color, aroma, and texture have better values then the product will be rejected by the panelists. The results of the calculation of the criteria weights and determine the best treatment of the criteria for the color of the aroma, texture, and taste are presented in Table 2.

Based on calculations using the Bayes method, the results obtained that crackers with the addition of 10% tenggiri fish head flavor powder have an alternative value and the highest prior as values are 7.88 and 0.30. the best panelists like best.

4. CONCLUSION

Based on the results of the research it was concluded that the addition rate of 10% tenggiri fish head flavor powder produced the most favourite crackers. Based on the research results, it can be suggested that to get the preferred crackers, the level of addition of tenggiri fish head flavor powder should be 10%.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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