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Effect of salt, sugar and water addition on consumer preferences of *terasi*

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Abstract. Terasi is one of the fermented shrimp or fish products that undergo the process of mixing additional ingredients such as salt, sugar, and water, which then left in a few days in a closed state so that the fermentation process occurs. Terasi usually produced traditionally by spontaneous fermentation, i.e., fermented without the addition of bacterial culture. Terasi produced using *Acetes* sp. shrimp which was obtained from Tuban. A descriptive method was used. Consumer preferences were determined using a Hedonic test and the determination of the best treatment was analyzed using the De Garmo calculation method. The results showed that consumer-preferred terasi with the addition of 15% salt, 10% sugar, and 50% water. The characteristics of terasi produced included more compact texture and more savory taste.

1. Introduction

Terasi is an Indonesian traditional fermented product that is made from shrimp or fish and widely used for seasoning and or condiment in food. Terasi is generally produced traditionally by a spontaneous fermentation process. The spontaneous fermentation occurs without the addition of bacterial culture [1]. Fermentation itself is a process of breaking down carbohydrates and amino acids anaerobically or without oxygen. The fermentation process can significantly increase protein levels. It is because protein degradation occurs by proteolytic microbes into smaller components, namely peptone, peptide, and amino acids that contain N groups [2].

Terasi from *Acetes* sp. has a better organoleptic value compared to other raw materials [3]. Karim et al., [3], the study indicated that the panelists had an average value of 7.78 for the overall organoleptic score of *Acetes* sp. shrimp has the best value. Salt content that exceeds 15% will affect the texture of terasi, where the higher the salt content, the stickier the texture will be in that study using 50% water with 1 kg of shrimp raw material [4].

The terasi production process generally includes the destruction and dozing of raw materials, drying, and fermentation. The drying and fermentation process is carried out repeatedly for two weeks. The



quality of terasi products is highly dependent on the manufacturing method and additional ingredients used during the production process. In this study, the addition of salt, sugar, and water during the process of making terasi using *Acetes* sp. analyzed its effect on the level of consumer preferences.

2. Material and methods

2.1. Material

The ingredients used for making terasi include shrimp (*Acetes japonicus*), salt, sugar, and water.

2.2. The effects of salt and sugar ratio on terasi

Dry shrimp as much as 100 gr milled using a blender, then add salt and sugar with a proportion of the ratio between salt and sugar by (15%:5%, 15%:10%, 20%:5%, 20%:10%) and added 75% water. Terasi dough is then put into a closed jar and fermented for 24 hours at room temperature. Second milling is done using a blender, then fermented for the second time for 24 hours at room temperature. After that, terasi was formed and dried with a temperature of 70°C for 6 hours. Terasi was left until its temperature reached about 30 °C. The last fermentation occurred in a closed jar for two weeks.

2.3. Proportion of water

One hundred grams of dried shrimp are pulverized using a blender, then add 15% salt 10% sugar and add 50% water (code 1), 65% water (code 2), and 75% water (code 3). Terasi dough is then put into a closed jar and fermented for 24 hours at room temperature. Second milling was done using a blender, then fermented for the second time for 24 hours at room temperature. After that, terasi is molded and dried with a temperature of 70 °C for 6 hours. The cooked-paste was allowed to stand until the temperature of n; after that, it is put into a closed jar for fermentation for two weeks.

2.4. Preference analysis using organoleptic test

Terasi is prepared in a container for organoleptic testing of texture, odor, color, and taste. The organoleptic analysis was carried by processing the Terasi into Sambal, a traditional dressing. Organoleptic tests conducted using the hedonic test with seven scales immensely dislike to like extremely. The organoleptic test was conducted with 20 semi-trained panelists who were students and students of the Faculty of Fisheries and Marine Sciences, Brawijaya University.

2.5. Analysis and method of calculating the best treatment

Preference analysis was carried out using the descriptive method. Determination of the best treatment in this study is to use a hedonic organoleptic test with 20 panelists and then analyzed using the De Garmo method

3. Results and discussion

3.1. Effect of different ratio of salt and sugar

Four ratios of salt and sugar in terasi were investigated for its effect on the organoleptic characteristics of Terasi. The best organoleptic data was obtained from code 2, which is the ratio of salt 15% and sugar 10%. In this ratio, the panelists showed the flavor of the most preferred terasi products. De Garmo's analysis results also show the results obtained in code 2, with a total NE of 5.67 and a total YV of 1.42. States that terasi with 14% salt has a brownish color and terasi with 14% salt is denser, compact, and elastic. In this study, 10% of sugar content showed the best results. Sugar content will replace the browning reaction in terasi products. During the heating process, the Maillard reaction changes the color of the product from mild brown to be dark brown due to the browning reaction [5]. It indicates that an increase in high

temperatures that causes a Maillard reaction between the amino composition and the reducing sugars which form dark melanoids [6].

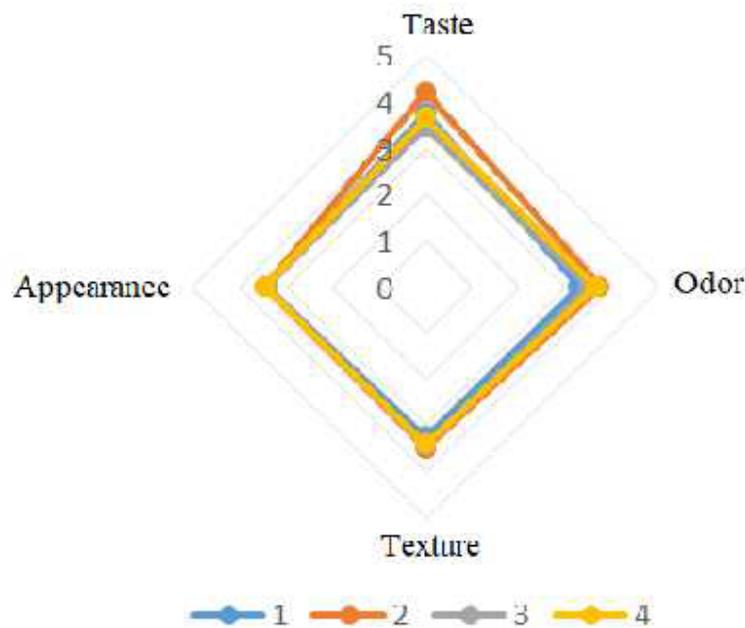


Figure 1. Spider web graph for organoleptic.

Table 1. Result of De Garmo analysis.

Variabel	BV	BN	Code							
			1		2		3		4	
			NE	NH	NE	NH	NE	NH	NE	NH
appearance	0.8	0.25	2.67	0.67	2.78	0.69	2.67	0.67	2.78	0.69
texture	0.6	0.19	0.74	0.14	0.88	0.17	0.85	0.16	0.82	0.15
odor	0.8	0.25	0.53	0.13	1	0.25	0.74	0.18	0.89	0.22
taste	1	0.31	0.64	0.20	1	0.31	0.40	0.13	0.56	0.18
Total	3.2	1.00	4.57	1.14	5.66	1.42	4.66	1.14	5.06	1.25

Note : BV= Weight Value , BN= Normal Value, NE= Effectiveness Value, YV=Yield Value

Products with code 2 show a better taste compared to other codes. It is presumably because, in these products, there are abundant umami compounds that enhance the taste of the product. Umami products that may appear in terasi are glutamic acid compounds. Glutamic acid compounds can form a good taste in the product. Glutamic acid is concentrated as a basic molecule for a delicious taste of the food [7].

3.2 Effect of the water percentage

Adding water to terasi is done with three different percentage treatments. Treatment code 1 (50% water), treatment code 2 (65% water), and treatment code 3 (75% water). Organoleptic analysis results showed that the most preferred terasi product by panelists was treatment code 1 (addition of 50% water). The

panelist decided that based on the overall characteristics of the terasi, such as taste, aroma, and appearance, code 1 is a preferable terasi (Figure 2). In the texture parameter of terasi product with code, one is less preferred by panelists. It is because, in this treatment, the texture of terasi products is too hard.

De Garmo's analysis showed that the best results obtained from treatment code 1, with 50% of water, had the highest total YV value (0.58) [8] (Table 2).

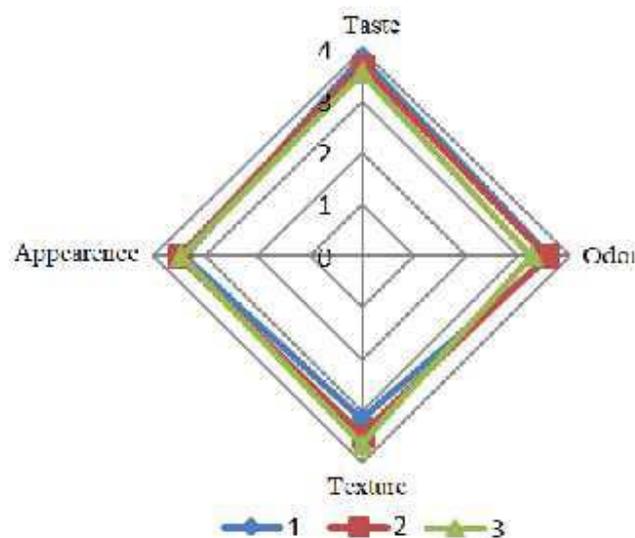


Figure 2. Spider web graph for Result of organoleptic.

Table 2. Result of de garmo analysis.

Variabel	BV	BN	Code					
			1		2		3	
			NE	NH	NE	NH	NE	NH
appearance	0.8	0.25	0.31	0.08	1	0.25	0	0
texture	0.6	0.19	1	0.19	1	0.19	0	0
odor	0.8	0.25	0.33	0.08	0	0	1	0.25
taste	1	0.31	0.75	0.23	0	0	1	0.31
Total	3.2	1	2.40	0.58	2	0.44	2	0.56

Note : BV= Weight Value, BN= Normal Value, NE= Effectiveness Value, YV=Yield Value

Water content in food will affect several characteristics of the product. Moisture content and moisture content influence not only taste but also texture, appearance, and shelf life of the product [9,10,11].

4. Conclusion

Terasi, with the addition of 15% salt, 10% sugar, and 50% water addition in the process of mixing, is preferred by panelists compared to other terasi codes.

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