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## CONSUMER ACCEPTANCE AND QUALITY OF STAR-SHAPED FISH BALLS OF SWANGI FISH (*PRIACANTHUS TAYENUS*)

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### ABSTRACT

Due to their popularity, these meatballs have become a profitable business for many people. However, people have been familiar with round balls for a long time. We think that innovation must be made to make these balls even more interesting, and we came to the idea of making star-shaped balls from the surimi of Swangi fish (*Priacanthus tayenus*). This study aimed to examine customer acceptance of and the quality of the star-shaped fish balls of Swangi fish surimi. Based on the assessment, 30 panelists agreed that customers could accept the star-shaped fish balls—the average score was 7, meaning that the panelists strongly liked the star-shaped balls. The hedonic test results on the test parameters in the form of percentage mode showed a value of 7 (53%) on appearance, 7 (43.4%) on aroma, 7 (46.7%) on flavor, and 8 (43%) on texture. The quality content in the form of proximate values of the star-shaped fish balls is water 71.9%, protein 41.62%, fat 9.14%, and ash 2.31%.

### KEY WORDS

Star-shaped fish ball, customer acceptance, hedonic test.

Indonesians love balls or *bakso* in the Indonesian language—meatballs, fish balls, and chicken balls. As their names suggest, the balls can be made from meat, fish, and chicken. These balls are tender and chewy. *Bakso* is food made from ground and mashed meat, fish, or chicken mixed with tapioca starch, rolled into a marble-sized ball with hands or bigger, and boiled with hot water (Suprianto et al., 2015). The Indonesian National Standard (*Standar Nasional Indonesia – SNI 7266:2014*) mentions that fish balls are processed fishery products—the balls are made from minced or ground fish or surimi of at least 40% mixed with flour and other ingredients if needed, formed into certain shapes and cooked. Fish balls are easy to make, and everyone can make fish balls. From the business point of view, fish balls are promising. From the nutrition perspective, fish balls can potentially fulfill community nutrition. Fish balls are highly nutritious because they are made from fish rich in protein.

The popularity of *bakso* has made many people turn the food into a profitable culinary business, from street vendors, shops, and restaurants, to big companies. The tight competition in the *bakso* business has encouraged businesspeople to innovate to attract customers and get higher profits. The innovation starts from the materials used to make *bakso*, the shapes (square, star, heart, and others), to the flavor and texture of the balls. There have not been many studies on customer acceptance and quality of star-shaped Swangi fish balls; this study is expected to examine customer acceptance and quality of star-shaped Swangi fish balls to know how people perceive the product and its nutritional status. We hope that the innovation in the shape of the balls attracts people to try the product. The study aimed to evaluate customer acceptance and quality of the star-shaped Swangi fish balls.

### MATERIALS AND METHODS OF RESEARCH

The ingredients used to make fish balls include: Swangi fish surimi, tapioca flour, sugar, salt, egg flour, thickener, food coloring, garlic, and margarine; all ingredients were weighed and placed in a special container. Swangi fish surimi products were obtained from PT. Indo Lautan Makmur—the fresh fish for surimi came from unpolluted Java sea waters delivered by suppliers as headless fish to speed up and simplify the processing. Materials for



chemical analysis consist of materials for proximate analysis, among others were H<sub>2</sub>SO<sub>4</sub>, HCL, NaOH, HBrO<sub>3</sub>, Kjeldahl tablets, and N-Hexan.

The tools used to make the star-shaped Swangi fish balls consisted of a knife, a cutting board, a basin, a star-shaped printer, and a steaming pan. The tools for proximate analysis consisted of an oven, Kjeldahl apparatus, Soxhlet apparatus, and digital scales.

## METHODS OF RESEARCH

The study employed a participatory method and direct observation; the researchers directly participated in making the fish balls at the fish processing unit. The fish underwent various processes such as kneading, molding, boiling, cooling, freezing, packaging, metal detecting, and storage. The final product was used as observation material by testing the acceptability of the product to consumers or panelists of 30 people.

The proximate test (water, protein, fat, and ash) was done using the AOAC method (2005). The hedonic test was done using the BSN method (2006). Based on SNI 01-2346-2006 regarding organoleptic or sensory testing standards, the hedonic test consists of 4 specifications: appearance, aroma, flavor, and texture. It has 9 scales: (1) strongly disliked, (2) disliked, (3) moderately disliked, (4) neutral, (5) moderately liked, (6) liked, (7) strongly liked, (8) loved, (9) extremely loved (Mulyani, 2016).

Based on SNI 01-2346-2006 regarding the instructions for organoleptic and/or sensory testing, the data obtained from the assessment sheet is tabulated, and the quality value is determined by finding the average result for each panelist at a 95% confidence level. The following formula is used to calculate the interval of the average quality value of each panelist:

$$X = \frac{\text{total average quality}}{n}$$

$$S^2 = \frac{\sum (xi - X)^2}{n}$$

$$s = \sqrt{\frac{\sum (xi - X)^2}{n}}$$

$$P (X - (1,96 \times s/\sqrt{n}) \leq \mu \leq (X + (1,96 \times s/\sqrt{n})) = 95\%$$

Where:

X: Average value;

S<sup>2</sup>: Diversity of quality value;

s: Standard deviation of quality value;

xi: Quality value of the i<sup>th</sup> panelist, where i = 1,2,3,...n;

n: Number of panelists;

1.96: Coefficient of standard deviation at 95%.

The above calculation results were used to conclude consumer preference by converting the results using assessment criteria with a scale of 1 (one) as the lowest value and 9 (nine) as the highest value.

## RESULTS AND DISCUSSION

Food and nutrition are essential components for body growth. Moreover, they contribute to realizing quality human resources to play an optimal role in national development. With such an important role, food and nutrition can be considered basic needs and capital for development and indicators of food supply success. Food diversification is one way to improve the nutritional status of the community. Food diversification can be done by creating new food ingredients or developing existing food ingredients into new products (Hayyuningsih et al., 2009). For example, one alternative to product diversification is to make star-shaped fish balls, as shown in the figure below.



Figure 1 – Bakso Bintang

Consumer acceptance of the star-shaped fish balls was tested by involving 30 non-standard panelists aged 7-50. The results of the assessment of the product are presented in Figure 2.

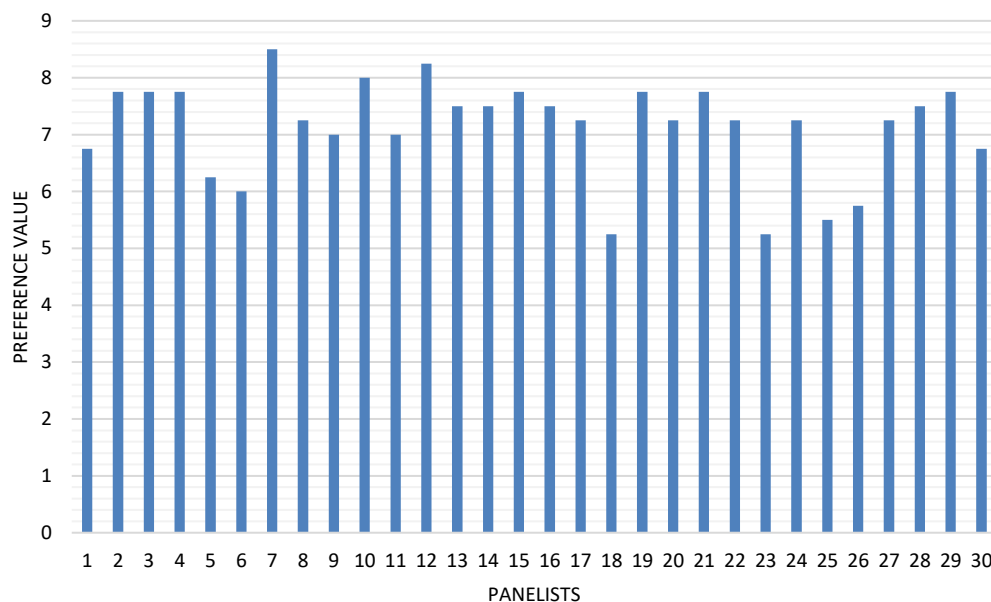


Figure 2 – The Average Value of Panelists' Preference

We analyzed the results in Figure 1 using SNI 01-2346-2006. From the results of the acceptance test and the above calculation, the consumer acceptance of the star-shaped fish balls was 7, which means that the product was strongly liked (Mulyani, 2016) by the panelists.

Based on the hedonic parameter test, the product characteristics include appearance, aroma, flavor, and texture. The results are presented in a percentage mode (the most frequently occurring value) in Figure 3.

Princestasari and Amalia (2015) state that the mode percentage is the ratio between the number of panelists giving the mode value or the value that often appears compared with the total number of panelists. In the hedonic test, the higher the value, the more the panelists liked the star-shaped fish balls.

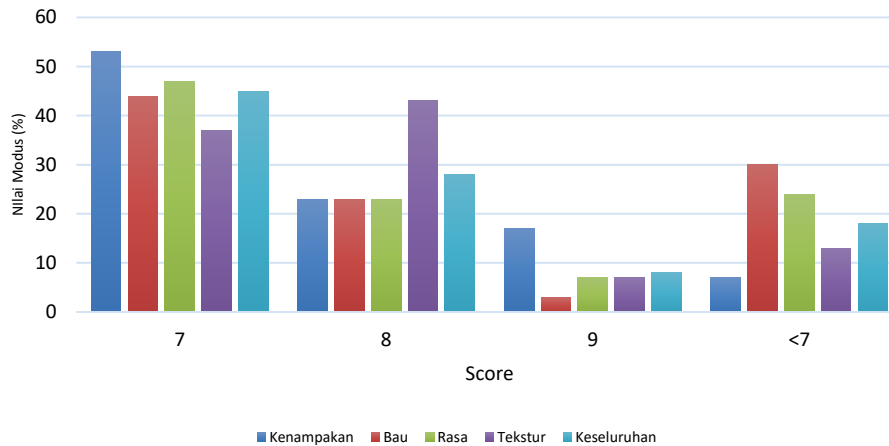


Figure 3 – The Mode Values of the Hedonic Test

Appearance is the first parameter of the star-shaped fish ball product. Apriliani and Nurhayati (2017) state that appearance is an important organoleptic parameter because it is a sensory trait that consumers first see. If consumers perceive the appearance as good and they like it, they will see other sensory properties (aroma, flavor, texture, and such the like). The preference test on the appearance parameter showed that the assessment mode was 7 of 53.3% of the total number of panelists, which means that they strongly liked the product's appearance. Meanwhile, 6.7% of the panelists gave 6 on the appearance parameter, meaning they liked it because the color (orange) was too bright. However, according to Riyadi and Atmaka (2010), color determines the level of acceptance of food. Although a product has high nutritional value, good flavor, and good texture, unattractive colors will cause the product to be less appealing. Fish balls generally have a white or gray color. However, to increase the acceptance of the product, the company changed the shape into stars and put a bright orange color with food coloring.

Setyaningsih et al. (2010) in Princestasari and Amalia (2015) state that aroma refers to the assessment of the smell, which can affect a person's appetite. Aroma is a sensory sensation experienced by the sense of smell. Handling and storing a food product can affect the aroma or odor of a food product, and aroma is one of the determining factors for the quality of food products (Riyadi and Atmaka, 2010).

The aroma assessment was done by smelling the fish ball directly; a good fish ball will smell like fish without any other odors (Nurhuda et al., 2017). The highest value was 7 with 43.4%, followed by 8 (23.3%) and 9 (3.3%), respectively. These results indicated that 70% of the panelists agreed that the aroma of the star-shaped fish balls smelled like fish, accompanied by the smell of the spices added to the product—no other aroma was detected. However, only 30% of the panelists gave 7, which means they disapproved of the aroma since they considered it too strong. The assessment results above mean that the odor parameter is still acceptable because 7 means strongly liked.

Flavor is a stimulus of something eaten, felt by the sense of taste or smell; it also refers to other stimuli such as touch and heats the mouth feels. The flavor is an important quality attribute for consumers in choosing a product. Consumers can accept a product if it has the desired taste (Riyadi and Atmaka, 2010). Nurhuda et al. (2017) state that the taste assessment is carried out by tasting *bakso*.

The assessment results show that the highest mode value was 7, with a percentage of 46.7%, which means that 46.7% of the total panelists strongly liked the fish ball product. The star-shaped fish balls had a distinctive fish flavor—the flavor of the spices was also quite prominent, and it had no other flavor detected. However, 23.7% of the panelists rated the fish ball product below 7, meaning that some panelists considered the fish flavor was too strong for those who did not like fish. Meanwhile, Dewi (2007) in Nurhuda et al. (2017) state that good fish balls have a dominant fish taste based on the type of fish used, and the flavor of



the seasoning must be quite prominent but not excessive—there must not be any disturbing foreign flavors and not too salty.

The assessment results on texture show that the highest mode value obtained is a value of 8 with a percentage of 43.3%, which means that 43.3% of the total panelists loved the texture of the star-shaped fish balls. The second highest mode value was 7, with a percentage of 36.7%, which means that 36.7% of panelists strongly liked the texture of the fish balls. This might be due to the use of medium-quality surimi with an elasticity level of 400-800 that the product had good elasticity. However, as many as 13.3% of the panelists gave a score of 7 because they thought the product had good elasticity due to the use of too much flour and/or other additives.

The star-shaped fish balls had a high water content of 71.9%, showing that the product was wet. The addition of fish meat, tapioca flour, and water made the water content of the star-shaped fish balls high.

Protein content indicates that the raw material contains protein. Swangi fish is one of the fish found in coastal waters between rocks and open areas with a depth of 20 to 200 meters and has a fairly high protein content. Meanwhile, the protein content of Swangi fish surimi as a raw material for the star-shaped fish balls is 47.72% (ULPKP Universitas Airlangga, 2014). Therefore, the star-shaped fish balls had a high protein content of 41.62% due to the high protein content of the raw material.

The fat content in the star-shaped fish balls reached 9.14%. Fat is influenced by fat content in raw materials; the fat content in Swangi Fish is 8.08% (Safitri, 2014). According to the Indonesian National Standard (SNI, 1995), the minimum fat content in *bakso* is 2%. Therefore, the assessment results of the proximate composition confirm that the star-shaped fish balls meet the quality requirements of the Indonesian National Standard.

Ash content describes the mineral content of food samples. There are certain limits on the amount of total ash in food products. Therefore, the total ash content is critical since high total ash content in food products strongly indicates that the product has a very high potential hazard for consumption. According to the Indonesian National Standard (SNI, 1995), the maximum ash content in food products is 3%. The ash content of the star-shaped fish balls was 2.31%, meaning that the star-shaped fish balls meet the quality requirements of the Indonesian National Standard.

## CONCLUSION

The organoleptic assessment with hedonic tests showed that the star-shaped Swangi fish balls were acceptable and liked by consumers with an average rating of 7, which means that they strongly liked the product. Furthermore, the hedonic test in the form of percentage mode resulted in a value of 7 (53%) on appearance, 7 (43,4%) on aroma, 7 (46,7%) on flavor, and 8 (43%) on texture.

The proximate content of the star-shaped fish balls was water 71.9%, protein 41.62%, fat 9.14%, and ash 2.31%. Therefore, the proximate test results showed that the star-shaped fish balls meet the quality requirements of the Indonesian National Standard.

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