Mackerel Tuna Fortification for Improving Wet Noodle Quality

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Abstract. Wet noodles are raw noodles that, before being marketed, undergo a boiling process in boiling water, with a water content of around 35%, and after boiling, the water content increases to 52%. In general, wet noodles are only made from the essential ingredients of wheat flour and eggs, with a protein content of 11.852%. This figure is low for one serving of food per human day. Therefore, it is necessary to think about alternative materials that can be used to increase the protein content of wet noodles. One of them is mackerel tuna. This study aims to describe the quality of wet noodles by adding mackerel tuna meat (10%) in terms of color, aroma, texture, and taste. The type of this research was an experiment conducted in October 2022 at the Culinary Study Program, Department of Home Economics, Faculty of Tourism and Hospitality, Universitas Negeri Padang. Data collection was carried out through organoleptic tests, which involved three expert panelists. The organoleptic test showed that the quality of wet noodles with the addition of mackerel tuna meat was light yellow, had a fragrant aroma, was chewy in texture, and had a savory mackerel tuna meat taste.

Keywords: Wet noodle, mackerel tuna meat, quality.

INTRODUCTION

People in Asia, especially in East Asia and Southeast Asia, are used to eating noodles. From what we know about history, noodles were first made in China. Noodles have come a long way since they were first made. Generally, there are two kinds of noodles: wet and dry. Wet noodles have yet to be further processed with a high water content (Handayani in Khairi & Ikawati, 2021).

Wet noodles are food items shaped like noodles that have not been dried. They are made from flour with or without other food ingredients and food additives that are allowed (Susanto et al., 2021). Wet noodles are raw noodles that endure a boiling process in boiling water before being marketed, with a water content of approximately 35%; after boiling, the water content increases to 52%. Due to the relatively high water content, the shelf life is limited (Husna & Holinesti, 2019).

Wet noodles have a minimal protein and fiber content, which is a disadvantage. Wet noodles are typically made with wheat flour and eggs, with a protein content of 11.852%, which is minimal for a daily serving. The Minister of Health of the Republic of Indonesia issued Regulation No. 28 of 2019, recommending 60 and 65 grams of protein per serving daily for women and men aged 19-64 in Indonesia. As a result, 20 grams of protein per serving is considered standard. Therefore, it is desired that wet noodles, frequently used as the main course in a meal, have more protein to fulfill daily dietary requirements (Candra & Rahmawati, 2018).

Mackerel tuna (*Euthynnusaffinis*) is a small species with an elongated body, no scales, and a tough dorsal fin. The genus *Euthynnus* of the Scombridae family is responsible for this vast, grey-skinned, thick-fleshed, and dark red fish. Indonesia's waterways, particularly West Sumatra, are teeming with this fish. Mackerel tuna has the benefit of being high in protein and abundant in omega-3 fatty acids, and each 100 grams contains 69.40% water, 1.50% fat, 25.00% protein, and 0.03% carbohydrates (Valentina, 2021). It is well known that protein is one of the essential nutrients for a balanced diet, where fish is a rich source of easily digestible protein that also provides polyunsaturated fatty acids, vitamins, and minerals for human nutrition (Susanto et al., 2021).

According to the Ministry of Maritime Affairs and Fisheries, there has been a growth in the value of mackerel tuna production in West Sumatra over the last three years, with a production value of 411,468,203 tons in 2019 and 438,283,525 tons in 2020. In 2021, the production amount was 478,848,212 tons. The lack of protein in wet noodles can be remedied by including other rich protein components. The data presented above suggest that mackerel tuna is valuable to one's protein intake.

Mackerel tuna has high red meat content and a reputation as a "fishy" species, making it less appealing to the public as a food choice. Therefore, it stands to reason that if mackerel tuna is added to wet noodles, it will become a popular processed food item. Wet noodle protein content can be increased, and the price of mackerel tuna is predicted to rise. It is a novel, soon-to-be-released product with promising nutritional and palatability improvements.

Valentina (2021) found that adding different varieties of fish to each treatment resulted in a statistically significant difference in the preference level for wet noodles. According to the hedonic organoleptic test, 15% gourami fish meal was the most effective treatment. There were no unexpected items in the bowl of wet noodles with fish. Noodles made with 15% fish meal have the same water absorption capacity as those made with catfish, carp, or other fish but a different water absorption capacity than noodles made without fish meal.

Studies on incorporating eel meat into wet noodles have revealed positive changes to the noodles' protein, ash, fat, carbohydrate, fragrance, flavor, and color profiles. However, including eel meat had no discernible influence on the water in the wet noodles. Eel meat, with a concentration of 4.5%, provides a protein content of 5.57%, the highest of any fish (Candra & Rahmawati, 2018).

According to earlier research, wet noodles with mackerel tuna flesh have yet to be studied. The authors are, therefore, interested in conducting the research. The preliminary research results indicate that the quality of wet noodles can be increased by adding 10% mackerel tuna meat.

METHODS

This study was conducted in experimental conditions. Mackerel Tuna meat was added 10% to the experiment to create wet noodles. **Tables 1** and **2** contain information about the materials and tools utilized in this study. **FIGURE 1** depicts the overall method for preparing mackerel tuna wet noodles.

TABLE 1. Ingredients for making wet noodles with mackerel tuna meat.

No	Component	Amount
1	High protein flour	300 grams
2	Salt	5 grams
3	Egg	1
4	Cooking oil	10 ml
5	Water	80 ml
6	Mackerel tuna meat	30 gr

TABLE 2. The tools used in the research.

No	Tools	Amount
1	Blender	1
2	Washbasin	3
3	Work cloth	1
4	Scales	1
6	Measuring cup	1
7	Tablespoon	1
8	Noodle extruder	1

| 9	Stove	1
10	Pot	1
11	Strainer	1
12	Strainer spatula	1
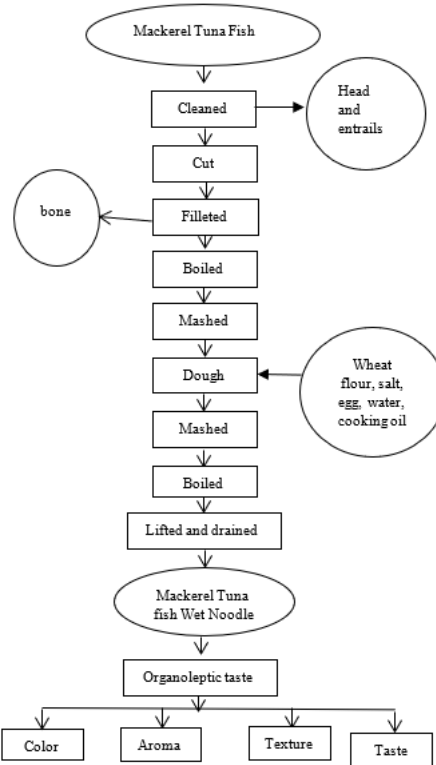
FIGURE 1. The process of making mackerel tuna wet noodles.

An organoleptic test was administered to determine the quality of a product. The scoring method used for testing was dependent on several indicators. Each panelist was given the sample (three repetitions) to be evaluated based on their preference for four test criteria: color, aroma, texture, and taste. In addition, panelists will be supplied with an instrument for evaluating the product. This test was conducted by assigning random codes to the sample displayed to not influence the panelists' interpretation (Litaay et al., 2021)—the quality of wet noodles produced compared to SNI standards (Susanto et al., 2021).

RESULTS AND DISCUSSION

After conducting three repetitions of the research, the results of wet noodles quality with the addition of mackerel tuna meat can be seen in **FIGURE 2** and **3**.
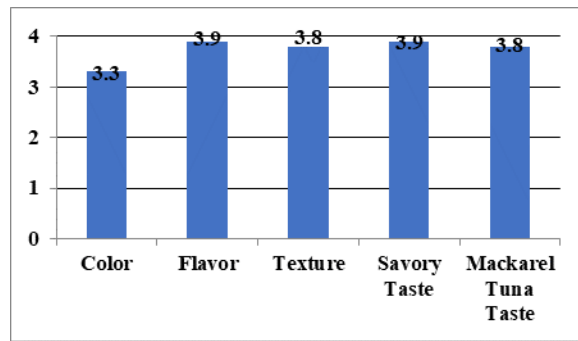
FIGURE 2. The quality of mackerel tuna wet noodles is based on organoleptic tests.

FIGURE 3. The addition of mackerel tuna meat produces wet noodles.

Color

Color is the most pervasive feature that can be seen just through visual perception. Color is not tangible; instead, it is a subjective experience triggered in response to a radiant beam striking the eye (Imantoro, 2017). Color plays a role in determining consumer acceptance of a product. Even though the product has high nutritional value, tastes good, and has a good texture, the color could be more attractive for the product to be more attractive. A nutritious, tasty material with an excellent texture will not be eaten if it has an unsightly color or gives the impression that it has deviated from its proper color (Husna & Holinesti, 2019).

Based on the results of the organoleptic test carried out three times with three panelists on the color of wet noodles with tuna meat, the average result was 3.3, which was on a reasonably light-yellow color indicator. This is in line with research conducted by Ags et al. (2021), which stated that the less minced fish meat was added, the brighter the color of the wet noodles produced. Iman (2017) explains that the color will get darker because of the high use of fish meal, but it does not affect the panelist acceptance rate.

According to the study, wet noodles have a bright yellow tint. The golden hue of the eggs and the quality of the mackerel tuna flesh influence the color of the mackerel tuna wet noodles. Wet noodles are often a bright yellow; however, the hue is muted when combined with fish (Pambudi et al., 2022).

Aroma

The average result of three organoleptic tests with three panelists on the aroma of tuna in the making of tuna meat wet noodles was 3.9, with a fragrant aroma indication.

According to the findings of this study, the smell of wet noodles is quite similar to the savory smell of mackerel tuna. This wet mackerel tuna noodle smells like mackerel tuna, affecting the overall aroma but not giving the noodles a fishy stench. This aroma is one of the main attractions of wet noodles with mackerel tuna meat.

The aroma of food defines its delicacy; consequently, the aroma is an essential factor in determining quality. Unique and appealing scents can make food more appealing to customers. Therefore, they must be addressed while processing a food product. Adawyah (2008) asserts that food that smells good is determined using quality ingredients.

Aroma refers to the fragrance of food. Odor is produced when volatile molecules from food enter the nasal cavity and are detected by the olfactory system. Volatile chemicals that excite the sense of smell provide food scent. Tanamool et al. (2019) research shows that the ingredients did not significantly affect the aroma, so there were no significant differences compared to the control. The aroma can stimulate the consumer's sensory acceptance of a product (Rahma et al., 2019).

Texture

Based on the three repetitions of the organoleptic test with three panelists, the average texture result for mackerel tuna wet noodles was 3.8 with a chewy texture indicator.

The research indicates that the texture of wet noodles is chewy. Good quality noodles are those with a chewy consistency. So that consumers can adequately enjoy the noodles. The texture value obtained from the hedonic test shows that the 10% composition has the texture favored by the panelist (Rahma et al., 2019). According to Fitriani & Roziana (2023), protein increases the texture because the proteins found in fish are myosin and actomyosin, which play an essential role in forming a gel. So, if the fish is processed, it will produce a chewy structure.

Taste

Savory Taste

The average result of three sets of organoleptic testing with three panelists on the savory flavor of mackerel tuna in the production of wet noodles with tuna meat was 3,9.

Its flavor is the primary factor in determining whether a product is high quality. Four fundamental flavors exist: sweet, salty, sour, and bitter. Multiple senses, including sight, scent, hearing, and touch, cooperate to produce food flavors. The taste of food is also a determinant of consumer acceptability. Taste is the tongue's sense of flavor, a response to nerve stimulation that includes sweet, salty, sour, and bitter (Iman, 2017).

This savory taste is influenced by the ingredients, such as salt, in making wet noodles. Changes in taste in food were caused by the decomposition of proteins, fats, and carbohydrates through chemical processes that occur due to enzymatic reactions (Fitriani & Roziana, 2023).

Mackerel Tuna Meat Taste

The average organoleptic test result for mackerel tuna in wet noodles with mackerel tuna meat is 3.8 with a mackerel tuna taste indicator. According to the study, mackerel tuna imparts a distinctive tuna flavor to the wet noodles. The freshness of the fish meat utilized dramatically affects the flavor of these wet noodles, which comes from the addition of mackerel tuna meat (Mailoa et al., 2019).

Taste is an essential factor determining consumers' final decision to accept or reject a product (Rahma et al., 2019). Ags et al. (2021) stated that wet noodles with minced fish meat did not cause a fishy taste or other harmful effects on taste.

CONCLUSION

Based on the research that has been done, wet noodles with the addition of 10% mackerel tuna meat have a light-yellow color, fragrant aroma, chewy texture, and a distinctive savory taste of mackerel tuna meat. The quality of the mackerel tuna meat wet noodles obtained follows the SNI of wet noodles. It is in line with several similar studies conducted by previous researchers.

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