Int. j. adv. multidisc. res. stud. 2023; 3(3):376-378

Received: 03-04-2023
Accepted: 13-05-2023

International Journal of Advanced Multidisciplinary Research and Studies

ISSN: 2583-049X

Characteristics of Tuna Meat Meal (*Thunnus Sp*.)

[1] Junianto, [2] Agnia Fauzyah Handayani, [3] Azka Zanira Sudiyana, [4] Kevin Kusuma, [5] Melisa Aditya Chandra, [6] Rizky Ahmad Sudrajat, [7] Salman Alfarisy Maulana

[1] Lecturer, Department of Fisheries, Padjadajaran University, Indonesia
[2, 3, 4, 5, 6, 7] Undergraduate Student, Fisheries Study Program, Padjadjaran University, Indonesia

Corresponding Author: **Rizky Ahmad Sudrajat**

Abstract
This article aims to analyze the characteristics of tuna meat meal obtained from the process of steaming, boiling and without heating before the tuna meat is dried. This research starts from March 1, 2023 to April 21, 2023 at the Laboratory of Fishery Product Processing Technology, Faculty of Fisheries and Marine Sciences-Padjadjaran University, Jalan Raya Jatinangor KM 21, Sumedang-Indonesia. The method used is experimental with three treatments of tuna meat treatment methods before the drying process in making tuna meat meal. The tuna meat meal obtained is then observed or measured yield, moisture content, water absorption, pH and organoleptic properties (color, odor and texture). Observation is carried out three times (triplo). The data obtained are analyzed descriptively. Based on the results of research on the characteristics of tuna meat meal obtained from the steaming process in fish meat before drying is as a kut berry: yield flour 17.92%, moisture content 3.87%, water absorption 1.84%, pH 6.2 and organoleptic description brownish yellow color, pungent odor and very fine texture. The characteristics of tuna meat meal obtained from the boiling process of fish meat before drying are as follows: flour yield 14.43%, moisture content 4.96%, water absorption 1. 70%, pH 6.66 and organoleptic description brownish-yellow color, not too pungent odor and smooth texture. The characteristics of tilapia meat meal obtained from the process without heating on fish meat before drying are as follows: flour yield 18.52%; moisture content 6.13, water absorption 1. 55%, pH 6.1 and organoleptic description yellow, odor is not pungent, and texture is slightly rough.

Keywords: Water Absorption, Odor, Quality, Large Pelagic, Economical

Introduction

Tuna is a fish with high economic value in the world fisheries trade and is included in the pelagic fish group. The economic value of tuna makes it one of the main commodities of the Indonesian fisheries subsector both for consumption and export commodities (Jaya *et al*., 2017) [7]. The increasing market demand for tuna products is an opportunity for Indonesian fisheries.
Tuna as a consumption fish can be used as a source of quality protein. According to Utami *et al* (2021) [13], the protein content of tuna meat is between 22.6-26.2 gr/100g of meat.Tuna meat also contains high omega 3, namely Eicosapnetaenoic Acid (EPA) of 1.17% and Docosahexaenoic Acid (DHA) of 8.82% (Megasanti *et al*., 2020) [9]. In addition, tuna meat contains minerals (calcium, phosphorus, iron, sodium), vitamin A (retinol), and B vitamins, namely thiamin, riboflavin, and niasin (Utami, *et al* 2021) [13]. Tuna meat is pink to dark red, because tuna muscles contain more myoglobin than other fish (Partanda *et al*., 2022).
Tuna production in Indonesia is among the largest compared to other types of marine fish, in 2021 the production was 358,626.16 tons and in 2020 it was 300,803.50 tons. Based on this amount of production, tuna is very feasible to be used as raw material for the food industry in Indonesia.
Tuna meat is more likely to be used as raw material for the food industry than fresh meat. The advantage in the form of flour compared to its fresh form is that it is more durable, more practical in its application and easier to pack and distribute (Rismaya *et al*., 2018). According to Mervina (2012), fish meat meal for food is still rarely used compared to fish meal for feed.
The application of flour including tuna meat meal is strongly influenced by its physiochemical and functional properties (Sukma *et al*., 2019). These properties are very dependent on the way or process of making flour. Therefore, this research aims to analyze the characteristics of tuna meat meal obtained from the process of steaming, boiling and without heating before tuna meat dried.

Research Method

This research starts from March 1, 2023 to April 21, 2023 at the Laboratory of Fishery Product Processing Technology, Faculty of Fisheries and Marine Sciences-Padjadjaran University, Jalan Raya Jatinangor KM 21, Sumedang-Indonesia. The method used is experimental with three treatments of the method of heating tuna meat before the drying process in making tuna meat meal.

The material used is tuna fish obtained from supermarket in Jatinangor, the research procedure is as follows: Tuna weeded ie removed the contents of the stomach, gills and fins, then cleaned and made filet. Next, a filet of 300 grams was weighed for each treatment consisting of three treatments, namely steamed, boiled and without heating before the process drying. After that, the filet for steaming treatment is carried out steaming process in boiling water (100oC) for 15 minutes, and filet for boiling treatment is carried out boiling process in water boil (100oC) for 15 minutes and the filet for treatment without direct heating is cut into small pieces to expand its surface. The next stage, after the filet is steamed or boiled is then cut into small pieces to expand its surface. The filet of each treatment is dried in a blower oven at 60oC for 5 hours after which it is mashed using a grinder and then filtered with a 100 mesh.

The tuna meat obtained is then observed or measured yield, moisture content, water absorption, pH and organoleptic properties (color, odor and texture). Observations were made three times (triplo). The data obtained are analyzed descriptively.

Results and Discussion

Yield

Yield is the percentage of product obtained from comparing the initial weight of the material with the final weight, so that it can be known to lose the weight of the processing process (Dewayani, *et al*., 2019) [4]. The yield value can indicate the efficiency of the process used in making or stratifying a product. The yield of tuna meat meal obtained from various heating methods applied before the drying process is carried out is shown in Table 1.

Table 1: Yield of tuna meat meal from different heating methods treatment before drying

S. No	Treatment	Average Yield
1	Steaming	17.92 % ± 0.25
2	Boiling	14.43% ± 0.55
3	No Heating (Control)	18.520% ± 0.35

Based on Table 1 above, the highest yield value of tuna meat meal was obtained from treatment without heating (control). This shows that in the manufacture of tuna meat meal treated without heating is more efficient than heating treatment, either by boiling or steamed. Heating treatment causes many compounds contained in tuna meat to be lost, which is soluble in heating media water. According to Ariany and Putalan (2021) [3], heatingn given to fish meat either by boiling or steaming causes a decrease in protein, fat and ash levels.

Water Content

Water content is an important product quality standard, because moisture content is a factor that determines shelf life (Amanto *et al*, 2015) [1]. The higher the water content in a food product, the more vulnerable it will be and have a relatively short shelf life. According to Orlan (2019), if the moisture content of food products is more than 10%, it will be able to increase the activity of microorganisms, especially Salmonella bacteria. The moisture content of tuna meat meal obtained from the treatment of different heating methods before drying is found in Table 2.

Table 2: Value of moisture content (%) tuna meat meal from different heating method treatment before drying

S. No	Treatment	Water content (%)
1	Steaming	3.87 ± 0.5
2	Boiling	4.96 ± 0.5
3	No Heating (Control)	6.13 ± 0.5

Based on Table 2, the highest moisture content of tuna meat meal is obtained from treatment without heating and the smallest is obtained from steaming treatment. Heating treatment of tuna meat either by steaming or boiling causes damage to the protein structure of until the binding power of water decreases. The impact of decreasing the binding of water by proteins causes water to be easily evaporated so that the water content becomes smaller.

According to Pratiwi and Wahida (2021), the Indonesian National Standard classifies fish meat meal quality into 3 standards based on its water content. Standard 1, with a moisture content of 6 – 10% and standard II with a moisture content of 10 – 12%, and standard 3, with a moisture content of more than 12%. Based on Table 2, the moisture content of tuna meat meal obtained from all treatments is below 10%, so it is included in standard 1.

Water Absorption

One of the factors that affect the quality of flour is water absorption (Ntau *et al*., 2017) [10]. Absorption in flour is the ability of flour to absorb water. Particle size, moisture content and differences in chemical content of materials affect water absorption (Lasale *et al*., 2022) [8]. The water absorption of tuna meat meal obtained from the treatment of different heating codes before drying is found in Table 3.

Table 3: Water absorption (%) tuna meat meal from different heating methods before drying

S. No	Treatment	Water content (%)
1	Steaming	1.84 ± 0.12
2	Boiling	1.70± 0.09
3	No Heating (Control)	1.55 ± 0.10

Based on Table 3, the highest water absorption of tuna meat meal was obtained from steaming treatment and lowest from no heating (control). The higher the water power of flour, the better the quality (Ariyantoro *et al*., 2020) [2]. The heat given in the heating treatment causes the hydrogen bond in the protein molecule to weaken and break so that water easily enters and water absorption becomes high (Haryanti *et al*., 2014) [5].

Acidity (pH)

pH has an important role in daily life and needs to be monitored for quality control of a product (Wasito *et al*., 2017) [14], such as fish meat meal. The pH value of a product can be measured with a pH meter. pH measurement of tuna meat meal obtained from 3 different treatments before drying can be seen in Table 4.

Table 4: The pH of tilapia meat meal from different treatments before drying

S. No	Treatment	Acidity Degree (pH)
1	Steaming	6.20± 0.03
2	Boiling	6.66 ± 0.21
3	No Heating (Control)	6.10 ± 0.04

Based on Table 4, it shows that the pH value of tuna meat meal obtained from the treatment without heating (control) is lower than the good heating treatment steaming and boiling. This means that tilapia meat meal obtained from without heating is more acidic. Heating treatment can cause acidic compounds in tuna meat in the water used as the heating medium. Heating also leads to denaturation and hydrolysis of proteins. Menurut Rohman *et al* (2015) [12], hydrolysis and denaturation of proteins cause damage to the acidic group, so that the concentration of OH-ions increases and pH will rise.

Organoleptic

The color of tuna meat meal produced by boiling, steaming and without heating (control) has the same basic color, which is yellow. The difference between the three actors lies only in the intensity of the yellow color. In tuna meat meal obtained from the heating process before drying is carried out it produces a slightly brownish yellow color. This can be caused by a non-enzymatic browning reaction, where carbohydrates will react with proteins when there is heat.

Tuna meat meal processed by boiling has a meat flour smell that is not too pungent and tuna meat meal made by steaming has a floury smell Tuna meat is pungent while tuna meat meal without heating has a non-pungent smell of fish meat meal.

Tuna meat meal processed by boiling has a smooth texture and fish meal made by steaming has a very fine texture and without treatment has a smooth texture a little rough. The cooking process by boiling or steaming can affect the organoleptic value of fish meal products, especially on texture. According to Imam (2016), cooking both boiling and steaming is done to reduce water content and maintain the quality of fish meat, which is a dense and compact texture so that if dried and floured, the texture of the flour becomes soft.

Conclusion

Based on the results of research on the characteristics of tuna meat meal obtained from steaming proses on fish meat before drying is as follows: flour yield 17.92%, moisture content 3.87%, water absorption 1.84%, pH 6.2 and organoleptic description brownish-yellow color, pungent odor and very fine texture. The characteristics of tuna meat meal obtained from the boiling process of fish meat before drying are as follows: flour yield 14.43%, moisture content 4.96%, water absorption 1. 70%, pH 6.66 and organoleptic description brownish-yellow color, not too pungent odor and smooth texture. The characteristics of tilapia meat meal obtained from the process without heating the fish meat before drying are as follows: flour yield 18.52%;moisture content 6.13, water absorption 1. 55%, pH 6.1 and organoleptic description yellow, odor is not pungent, and texture is slightly rough.

Acknowledgments

To Mr. Basri and the team from the Laboratory Assistant for Fisheries Product Processing Technology, Faculty of Fisheries and Marine Sciences, Padjadjaran University who have helped us in our activities practicum, so that we are able to complete this paper well and on time.

References

1. Amanto BS, Siswanti, Atmaja A. Drying Kinetics of Curcuma heynena using the Cabinet Dryer with the Blanchings as Introduction Tratment. Journal of Agricultural Product Technology. 2015; 8(2):107-114.
2. Ariyantoro AR, Riyadi Parnanto NHR, Kuntatiek ED. The Effect of various of Temperature on Physical, Chemichal and Physicochemical Properties of Yam Bean Pre-Gelatinizes Flour. Journal of Agricultural Product Technology. 2020; 8(1):12-19.
3. Ariany SP, Putalan R. Perubahan Kandungan Gizi Ikan Nike Pascapengolahan. Jurnal Pengolahan Hasil Perikanan Indonesia. 2021; 24(2):167-173.
4. Dewayani W, Syamsuri R, Septianti E. Effect of Varieties Bima Brebes and Maja Cipanas, Dryers And Filler Materials On Onion Powder. Gorontalo Agriculture Technology Journal. 2019; 2(1):38-50.
5. Haryanti P, Setyawati R, Wicaksono R. Effect of Temperature and Time of Heating of Starch and Butanol Concentration on the Physicochemical Properties of High-Amylose Tapioca Starch. Agritech. 2014; 34(3):308-315.
6. Iman S. Hasil Analisis Mutu Tepung Cumi-Cumi (Teuthida) Dengan Variasi Suhu Yang Berbeda. Skripsi, Program Studi Agroindustri. Politeknik Pertanian Negeri, Pangkep, 2016.
7. Jaya MM, Wiryawan B, Simbolon D. Sustainability of Tuna Fisheries in Sendangbiru Malang District. Albacore. 2017; 1(1):111-125.
8. Lasale NR, Liputo SA, Limonu M. Physical and Chemical Characteristics of Goroho Banana Resitance Starch (Musa acuminafe, sp) At Various Drying Temperatures. Jambura Journal of Food Technology. 2022; 4(1):64-77.
9. Megasanti M, Pontoh J, Koleangan HSJ. Pengayaan Asam Lemak Omega-3 dari Minyak Ikan Tuna (Thunnus sp.) di Sulawesi Utara. Chemestry Progress. 2020; 13(2):96-101.
10. Ntau L, Sumual MF, Assa JR. The Fermentation Effects of Lactobacillus casei to Sweet Corn Physical Characteristic. Jurnal Food Science and Technology. 2017; 5(2):11-19.
11. Patanda M, Sala M, Manuputty A. Growth Pattern of Yellowfin Tuna Landed at Palabuhanratu Fishing Port, Sukabumi. Journal of Tropical Fisheries Management. 2022; 6(1):27-34.
12. Rohman F, Eny R, Arifin HD. Effect of Dose and Soaking Duration of Pineapple Extract (Ananas comosus L. Merr) to the physical quality of breast meat of laying hens afkir. Surya Agritama. 2015; 4(1):35-42.
13. Utami ND, Ratnaningsih N, Lastariwati B. Uji Kesukaan dan Kandungan Gizi Tuna Mentai Sebagai Alternatif Main Course Untuk Mencegah Stunting. Agrointek. 2021; 15(1):382-388.
14. Wasito H, Karyati E, Vikarosa CD, Hafizah IN, Utami HR, Khairun M. Test Strip Pengukur pH dari Bahan Alam yang Diimmobilisasi dalam Kertas Selulosa. Indonesian Journal of Chemical Science. 2017; 6(3):223-229.