

Effect of Using Different Meats of Barracuda Fish (Sphyrna Barracuda) on the Sensory Quality, Level of Taste and Protein Content of Nugget

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Abstract. Nugget is a processed product with fish raw materials that are mashed, then mixed with adhesive flour and complementary spices with a half-cooked steamed process and then breaded. Fish as a raw material for nuggets is very important to develop, the use of Barracuda fish meat is an alternative effort in creating the best quality nuggets. This study aims to determine the effect of using different weight of Barracuda fish meat on the sensory quality, liking and protein content of nuggets. The independent variable in this study was the use of Barracuda fish meat weight, namely 250 grams, 300 grams and 200 grams with the control being 250 grams of Dori fish. The dependent variable in this study is the sensory quality of the indicators of color, aroma, taste and texture, the level of public preference and protein content. The control variables in this study are the condition of the ingredients, the amount of ingredients, equipment, processing process. The method used was single-factor complete randomized design with analysis of variance F count, then if there is an effect then Tukey test with 95% confidence level. The results of the study can be concluded that the best treatment in sensory quality on color indicators is 250 grams of Dori fish meat nuggets. On the aroma indicator, the flavor is Barracuda fish meat nuggets with 300 grams. While the texture indicator is 200 grams of Barracuda fish meat nuggets. The treatment with the highest average on the level of public liking is Barracuda fish meat with a ratio of 300 grams from indicators, aroma, taste and texture while from the color of the treatment with the highest average is Barracuda fish with a ratio of 250 grams. While in laboratory results using the tetrimetric method, the treatment that has the highest protein content is Barracuda fish with a ratio of 300 grams with an average of 14.77%. The suggestion in this research is that nuggets need to be socialized to the public and can be traded because nuggets with a weight ratio of 300 grams of Barracuda fish meat get the highest value for the sensory test and the highest value for liking.

Keywords: *Nugget, Barracuda Fish, Meat Weight*

INTRODUCTION

Nugget is a processed animal protein from ground meat and a mixture of adhesive flour and complementary flavor spices coated with breadcrumbs with a half-cooked steaming process and freezing to maintain quality in the storage process. Nugget is a good solution in increasing the selling value and reducing post-harvest losses in fish (Oppong et al., 2021). As a processed ready-to-eat food that is favored by various groups of people, nuggets have generally been recognized for their good taste with a fairly simple processing method (Siburian, 2022). Nuggets are usually made from beef, chicken and fish meat (Domili, 2021). According to (Hayati et al., 2023) there needs to be an innovation in nuggets so as not to cause boredom in consuming

nuggets. Therefore, in this study, ingredients from marine fish are proposed with the intention of developing marine fish products and variations in nugget products on the market.

Fish as a raw material for nuggets is very important to develop, because fish contains protein that is no less high than beef and chicken, especially to help increase the economic value of the product (Tumion and Hastuti, 2017). One potential alternative fish that meets the criteria to be used as raw material for nuggets is Barracuda fish. Barracuda fish (*Sphyraena Barracuda*) is known to have meat that is rich in protein and good texture, making it suitable for processing into food products such as nuggets (Julpahri et al., 2023). Fish that are often used as raw materials for making nuggets are fish that have soft meat textures such as Dori, Tuna, Swanggi, Tengiri and Salmon. However, these fish have a relatively higher price and some are less easy to process for meat. By using Barracuda fish meat, which is easy to process, it is expected to not only have good taste but also high nutritional content.

In the first pre-experiment, referring to the formula for making nuggets by (Panuwun, 2023) nuggets using 250 grams of dori fish meat as raw material can produce nuggets with a soft texture, white color and savory taste. The formula was used by researchers as a reference in the control product. In the second pre-experiment, referring to (Hamka, 2021), researchers tested using barracuda meat weight of 200 grams, 250 grams and 300 grams in the hope of showing a significant increase and decrease in the effect of using barracuda meat weight on nuggets so that it can also be compared to the control product. The product results showed that the nuggets had a more savory taste, and a denser texture.

Based on the results of the pre-experiment, determining the right weight of meat is very important to produce high-quality nuggets that are still favored by consumers. This is also inseparable from the high sensory quality, favored by many people and has a high protein content. Therefore, in this study it is necessary to conduct sensory tests, favorability tests and protein content tests. Sensory analysis, liking level and protein content are important steps in evaluating the quality of marine fish products. Through sensory analysis, such as assessment of the taste, aroma, color and texture of the product, we can understand the sensory response of consumers to the product. Organoleptic tests are needed to see the best quality in each treatment of nuggets. (Puspita, 2021)

In addition, protein content is a key factor that needs to be analyzed to ensure that marine fish products contribute sufficient nutrients to consumers. Protein in nuggets has significant importance due to the difference in protein content of barracuda fish which is higher than dori fish. In addition, protein is one of the main requirements in the Indonesian National Standard (SNI) for nugget products. With the combination of these analyses, we can ensure that marine fish products meet quality standards, are accepted in the community, and meet the nutritional needs of consumers.

METHODS

This study used an experimental research design, namely a complete randomized design. The independent variable was the use of different weight of barracuda fish meat of 200 grams, 250 grams and 300 grams with a control of 250 grams of dori fish meat. Favorability variables are sensory quality, level of public liking, and protein content. Control variables in this study were materials, tools and methods of manufacture. Data collection was done by sensory test using 30 moderately trained panelists while the liking test used 80 untrained panelists. Analysis of sensory test data was carried out using analysis of variance f count and followed by tukey test, analysis of liking test data was carried out using mean analysis, protein content was analyzed using the Kjeldahl method in the SIG laboratory, Bogor.

RESULTS AND DISCUSSION

This research was conducted in the Laboratory of Catering Education Study Program, Faculty of Engineering, Semarang State University. Research on the effect of nuggets using barracuda fish meat was assessed from the sensory quality, level of liking and protein content, the following are the results and discussion of the effect of using different barracuda fish meat.

1. Inderawi Test Results

The sensory test was conducted by 30 moderately trained panelists who had gone through an ability evaluation. Sensory quality assessment was carried out from the aspects of inner color, outer color, aroma, taste, and texture. Each assessment indicator consists of 7 levels of assessment. The lowest value is indicated by a value of 1 and the highest value is indicated by a value of 7. The following are the results of the sensory test assessment:

a. Inner Color Aspect

Based on the analysis of variance f count, the results showed that the use of different weight of barracuda fish meat affects the sensory quality of the inner color of the nuggets. The following are the tabulated results of the sensory test of the inner color indicator:

TABLE 1 tabulated Results of Inner Color Sensory Test

Repeat	K	A	B	C
1	6,27	4,93	5,07	5,77
2	6,13	4,97	5	5,77
Total	12,4	9,9	10,1	11,5
Avarage	6,2	4,95	5,03	5,77

Based on the results of the research, the results of the sensory test of the inner color indicator show that sample K has an average of 6.02, sample A has an average of 4.95, sample B has an average of 5.03 while sample C has an average of 5.77. Thus, through the analysis of variance, F calculated that the use of different weight of barracuda fish meat affects the color of the inside of the nuggets. The effect of this difference is positive because the difference in color in the nuggets occurs due to differences in the ratio of fish meat. The appearance of the white inside will reflect good quality and attractive visuals. Referring to (Anam et al., 2023) that different concentrations of flour use will affect the color of the inside of the nugget. Referring to (I Ketut Suwetja and Feny Mentang, 2018) that fish meat contains myoglobin protein which has an important role in creating a brighter color impression so that when the ratio of fish meat increases, it will produce a brighter and more dominant inner color to the filler.

The replacement of dory fish meat with barracuda fish has a negative effect on color. The color of dory fish is slightly brighter than barracuda fish, this is due to differences in the living environment of dory fish and barracuda fish. Dory fish live in depths of 5-30 meters so they need little oxygen which causes low myoglobin content in the meat. This myoglobin content has a role in storing and transferring oxygen and providing color to the meat (Izzah et al., 2024), the lower the myoglobin content, the brighter the meat color will be. Whereas barracuda fish live in water so that they need more oxygen and cause higher myoglobin content than dori fish (Hidayati, Subagio and Rosana, 2022).

b. Outer Color Aspect

Based on the analysis of variance f count, the results showed that the use of different weight of barracuda fish meat affects the sensory quality of the outer color of the nuggets. The following are the tabulated results of the outer color indicator sensory test:

TABLE 2 Outer Color Sensory Test Tabulation Results

Repeat	K	A	B	C
1	6,03	6,03	6,03	6
2	6,03	6,07	6,03	6
Total	12,1	12,1	12,1	12
Avarage	6,03	6,05	6,03	6

Based on the results of the study, the results of the sensory test of the outer color indicator showed that sample K had an average of 6.03, sample A had an average of 6.05, sample B had an average of 6.03 while sample C had an average of 6. So that through the analysis of variance F calculated that the use of different weight of barracuda fish meat has no effect on the color of the outside of the nugget. This is because the color of the outer nuggets does not have a significant effect because the butter (coating material) used in each sample is controlled equally, so that the outer nuggets have no effect on the use of the weight of fish meat or the replacement of Dori fish with Barracuda fish meat. While the level of intensity of the color of the outside of the nugget is influenced by the frying time, temperature and composition of the outer surface so that the use of yellow panir flour in all samples without any difference cannot affect the outer color of the nuggets produced (Simanjuntak and Pato, 2020). This is also supported by the same frying time and coating material that has no significant effect on nuggets even though the raw materials in the nuggets are different (Ratnasari, 2022). Therefore, the use of different raw materials has no significant effect on the color of the outer nuggets (Alghifari and Azizah, 2021).

c. Aroma Aspect

Based on the analysis of variance f count, the results showed that the use of different weight of barracuda fish meat affects the sensory quality of nugget aroma. The following are the tabulated results of the aroma indicator sensory test:

TABLE 3 Tabulated Results of Aroma Sensory Test

Repeat	K	A	B	C
1	4,4	4,9	5,43	6,33
2	4,37	5,03	5,67	6,2
Total	8,77	9,93	11,1	12,53
Avarage	4,38	4,97	5,55	6,27

Based on the results of the study, the results of the aroma indicator sensory test showed that sample C, namely Barracuda fish nuggets with the use of 300 grams of fish meat weight, had the highest assessment with an average of 6.27. Sample A has an average of 4.38, B has an average of 5.55 while sample K has an average of 4.38. Therefore, the analysis of variance F calculated that the use of different weight of Barracuda fish meat affects the aroma of nuggets. The sensory quality of nugget aroma using barracuda fish meat which has the highest value is the use of 300 grams of barracuda fish meat weight. The effect of this difference is positive because the weight of fish meat affects the aroma of nuggets, so that the more the use of meat weight, the nuggets have a sharper aroma (Husna Nadhifah et al., 2021). Fish meat contains protein, especially volatile compounds that can be released during cooking which have an important role in the more distinctive and intense aroma, (Lei Sha, 2020) especially in marine fish tends to be sharper. (Miao, 2023). This is also due to the presence of volatile compounds derived from the results of enzymatic reactions that have oxidative properties and auto-oxidation of fish fat so that the aroma produced by nuggets is influenced by the formulation of fish meat and fillers (Anam et al., 2023).

d. Taste Aspect

Based on the analysis of variance f count, the results showed that the use of different weight of barracuda fish meat affects the sensory quality of nugget flavor. The following are the tabulated results of the sensory test of the flavor indicator:

TABLE 4 Tabulated Results of Taste Test

Repeat	K	A	B	C
1	4,9	4,37	5,47	6,1
2	5,4	4,4	5,63	6,23
Total	10,3	8,77	11,1	12,33
Avarage	5,15	4,38	5,55	6,17

Based on the results of the research, the results of the sensory test of taste indicators show that sample C, namely Barracuda fish nuggets with the use of 300 grams of fish meat weight, has the highest assessment with an average of 6.17, K has an average of 5.15, A, has an average of 4.38, while B has an average of 5.55. So that through the analysis of variance F calculated that the use of different weight of Barracuda fish meat affects the taste of nuggets. The sensory quality of nugget color using barracuda fish meat which has the highest value is the use of 300 grams of barracuda fish meat weight. The effect of this difference is positive because fish meat contains proteins and fats such as glutamate and inosine monophosphate which affect the savory taste of meat (Hossain, 2024). So that when the use of fish meat weight increases, it will produce a more savory taste (Ghassani and Agustini, 2022) Along with the addition of fillers, the savory taste of fish nuggets decreases slightly and a floury taste appears (Alghifari and Azizah, 2021). The proportion of fish meat affects the taste of nuggets, so the more the proportion of meat, the more savory the nuggets taste (Husna Nadhifah et al., 2021).

e. Texture Aspect

Based on the analysis of variance f count, the results showed that the use of different weight of barracuda fish meat affects the sensory quality of nugget texture. The following are the tabulated results of the texture indicator sensory test:

TABLE 5 Tabulated Results of Texture Sensory Test

Repeat	K	A	B	C
1	3,77	6,23	5,83	5,3
2	3,93	6,1	5,47	5,43
Total	7,7	12,33	11,3	10,73
Avarage	3,85	6,17	5,65	5,37

Based on the panelists' assessment of the sensory test results of the texture indicator, sample A, namely Barracuda fish nuggets with the use of 200 grams of fish meat, has the highest assessment with an average of 6.17, K has an average of 3.85, B has an average of 5.65, while C has an average of 5.37. Therefore, the analysis of variance F calculated that the use of different weight of Barracuda fish meat affects the texture of the nuggets. The sensory quality of nugget texture using barracuda fish meat which has the highest value is the use of 200 grams of barracuda fish meat. The effect of this difference is negative because there are myofibril proteins in fish meat that contribute to increasing softness and forming elastic and stable gels during cooking (Faloye et al., 2024). So that the more the addition of flour as a filler in the nuggets, the denser the texture of the resulting fish nuggets.(Ratnasari and Dewi R, 2021).

2. Taste Test Results

The favorability test was conducted by 80 untrained panelists from around Pati district. The assessment of liking quality was done from the aspects of color, aroma, taste, and texture. Each assessment indicator consists of 7 levels of assessment. The lowest value is indicated by a value of 1 and the highest value is indicated by a value of 7. The following are the results of the favorability test assessment:

Aspect	K	A	B	C
Color	6,01	5,25	5,3	4,3
Aroma	4,51	5,56	6,02	5
Taste	6,14	5,97	6,35	5,36
Texture	6,34	5,55	6,46	5,07
Avarage	5,75	5,58	6,03	4,93

Description:

7 : Very like 6: Like 5: Somewhat like 4: Neutral 3: Somewhat dislike 2: Dislike 1: Strongly dislike

Based on the liking test, it can be seen that the results of the liking for the color aspect have the highest level of liking in sample K with an average of 6.01, namely like. While the other samples sequentially get a lower level of liking, namely sample B with an average of 5.3, sample A with an average of 5.25 and sample C with a retata of 4.3. The results of this liking test are in line with (Widyawatiningrum, Dwi Yati and Nur, 2022), that the brighter the color of the nugget will be an attraction and lure so that it is preferred by the public.

In the aroma aspect, it can be seen that the average sample B has the most favorable aroma criteria with an average of 6.02, which is like. While the other samples sequentially get a lower level of favorability, namely sample A with an average of 5.56, sample C with an average of 5 and sample K with a retata of 4.51. The results of this favorability test are in line with research (Maryati Maryati et al., 2021) that aromas that can be smelled will be preferred and provide a distinctive aroma by the community.

In the aspect of taste, it can be seen that the average sample B has the most preferred taste criteria with an average of 6.35, namely like. While the other samples sequentially get lower samples, namely sample A with an average of 6.14, sample K with an average of 5.97 and sample C with a retata of 5.36. The results of this liking test are in line with research (Maryati, Primairyani and Irawati, 2018) that people prefer savory and umami flavors, so the more savory the nugget tastes, the more it will be liked by the public.

In the texture aspect, it can be seen that the average sample B has the most favorable texture criteria with an average of 6.46, namely like. While the other samples sequentially get lower samples, namely sample K with an average of 6.34, sample A with an average of 5.55 and sample C with a retata of 5.07. The results of this favorability test are in line with research (Tumion and Hastuti, 2017) that the aspect of whether or not it is easy to chew into smaller parts is a factor that needs to be maintained in nuggets. The more ratio of barracuda fish meat used will produce nuggets with a soft texture that resembles the texture of meat so that it is easier to digest. However, some people also like a chewy texture so that it has a pleasant sensation to eat. The following is a graph of the favorability data presented below:

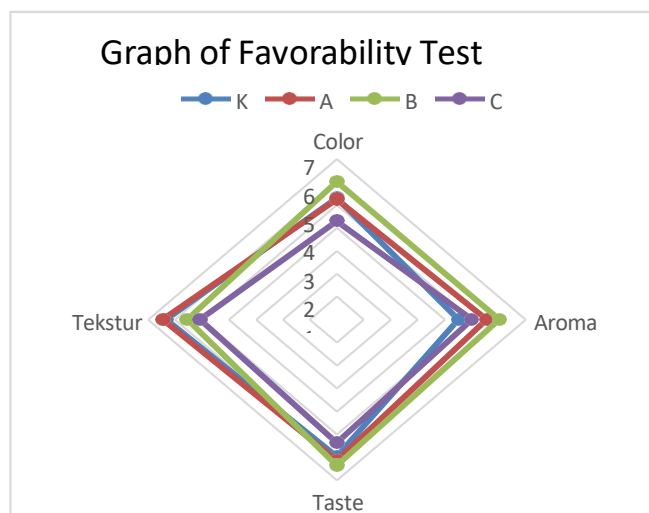


FIGURE 1 Graph of Favorability Test Results

3. Protein Content Test Results

The protein content test was carried out using the titrimetric method in the SIG laboratory. The results of the protein content test can be seen in the table

TABLE 7 Tabulated Results of Protein Content Test

Treatment	Simplo	Duplo	Total	Avarage
K	10,48	10,86	21,34	10,67
A	12,95	14,14	27,09	13,545
B	15,43	14,11	29,54	14,77
C	12,24	12,56	24,8	12,4

The table above shows that among the 4 samples, the highest protein content is in sample code B, which is 14.77. While the other samples in order have protein content, namely sample A with an average of 13.54, sample C 12.4 and sample K with 10.67. Thus, the protein content results are actually influenced by 2 factors, namely the protein content of dory fish and barracuda fish has a difference. In addition, the second factor is the weight of fish meat. The higher the protein content in food products reflects that the product is better in terms of nutrient content, because protein is an important nutrient for the body.

CONCLUSION

Based on the sensory test, there is an influence on the use of barracuda fish meat weight of 200 grams, 250 grams, 300 grams and 250 grams of dori fish on nuggets, resulting in that the best sample in terms of color is nuggets with 250 grams of dori fish meat, from the aspect, aroma, taste is nuggets with 300 grams of fish meat weight while from the texture aspect is 200 grams of barracuda fish meat nuggets. The nugget that has the highest level of preference in the color indicator is the nugget using 250 grams of Dori fish meat because it has a brighter color. On the aroma, taste and taste indicators, nugget sample B is a nugget with a weight ratio of 300 grams of Barracuda fish meat because it has a sharper aroma and a more savory taste. Based on laboratory results, all

samples experienced an increase in protein content as the weight of the fish meat increased. The highest protein content was 300 grams of Barracuda fish meat nuggets with an average of 14.77 and successively using 250 grams of Barracuda fish meat with an average of 13.54, using 200 grams of Barracuda fish meat with an average of 12.4, using 250 grams of Dori fish meat with an average of 10.67. The difference in protein content of Dori fish and Barracuda fish occurs because the difference in protein content of Barracuda fish is higher than that of Dori fish.

REFERENCE

- Alghifari, V. dan Azizah, D. N. (2021) “Perbandingan Tepung Kentang Dan Tepung Terigu Terhadap Karakteristik Nugget,” *Edufortech*, 6(1). doi: 10.17509/edufortech.v6i1.33287.
- Anam, C. *et al.* (2023) “Formulasi nugget ikan curah berdasarkan karakteristik organoleptik dan fisik,” *Agrointek : Jurnal Teknologi Industri Pertanian*, 17(3), hal. 537–548. doi: 10.21107/agrointek.v17i3.15817.
- Domili, I. (2021) “Tingkat Kesukaan Dan Umur Simpan Nugget Ikan Gabus (*Channa Striata*) Dengan Penambahan Jagung (*Zea Mays L.*),” *Journal Health & Science : Gorontalo Journal Health and Science Community*, 5(1), hal. 133–145. doi: 10.35971/gojhes.v5i1.9346.
- Faloye, O. R. *et al.* (2024) “Effect of different starches in batter formulation on oil content and associated quality attributes of fried chicken nuggets,” *Food Production, Processing and Nutrition*, 6(1). doi: 10.1186/s43014-023-00214-4.
- Ghassani, A. M. dan Agustini, R. (2022) “Formulation of Flavor Enhancer from Shiitake Mushroom (*Lentinula edodes*) with the Addition of Mackerel Fish (*Scomberomorus commerson*) and Dregs Tofu Hydrolysates,” *Indonesian Journal of Chemical Science*, 11(3), hal. 222–232. Tersedia pada: <http://journal.unnes.ac.id/sju/index.php/ijcs>.
- Hayati, R. *et al.* (2023) “Pengolahan Nugget Ayam dan Penerimaannya Melalui Uji Organoleptik di Desa Krueng Lam Kareung Kecamatan Indrapuri Aceh Besar,” *Jurnal Pengabdian Mahakarya Masyarakat Indonesia*, 1(1), hal. 19–24. doi: 10.24815/pemasi.v1i1.30198.
- Hidayati, A. N., Subagio, H. dan Rosana, N. (2022) “Karakteristik Reproduksi Ikan Barakuda (*Sphyræna Barracuda*) Pada Jaring Insang Permukaan Di Perairan Bulu Tuban,” *Jurnal Perikanan Unram*, 12(3), Hal. 467–479. doi: 10.29303/jp.v12i3.346.
- Husna Nadhifah *et al.* (2021) “Pengaruh Proporsi Ikan Patin (*Pengasius Hypothalmus*) dan Ikan Bandeng (*Chanos Chanos*) terhadap Sifat Organoleptik Nugget Kelor,” *Jurnal Tata Boga*, 10(3), hal. 418–427. Tersedia pada: <https://ejournal.unesa.ac.id/index.php/jurnal-tata-boga/>.
- I Ketut Suwetja dan Feny Mentang (2018) *Uji Mutu Ikan dengan Indeks Mioglobin*. Lembaga Penelitian dan Pengabdian Kepada Masyarakat, Universitas Sam Ratulangi (LPPM UNSTRAT).
- Izzah, A. N. *et al.* (2024) “Effect of Beef Treatment at Different Temperatures on Myoglobin Changes : A Brief Review,” *Journal of Tropical Food and Agroindustrial Technology*, 5(01), hal. 1–8. doi: 10.21070/jtfat.v5i01.1620.
- Julpahri *et al.* (2023) “Uji Organoleptik Nugget Ikan barakuda Substitusi Ekstrak Bayam Merah,” *Jurnal Pendidikan Tambusai*, 7(3), hal. 23361–23362.
- Maryati, M., Primairyani, A. dan Irawati, S. (2018) “Pengembangan Lembar Kerja Siswa Berdasarkan Hasil Observasi Keanekaragaman Morfologi Tanaman Mangga (*Mangifera Indica*),” *Diklabio: Jurnal Pendidikan dan Pembelajaran Biologi*, 2(1), hal. 68– 75. doi: 10.33369/diklabio.2.1.68-75.
- FSCE Vol. 13 No. 2 (2024) : Effect of Using Different Meats of Barracuda Fish (*Sphyræna Barracuda*) on the Sensory Quality, Level of Taste and Protein Content of Nugget

- Maryati Maryati *et al.* (2021) “Analisis Tingkat Kesukaan Nugget Ikan Tuna pada Masyarakat Kampung Tanama Kabupaten Fakfak Papua Barat,” *Jurnal Informasi, Sains dan Teknologi*, 4(1), hal. 26–31. doi: 10.55606/isaintek.v4i1.38.
- Miao, X. (2023) “Characterization of volatile flavor compounds from fish maw soaked in five different seasonings,” *Food Chemistry*, 19. Tersedia pada: Characterization of volatile flavor compounds from fishmaw soaked in five different seasonings.
- Oppong, D. *et al.* (2021) “Comparative effect of frying and baking on chemical, physical, and microbiological characteristics of frozen fish nuggets,” *Foods*, 10(12), hal. 1–12. doi: 10.3390/foods10123158.
- Panuwun, B. (2023) *Panduan Mudah Membuat Beberapa Jenis Nugget*. 1 ed. Diedit oleh G. Irawan. Yogyakarta: Rumah Baca. Tersedia pada: <https://ipusnas2.perpusnas.go.id/book/eddf3c9c-dea1-449b-8187-4c054a7270f5/789493d9-4f7c-48d1-ad32-e2c120461f68%0A>.
- Puspita, I. A. (2021) “A Development of Mushroom Nugget Using Dragon Fruit Peel Additive (*Hylocereus Polyrhizus*) to Know the Organoleptic Products,” *Proceedings of the 4th International Conference on Sports Sciences and Health (ICSSH 2020)*, 36(Icssh 2020), hal. 82–88. doi: 10.2991/ahsr.k.210707.020.
- Ratnasari, D. dan Dewi R, Y. (2021) “Pengaruh Penambahan Tepung Maizena Terhadap Mutu Nugget Ikan Gabus (*Channa Striata*),” *Jurnal Ilmiah Gizi dan Kesehatan (JIGK)*, 2(02), hal. 7–14. doi:10.46772/jigk.v2i02.451.
- Ratnasari, W. (2022) “Penggunaan Jenis Tepung yang Berbeda Terhadap Hasil Jadi Nugget Belut (Use Of Different Flour Types Of Results So Nugget Pelt) Wahyu,” *Jurnal Pendidikan dan Konseling*, 4(6), hal. 1594–1601.
- Sali, F., Asnani, A. dan Suwarjoyowirayatno, S. (2020) “MUTU KIMIA DAN ORGANOLEPTIK NUGGET IKAN BARAKUDA (*Sphyraena jello*), DENGAN SUBSTITUSI TEPUNG TAPIOKA DAN TEPUNG WORTEL (*Daucus carota L.*),” *Jurnal Fish Protech*, 3(1), hal. 1. doi: 10.33772/jfp.v3i1.11598.
- Siburian, G. L. (2022) “Pengaruh Variasi Jenis Daging Ikan Yang Berbeda Terhadap Mutu Nugget Ikan,” *Jurnal Ilmu Pertanian*, 16(8.5.2017), hal. 2003–2005.
- Simanjuntak, A. T. dan Pato, U. (2020) “Tepung Kedelai Production of Nugget From Tilapia Fish With Addition of Soybean Flour,” *SAGU Journal*, 19(2), hal. 1–9. Tersedia pada: <https://sagu.ejournal.unri.ac.id>.
- Tumion, F. F. dan Hastuti, N. D. (2017) “Making of lele fish nugget (*Clarias sp*) with additional variation of wheat flour,” *Jurnal Agromix*, 8(1), hal. 25–35.
- Widyawatiningrum, E., Dwi Yati, M. dan Nur, S. (2022) “Peningkatan Mutu Produk Nugget Ayam Kelor melalui Unjuk Kerja Metode Penggorengan Deep Frying,” *Jurnal Pengembangan Potensi Laboratorium*, 1(2), hal. 73–78. doi: 10.25047/plp.v1i2.3078.

