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Healthy Cookies Fortification of Fish Meal as an Effort to Diversify Post-Harvest Processing of Fishery Products to Increase the Economic Value of Fishermen

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Abstract
This study aims to determine the most preferred healthy cookies after the addition of fish meal which was given different treatment. The research method uses a quasi-experimental research design (quasi-experimental) which is a nonequivalent control group design. This nonequivalent control group design study consisted of four intervention groups and one control group. The intervention group was the group that was given additional treatment of 10%, 20%, 30%, and 40% fish meal. The control group was the group that was not given additional fish meal. The results showed that there was an effect of adding fish meal on the manufacture of healthy cookies in terms of organoleptic tests which included taste, color, aroma, and texture, had the effect of adding fish meal in terms of color and aroma, while in terms of taste and texture there was no effect of adding fish flour. The level of consumer acceptance of healthy cookies fish flour in terms of organoleptic tests includes consumer acceptance, with the highest level of liking for healthy cookies X2 and healthy cookies X1, then in the liking level position there are oatmeal cookies X0, while healthy cookies X3 and X4 get the position dislike level. The total nutritional value of fiber content in fish meal cookies proves good results, it can be concluded that the more the proportion of fish meal added to healthy cookies, the higher the nutritional value.
Keywords: healthy food, fish meals, empowerment, economic changes
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1. Introduction

Fish is a source of food that contains high levels of protein, this makes fish a potential source of animal protein in meeting the nutritional needs of the community. Processed fish products are no longer intact but can be processed into various processed forms that will affect the level of public consumption of fish.

Food products are very diverse, but this must be followed by an increase in nutrition from the processed product itself or better known as fortification, The joint Food and Agricultural Organization (FAO/WHO, 1971 in Astute 2019) the term fortification most accurately describes the process by which nutrients Macro and micro nutrients are added to the food consumed to increase the nutritional value of a product so that the nutritional value of a product increases.

The Indonesian Bakery Entrepreneurs Association (APEBI) said that the data on the increase in the market value of cakes and breads in Indonesia in 2012 reached 31 trillion, this number has increased 15% from the previous year and there will be an increase from year to year, for example one snack product (snack food) which is very popular among the people of Indonesia is pastries (cookies). So it is not surprising that Indonesian people prefer cookies (cookies) to make snacks when relaxing and gathering with family (Wijayanti et al., 2015).

Cookies are one type of snack or snack that are popular with the public because of the variety of shapes and flavors of cakes, depending on the additional ingredients used. While cookies are a type of cake made from soft dough, high in fat content, made from a mixture of flours, vegetable or animal fats, eggs and developer ingredients. Cookies are relatively crunchy when broken or bitten, dense textured and small in size (Kalisom, 2021). The addition of fish meal is expected to increase the nutritional value of the protein cookies produced so that they are not dominant in the high level of dominant carbohydrates and fats.

According to (Wijayanti et al., 2015) Cookies are one type of cake that uses a baking technique for the process of maturation of the type of solid and liquids dough, cookies are usually identical with a small size, relatively crunchy when broken and generally have a sweet taste. Cookies have a character with a crunchy texture, sweet taste and contain lots of gluten.

Gluten is a form of protein that tends to be unfriendly to the human digestive system because protein (gluten) that is not easily digested properly will result in an immune response and are at risk for various health problems such as type 2 diabetes, obesity and heart disease.

Based on global study data, Indonesia is ranked 7th in the world with the number of people with diabetes mellitus as a fairly large problem. In 2015 around 415 million people had diabetes and it is estimated that by 2040

it will increase to 642 million people with diabetes mellitus. This is due to an increase in the number of people with diabetes mellitus from year to year (Nur Fajri Suloi et al., 2020).

Pastries made from wheat flour are not all harmful to health as long as we can still enjoy them with the right portion. Therefore, it is necessary to make an effort to change the diet, starting from reducing dependence on the use of wheat flour as the main food ingredient by switching to one of the gluten-free flours, namely using rice bran and oatmeal for a mixture of cookies. Rice bran is one of the results of the rest of the process of pounding or milling rice. Indonesia itself bran is available in abundant quantities and since the first bran is only known by the public as an animal feed ingredient, it's just that so far bran is seen as waste because the process of processing grain into rice is less useful or of low quality and has low economic value. So that the abundant bran is necessary for food diversification so that it is more useful and has a very high selling power, which is used as an additional ingredient or mixture for food products (Trihaditia et al., 2015).

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Healthy cookies with the addition of fish meal become an innovative healthy snack rich in fiber. The addition of fish meal is expected to have a positive impact on obese people by replacing their snacks, which are usually fast food or those containing excessive calories and sugar, replaced with healthy snacks, fish meal cookies that have high fiber content.

2. Research Method

The research design used in this study is a quasi-experimental design (quasi-experimental) which is a nonequivalent control group design. This nonequivalent control group design study consisted of four intervention groups and one control group. The intervention group was the group that was given additional treatment of 10%, 20%, 30%, and 40% fish meal. The control group was the group that was not given additional fish meal.

The population taken from this research is the addition of fish meal in the manufacture of oatmeal cookies which is used to see the effect of its addition. The sample was distributed to 30 panelists with details, 15 trained panelists from PGRI Adi Buana University majoring in Catering and 15 untrained panelists from the general public. Each panelist will be given 5 samples of oatmeal cookies, namely X0, X1, X2, X3, and X4 with a weight of 5 grams of each cookie sample.

Data collection techniques include experimental methods, and organoleptic tests. Experimental methods with the formulation of the percentage addition of fish meal in the manufacture of oatmeal cookies: (1) sample X0 without the addition of fish meal; (2) sample X1 with the addition of 20 grams of fish meal; (3) sample X2 with the addition of 40 grams of fish meal (4) sample X3 with the addition of 60 grams of fish meal; (5) sample X4 with the addition of 80 grams of fish meal. Organoleptic tests include taste, aroma, texture, and color. Organoleptic test serves as a measure of the level of consumer acceptance of a product. The instrument of this research consisted of two types of panelists, namely trained panelists from 15 students of Unipa Surabaya culinary arts and untrained panelists consisting of 15 general public. The data analysis technique used is single variance analysis (one way ANOVA).

3. Result and Discussion

The level of preference and acceptance of the panelists towards a product can be assessed based on the organoleptic characteristics (hedonic test). The organoleptic characteristics observed in healthy cookies made from fish meal include taste, color, aroma, texture and level of preference

3.1 Flavor testing

The results of the calculation of the analysis of the single classification variance in terms of taste based on table 4.7 it is found that the value of Fcount is 0.394 and Ftable is 2.76. So that Fcount 0.394 Ftable 2.76 then Ho is accepted and Ha is rejected. So it can be concluded that there is no effect of adding fish meal to the taste of the five types of healthy cookies. So the hypothesis reads "There is no effect of adding fish meal to the taste of healthy cookies" which has been proven in the analysis of the data above.

This is supported by sensory responses to nerve stimulation, such as sweet, bitter, sour to the sense of taste, or heat, cold, pain to the sense of taste. The taste of healthy cookies is usually unstable, because it is influenced by several factors such as when mixing or addition of material. According to Raditrini and Ratu Hani (2017), sugar can give a sweet taste and brown color to cakes because of the caramelization effect. According to Christina Wisti (2011), the other function of eggs in pastries is to add flavor, add nutrition and produce crispy and soft cakes. According to Wulan Praptiningrum (2015), states that sugar is needed in making patisserie with the main function

being as a sweetener and adding nutritional value to the product. The function of sugar in making butter cookies is to give a sweet taste, give a brown color to the crust due to the caramelization process, extend shelf life, improve texture and add calories.

3.2 Color testing

The calculation results from the analysis of the single classification variance in terms of color, based on table 4.8, it is found that the value of Fcount is 3.586 and Ftable is 2.76. So that Fcount 3,586 Ftable 2,76 then Ho is rejected and Ha is accepted. So it can be concluded that there is an effect of adding fish meal to the color of the five types of healthy cookies. So that the hypothesis reads "There is an effect of adding fish meal to the color of healthy cookies" which has been proven in the analysis of the data above.

This is supported, according to the Big Indonesian Dictionary, color is the impression that the eye gets from the light reflected by the objects it hits. Color in cookies is usually unstable, because it is influenced by several factors such as when mixing or adding ingredients and the process when baking. According to Wulan Praptiningrum (2015), stated that the sugar caramelization process gives a good color to cookies. According to Raditrini and Ratu Hani (2017), stating that sugar can give a sweet taste and brown color to cakes because of the caramelization effect. In the baking process cookies should use the size of the fire. medium, to avoid scorching or scorching, because sugar melts easily when exposed to hot temperatures. According to Maesye Manaffe Sondakh, et al (1999) (in the journal of Christiana Wisti A.P. 2011's final project), stated the function of fat in pastries, among others, adds color, adds deliciousness and adds nutrition.

3.3 Scent testing

The calculation results from the analysis of the single classification variance in terms of color, based on table 4.9, it is found that the Fcount value is 5.896 and Ftable is 2.76. So that Fcount 5.896 Ftable 2.76 then Ho is rejected and Ha is accepted. So it can be concluded that there is an effect of adding fish meal to the aroma of the five types of oatmeal cookies. So the hypothesis reads "There is an effect of adding fish meal to the aroma of oatmeal cookies" which has been proven in the analysis of the data above.

This is supported, according to the Big Indonesian Dictionary, aroma is a fragrant smell. The aroma of cookies is influenced by the additional ingredients used, such as the use of vanilla paste and cinnamon powder which serves to give the cookies a distinctive aroma. In addition to vanilla paste and cinnamon powder, margarine and butter can also provide aroma when undergoing the roasting process so that the aroma smells typical of cookies. According to Wulan Praptiningrum (2015), states that the function of margarine in the manufacture of butter cookies is to give aroma. The use of butter and margarine can provide a distinctive aroma of cookies. According to Tintin Rayner (2017), states that pastes and liquid essences are used to add or give aroma to cakes, cakes, cookies. Usually in the form of a thick and watery liquid, sometimes also in the form of a powder.

3.4 Texture testing

The calculation results from the analysis of the single classification variance in terms of texture, based on table 4.10, it is found that the Fcount value is 0.218 and Ftable is 2.76. So that Fcount 0.218 Ftable 2.76 then Ho is accepted and Ha is rejected. So it can be concluded that there is no effect of adding fish meal to the texture of the five types of healthy cookies. So that the hypothesis reads "There is no effect of adding fish meal to the texture of oatmeal cookies" which has been proven in the analysis of the data above.

This is supported, eggs are natural emulsifiers, emulsifiers are softening and softening ingredients in sponges and pastries. In making healthy cookies, you only need egg yolks, so the resulting healthy cookies are crunchy and melt when consumed. According to Wulan Praptiningrum (2015), sugar has the effect of softening gluten so that the resulting cookies are crispier and wheat flour serves as a framework for forming the dough, retaining ingredients such as water and fat, forming a crunchy texture. According to Christiana Wisti A.P. (2011), stated that the other function of eggs in pastries is to add flavor, add nutrition and produce crispy and soft cakes. The function of wheat flour is as a framework and can provide a dry, brittle and crunchy texture to pastries (Sri Boga, 2003: 16).

3.5 Fiber content

Based on the test results of the five samples of oatmeal cookies in the nutrition laboratory of the Faculty of Public Health, Airlangga University, Surabaya, the results showed good results. Sample X0 without treatment contains a fiber content of 3.07%. Sample X1 with 10% fish meal treatment contains fiber content of 12.85%. Sample X2 with 20% fish meal treatment contained 18.12% fiber content. Sample X3 with 30% fish meal treatment contained 0.47% fiber content. Sample X4 with 40% fish meal treatment contained 33.71% fiber content. So the hypothesis that reads "There is an effect of adding fish meal to the nutritional value of healthy cookies fiber content" has been proven in the analysis of the data above.

This is supported by Ahmad Nafi et al, stating that the research they have done shows that the more addition

of fish meal will increase the fiber content in healthy cookies produced by the addition of fish meal consumed by people who are on a diet. According to the United States of Agriculture (2018), 100 grams of fish meal contains 50.1 grams of fiber.

3.6 Consumer Acceptance Rate

The calculation results from the analysis of the single classification variant in terms of consumer acceptance based on table 4.11 it is found that the value of Fcount is 21.641 and Ftable is 2.76. So that Fcount 21.641 Ftable 2.76 then Ho is rejected and Ha is accepted. So it can be concluded that there is an effect of adding fish meal to consumer acceptance of the five types of healthy cookies. So that the hypothesis reads "There is an effect of adding fish meal on consumer acceptance of oatmeal cookies" which has been proven in the analysis of the data above.

This is supported by Afika Iknar Wijaya Putri (2016), stating that based on the results of statistical tests, panelists have a tendency to like the first treatment (10% oyster mushroom flour) of 56.67%. Similarly, the most preferred oatmeal cookies are the second treatment (20% addition of fish meal) with an average value of 3.50 because the taste produced by these second treatment cookies has a sweet taste and does not taste fish meal, has a yellow-brown color, has the distinctive aroma of cookies and no fishmeal aroma, and has a crunchy texture. The higher the proportion of fish meal added, the less favorable the taste, because the resulting oatmeal cookies taste a bit starchy when consumed.

4. Conclusion and Suggestion

The conclusion of this study is the effect of adding fish meal on the manufacture of healthy cookies in terms of organoleptic tests which include taste, color, aroma, and texture, which has the effect of adding fish meal in terms of color and aroma, while in terms of taste and texture there is no effect of adding fish meal. The level of consumer acceptance of healthy cookies fish flour in terms of organoleptic tests includes consumer acceptance, with the highest level of liking for healthy cookies X_2 and healthy cookies X_1, then in the liking level position there are oatmeal cookies X_0, while healthy cookies X_3 and X_4 get the position dislike level. The total nutritional value of fiber content contained in fish meal cookies proves good results, it can be concluded that the more the proportion of fish meal added to healthy cookies, the higher the amount of fiber nutritional value.

Suggestions from this study are that this research can be useful for further research, to be able to develop fish meal research for other types of cookies or cakes, this research can provide a solution for people with obesity and diabetes mellitus, by consuming fish meal oatmeal cookies as a diet snack, the results This research can refer to cookie products for the diet of obese people and business opportunities for the catering service industry and SMEs. Diversification of post-harvest processing of fish can improve the economy of fish farmers and home industries, and this research can be useful for fish meal farmers, because they have made good use of the results of their cultivation.

References

Dewayanti, I. S. R. (2021). Pengaruh Proporsi Tepung ikan dan Tepung Edamame Dengan Penambahan Bekatul Beras Merah Terhadap Karakteristik Fisik, Kimia Dan Organoleptik Cookies. 2013–2015.

Djajasentana, B. A., & Samboh, R. D. (2020). Uji Kesukaan Penambahan Madu Sebagai Olesan Kue Kering. II(2003).

Fajri, A. N., Rumitasari, A., Andriani, J., Azizah, S. N., & Luthfiah, N. (2020). Snack Bars : Camilan Sehat Rendah Indeks Glikemik Sebagai Alternatif Pencegahan Penderita Diabetes. Jurnal ABDI Vol.2, 2(1), 59–67.

Harini, N., Warkoyo, & Hermawan, D. (2015). Pangan Fungsional: Makanan Untuk Kesehatan. Universitas Muhammadiyah Malang, I, 21.

Idora, M., Prarudiyanto, A., & Alamsyah, A. (2018). Pengaruh Kombinasi Tepung Bekatul Dan Tepung Menir C4 Terhadap Beberapa Komponen Mutu Cookies. Pro Food, 3(2), 207–216. https://doi.org/10.29303/profood.v3i2.50

Imron, I. (2019). Analisa Pengaruh Kualitas Produk Terhadap Kepuasan Konsumen Menggunakan Metode Kuantitatif Pada CV. Meubele Berkah Tangerang. Indonesian Journal on Software Engineering (IJSE), 5(1),19–28. https://doi.org/10.31294/ijse.v5i1.5861

Maria, Polikandrioti dan Stefanou Evagelia. 2020. “Obesity Disease.” Dalam Health Science Journal, Volume 7.

Mulia, Ziel H. 2017. Pengaruh Penambahan Tepung Kacang Hijau (Vigna Radiata L.) Ditinjau Dari Segi Tekstur Dan Rasa Kulit Pie Susu. Skripsi. Universitas PGRI Adi Buana Surabaya.

Hari, Y., Dewi, L. P., Santi, C., & Sembiring, M. J. (2018). Improving Financial Marketing And Accountability With Technology Penetration For The Bag SMEs Community In Gresik, Jawa Timur. Advances in Social Sciences Research Journal, 5(10), 160-164.

Jevitasari, O., Sari, T., & Ismail, E. (2018). Flakes Dengan Bahan Dasar Tepung Terigu,Tepung Oatmeal Dan Tepung Kacang Hijau Sebagai Alternatif Sarapan Pagi. Poltekkes Kemenkes Yogyakarta, 53, 8–48.

Kalisom. (2021). Proporsi tepung kacang hijau dan bekatul terhadap sifat kimia dan organoleptik cookies.

Teknologi Hasil Pertanian Jurusan Teknologi Pertanian Universitas Muhammadiyah Mataram.

Kurniawan, A., Jaziri, A. A., Amin, A. A., & Salamah, L. N. (2019). Indeks Kesesuaian Garam (Ikg) Untuk Menentukan Kesesuaian Lokasi Produksi Garam; Analisis Lokasi Produksi Garam Di Kabupaten Tuban Dan Kabupaten Probolinggo. JFMR-Journal of Fisheries and Marine Research, 3(2), 119–127. https://doi.org/10.21776/ub.jfmr.2019.003.02.14

Kusumastuty, I., Fandianty Ningsih, L., & Julia, A. R. (2015). Formulasi Food Bar Tepung Bekatul dan Tepung Jagung sebagai Pangan Darurat. Indonesian Journal of Human Nutrition, 5(2), 68–75.

Listyaningrum, C. E., Affandi, D. R., & Zaman, M. Z. (2018). Pengaruh Palm Sugar Sebagai Pengganti Sukrosa Terhadap Karakteristik Snack Bar Tepung Komposit (Ubi Ungu, Jagung Kuning Dan Kacang Tunggak) Sebagai Snack Rendah Kalori. Jurnal Teknologi Hasil Pertanian, 11(1), 53. https://doi.org/10.20961/jthp.v11i1.29096

Lusiana, L. E., Andrianty, D., Hidayat, T. N., & Muflihati, I. (2021). Pengaruh Penggunaan Pewarna Alami Terhadap Mutu Fisik Macaron Oat. Jurnal Ilmiah Teknosains, 7(1), 22–28.

Luthfianto, D., Noviyanti, R. D., & Kurniawati, I. (2017). Karakterisasi Kandungan Zat Gizi Bekatul pada Berbagai Varietas Beras di Surakarta. Jurnal Kesehatan, 2(1), 371–376.

Nadimin, Fitriani, N., Gizi, J., Kemenkes, P. K., Sarjana, A., Gizi, T., & Kemenkes, P. K. (2019). Mutu Organoleptik Cookies Dengan Penambahan. Media Gizi Pangan, 26(1), 8–15.

Nur Fajri Suloi, A., Rumitasari, A., Andriani Farid, J., Nur Azizah Fitriani, S., & Luthfiah Ramadhani, N. (2020). Snack Bars : Camilan Sehat Rendah Indeks Glikemik Sebagai Alternatif Pencegahan Penderita Diabetes. ABDI, 2(1).

Pakaya, N. K., Sulistijowati, R., & Dali, F. A. (2015). Analisis Mutu Garam Tradisional di Desa Siduwonge Kecamatan Randangan Kabupaten Pohuwato Provinsi Gorontalo. Jurnal Ilmiah Perikanan Dan Kelautan, 3(1), 1–6.

Praseptiangga, D., Nabila, Y., & Muhammad, D. R. A. (2018). Kajian Tingkat Penerimaan Panelis pada Dark Chocolate Bar dengan Penambahan Bubuk Kayu Manis (Cinnamomum burmannii). Caraka Tani: Journal of Sustainable Agriculture, 33(1), 78–88. https://doi.org/10.20961/carakatani.v33i1.19582

Rachman, T. (2018). 済無 No Title No Title No Title. Angewandte Chemie International Edition, 6(11), 951–952., 10–27.

Rosida, D. F., Putri, N. A., & Oktafiani, M. (2020). Karakteristik Cookies Tepung Kimpul Termodifikasi (Xanthosoma Sagittifolium) Dengan Penambahan Tapioka. Agrointek, 14(1), 45–56. https://doi.org/10.21107/agrointek.v14i1.6309

Santoso, U., Rahayu, W. P., Pambayun, R., Giyatmi, Ardiansyah, & Harmayani, E. (n.d.). Pangan Indonesia Yang Diimpikan (U. Santoso, W. P. Rahayu, R. Pambayun, Giyatmi, Ardiansyah, & E. Harmayani (eds.)). Interlude.

Sintia, N. A., & Astuti, N. (2018). Pengaruh Subtitusi Tepung Beras Merah Dan Proporsi Lemak (Margarin Dan Mentega) Terhadap Mutu Organoleptik Rich Biscuit. Jurnal Tata Boga, 7(2).

Sudibyo, A. (2012). Peran Cokelat sebagai Produk Pangan Derivat Kakao yang Menyehatkan. Jurnal Riset, Industri, VI(1), 23–40.

Susanti, A. D., Ardiana, D., Gumelar P, G., & Bening G., Y. (2000). Polaritas Pelarut Sebagai Pertimbangan Dalam Pemilihan Pelarut Untuk Ekstraksi Minyak Bekatul Dari Bekatulvarietas Ketan (Oriza Sativa Glatinosa). Journal of Social Welfare and Family Law, 22(3), 277–294. https://doi.org/10.1080/01418030050130185

Ulfa, S. M. (2016). Identifikasi Dan Uji Aktivitas Senyawa Antioksidan Dalam Bekatul Dengan Menggunakan Variasi Pelarut.

Utami, N. D., Hamidah, S., & Lastariwati, B. (2020). Oatmeal Cookies Sebagai Pengganti Makanan Selingan Untuk Penderita Diet Rendah Kalori. HEJ (Home Economics Journal), 4(2), 44–48.

Wahyuningtias, D., Putranto, T. S., & Kusdiana, R. N. (2014). Uji Kesukaan Hasil Jadi Kue Brownies Menggunakan Tepung Terigu dan Tepung Gandum Utuh. Binus Business Review, 5(1), 57. https://doi.org/10.21512/bbr.v5i1.1196

Widodo, R. F., & Priyanti, E. (2020). Kajian Daya Terima Kandungan Serat dan Protein dari Cookies Berbahan Dasar Tepung Oat dan Tepung Tempe. Jurnal FARMASINDO Politeknik Indonusa Surakarta, 4(1), 16–21.

Widyastuti, L. A., Nugroho, W. A., & Rilianti, A. P. (2015). Oats-Bekatul Sebagai Pangan Fungsional. Pelita - Jurnal Penelitian Mahasiswa UNY, 0(2), 1–10.

Wijayanti, W., Mahfud, T., & Djati K., B. (2015). Acceptance Test Oatmeal Cookies Dengan Substitusi Dedak Padi. Teknobuga, 2(2), 9–17.