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THE USE OF PAYUS MEAT (*Elops hawaiensis*) AS A BASIC MATERIAL IN THE FISH CRACKERS PRODUCTION

Pemanfaatan Daging Ikan Payus (Elops Hawaiensis) Sebagai Bahan Dasar Pembuatan Kerupuk Ikan

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ABSTRACT

Payus fish (*Elops hawaiensis*) is a predatory pest in milkfish ponds which has soft-textured flesh with a high enough protein content, namely 22.58%, so it has the potential as a follow-up product such as fish crackers. This research was conducted to determine the optimal amount of carp fish meat in the formulation of good quality and acceptable by the public. This study used a completely randomized design (CRD) with 4 treatments and 5 repetitions. The treatments used in this research were treatment P0 (control), 0 g of payus fish meat and 70 g of tapioca flour; treatment P1, payus fish meat 20 g and tapioca flour 50 g; treatment P2, payus fish meat 35 g and tapioca flour 35 g; and treatment P3, 50 g of payus fish meat and 20 g of tapioca flour. The parameters of this study include swelling power, oil absorption, chemical properties, and organoleptic value of Payus fish crackers. The results of the research show that payus fish can be used as a basic material in the fish crackers production with the best result with adding 50 g of payus fish meat and 50 g of tapioca flour, which produces sweeling power of 239.00%, oil absorption capacity of 37.75%, water content of 4.29 %, protein content 17.92%, fat content 2.47%, and carbohydrate content 54.11%. It has sensory acceptance with an appearance value of 8.40, a smell value of 8.19, a taste value of 7.94, and a texture value of 7.74.

Keywords: Crackers, Oil Absorption, Payus Fish, Quality, Swelling Power

ABSTRAK

Ikan payus (Elops hawaiensis) merupakan salah satu jenis hama pemangsa di perairan tambak ikan bandeng yang memiliki daging bertekstur lembut dengan kandungan protein yang cukup tinggi, yaitu 22,58% sehingga berpotensi sebagai produk lanjutan seperti kerupuk ikan. Penelitian ini dilakukan untuk mengetahui jumlah daging ikan payus yang optimal dalam formulasi pembuatan kerupuk ikan payus dengan kualitas yang baik dan dapat diterima oleh masyarakat. Penelitian ini menggunakan Rancangan Acak Lengkap (RAL) dengan 4 perlakuan dan 5 pengulangan. Perlakuan yang digunakan dalam penelitian ini adalah perlakuan P0

(kontrol), daging ikan payus 0 g dan tepung tapioka 70 g; perlakuan P1, daging ikan payus 20 g dan tepung tapioka 50 g; perlakuan P2, daging ikan payus 35 g dan tepung tapioka 35 g; dan perlakuan P3, daging ikan payus 50 g dan tepung tapioka 20 g. Parameter penelitian ini meliputi daya kembang, daya serap minyak, sifat kimia, dan nilai organoleptik kerupuk ikan payus. Hasil penelitian menunjukkan bahwa ikan payus dapat dimanfaatkan sebagai bahan dasar pembuatan kerupuk ikan dengan hasil yang terbaik pada penambahan daging ikan payus 50 g dan tepung tapioka 50 g, yang menghasilkan daya kembang 239,00%, daya serap minyak 37,75%, kadar air 4,29%, kadar protein 17,92%, kadar lemak 2,47%, dan kadar karbohidrat 54,11%. Memiliki daya terima sensori dengan nilai kenampakan 8,40, nilai bau 8,19, nilai rasa 7,94, serta nilai tekstur 7,74.

Kata Kunci: Daya Kembang, Daya Serap Minyak, Ikan Payus, Kerupuk, Kualitas.

INTRODUCTION

Payus fish (*Elops hawaiensis*) is one type pest predators in the waters pond traditional milkfish (Mufarihat *et al*., 2019). This fish own texture tender meat with protein content of 22.58%, less fat content of 5% (Nuraeni, 2015), as well as own content sufficient amino acids and minerals complete (Lesmana *et al*., 2022). This matter strengthen fact that whale fish can utilized as product advanced To use increase mark sell it . One of form use of whale fish is process it become fish crackers .

Fish crackers are one of them food frequent light consumed as snacks or food complement for food mainly by the community (Ghazali *et al*., 2021). Fish crackers are made from mixture flour tapioca (starch) with fish meat already mashed and material complement other such as sugar, salt, monosodium glutamate, and water (Neiva *et al*., 2011). Quality good fish crackers can seen from appearance physical and in a way chemistry according to SNI 2713.1: 2009, as well Power flower crackers and power absorb oil on crackers (Zulfahmi *et al.,* 2014) .

Mengare Village is one of villages in the Bungah District already produce Payus fish crackers, However, the quality of the crackers produced was not as expected. The crackers can influenced by quantity protein content (Chudasama *et al*., 2019) as well amount content materials used in making crackers (Kusuma *et al*., 2013). The aim of this research is to find out the correct formulation in the process of making payus fish crackers so as to produce payus fish crackers that comply with standards, namely swelling power, oil absorption capacity, and cracker quality based on the Indonesian National Standard (SNI).

RESEARCH METHODS

Time and place

Study This implemented in the month February – May 2023, which takes place in the Laboratory Faculty of Fish Processing Fisheries and Marine Science, Airlangga University, Chemistry and Analysis Laboratory Faculty Fisheries and Marine Science, Airlangga University, and Laboratory Research and Consulting Industry.

Tools and materials

Equipment used in study making Payus fish crackers This form basin, knife, cutting board, thinwall, refrigerator, freezer, digital scale, cloth calico, tray, chopper, glass measure, cover hand plastic, cover oven hand, ruler, pan steamer, gas stove, aluminum foil, clamp, timer, oven, plastic wrap, plastic clips, deep fryer, spatula, dining tissue, label paper and HVS paper. The tools used For analysis form ruler, digital scale, paper millimeter, moisture analyzer, paper weighing scale, boiling stone, capitalist tablet, cupboard acid, tools destruction Kjeldahl, Erlenmeyer, flask measure, paper filter, oven, cup porcelain, and Soxhlet, reflux, and hotplate.

Materials used in study making Payus fish crackers This form Payus fish meat (*Elops hawaiensis*), flour tapioca, salt, sugar, garlic, water, and cooking oil. Material analysis used is Concentrated H_2SO_4, H_2O_2, H_3BO_3, HCl, distilled water, N-hexane, indicator phenolphthalein (PP), NaOH, CH_3COOH, Luff Schoorl's solution, KI, Na-Thio and starch.

Research Procedure

The procedure for making payus (*Elops hawaiensis*) fish crackers in this study uses references from Kamari and Candra (2017). The initial stage, namely the preparation of raw materials and additional materials. The raw material used is ground Payus fish meat which is then weighed according to the treatment (20, 35 and 50 g). Followed by weighing the additional ingredients in the form of tapioca flour (20, 35, 50, and 70 g), 1 g of finely ground garlic, 1 g of salt, 3.75 g of sugar, and adjusted water. After that, the raw materials and additional materials are mixed in a basin slowly and water is added little by little. Knead the dough until it is evenly mixed, smooth and not sticky. Then the dough is shaped like a *lontong* with dimensions of 3 x 10 cm and placed in a steamer filter which has first been lined with aluminum foil. Next, the mixture is steamed for 30 minutes, then removed and cooled at room temperature for 36 hours. After that, the cracker dough is sliced using a knife that has been smeared with oil with a slice thickness of 2 mm. Then, the raw cracker slices were dried in the oven for 4 hours 30 minutes at a temperature of 50ºC. The crackers are fried using a deep fryer for 20 seconds at 180ºC using 2L oil. Then remove the crackers and drain using a tissue. Tests carried out include swelling power tests, oil absorption tests, water content tests, protein content tests, fat content tests, carbohydrate content tests, and organoleptic tests.

Design Study

Design experiment used in this study is Design Random Complete (RAL) with 4 treatments with 5 repetitions. Treatment used in study This is treatment P0 (control), 0 g payus fish meat and flour tapioca 70 g; treatment P1, 20 g payus fish meat and flour tapioca 50 g; treatment P2, 35 g payus fish meat and flour tapioca 35 g; and treatment P3, 50 g payus fish meat and flour tapioca 20 g.

Research Parameters

Main parameters in this study are ability to expand and power absorb oil in payus fish crackers. Supporting parameters in this study are mark organoleptic fish crackers in the form of appearance, odor, taste, texture, and mold and value proximate Payus fish crackers, which include water content, protein content, fat content and carbohydrates.

RESULTS

Based on Table 1, results calculation statistics (ANOVA) shows that use breast fish meat influential real to Power flower Payus fish crackers were produced ($p<0.05$). Power flower Payus fish crackers highest found in treatment P2, namely 239.00%.

Table 1. Power Flowers and Power Absorb Oil Payus Fish Crackers

Treatment	Power Flowers (%) (Mean ± SD)	Power Absorb Oil (%) (Mean ± SD)
P0	c	$28.14^{c} \pm 0.75$
P1	$229.14^{b} \pm 0.47$	$32.75^{b} \pm 1.01$
P2	$239.00^{a} \pm 0.36$	$37.75^{a} \pm 0.43$
P3	$95.35^{d} \pm 0.11$	$23.76^{d} \pm 0.79$

Description : P0 (payus fish meat 0 g, flour tapioca 70 g), P1 (payus fish meat 20 g, flour tapioca 50 g), P2 (payus fish meat 35 g, flour tapioca 35 g), and P3 (payus fish meat 50 g, flour tapioca 20 g) notation

indicated use letter *superscript* different in the same column show that exists real difference between treatment ($p < 0.05$).

Based on Table 1, results calculation statistics (ANOVA) shows that use breastfish meat influential real to Power absorb oil Payus fish crackers were produced ($p<0.05$). Power absorb oil in payus fish crackers highest found in treatment P2, namely 37.75%.

Table 2. Chemical Properties of Payus Fish Crackers

Parameter (Mean ± SD)	Treatment				SNI 01.2713: 2009
	P0	P1	P2	P3	
Water content	2.50 ^{a} ± 0.48	2.95 ^{ab} ± 0.91	4.29 ^{b} ± 1.40	1.49 ^{a} ± 0.34	Max . 12%
Protein Content	2.26 ^{c} ± 0.12	13.90 ^{b} ± 1.03	17.92 ^{a} ± 0.12	18.78 ^{a} ± 0.25	Min. 5%
Fat level	1.11 ^{c} ± 0.07	2.35 ^{b} ± 0.07	2.47 ^{a} ± 0.25	2.48 ^{a} ± 0.02	-
Carbohydrate Levels	66.58 ^{d} ± 0.70	57.15 ^{c} ± 1.01	54.11 ^{b} ± 0.72	51.60 ^{a} ± 0.61	-

Description : P0 (payus fish meat 0 g, flour tapioca 70 g), P1 (payus fish meat 20 g, flour tapioca 50 g), P2 (payus fish meat 35 g, flour tapioca 35 g), and P3 (payus fish meat 50 g, flour tapioca 20 g) notation indicated use letter *superscript* different in the same column show that exists real difference between treatment ($p < 0.05$).

The calculation results statistics (ANOVA) shows that use payus meat influential real to characteristic chemistry Payus fish crackers were produced ($p<0.05$). Based on results research, nature chemistry fish crackers were highest in treatment P3.

Table 3. Organoleptic Value Payus Fish Crackers

Parameter	Treatment ± SD			
	P0	P1	P2	P3
Appearance	7.96 ^{ab} ± 1.02	8.07 ^{b} ± 0.75	8.40 ^{a} ± 0.72	5.95 ^{c} ± 1.79
Smell	6.63 ^{b} ± 1.11	7.67 ^{a} ± 0.87	8.19 ^{a} ± 0.63	7.96 ^{a} ± 0.95
Flavor	6.72 ^{b} ± 1.09	7.69 ^{a} ± 0.97	7.94 ^{a} ± 0.80	7.84 ^{a} ± 0.88
Texture	6.44 ^{b} ± 1.80	7.20 ^{a} ± 1.65	7.74 ^{a} ± 1.21	7.57 ^{a} ± 1.15

Description : P0 (payus fish meat 0 g, flour tapioca 70 g), P1 (payus fish meat 20 g, flour tapioca 50 g), P2 (payus fish meat 35 g, flour tapioca 35 g), and P3 (payus fish meat 50 g, flour tapioca 20 g) notation indicated use letter *superscript* different on the same line show that exists real difference between treatment ($p < 0.05$).

Organoleptic test results in a way statistics processed using the Kruskal Wallis test shows that use payus meat influential real to each organoleptic parameter For every treatment. Treatment with mark organoleptic best found in treatment P2.

DISCUSSION

Power flower is ability from shrimp crisp For experience increase size from its original state , p This influenced by quantity flour tapioca is used in making shrimp crisp . Flour tapioca own content starch with rate amylopectin more tall compared to with amylose . Amylopectin own branched structure so that difficult For absorbs water, however can keep water out so that can improve the development process starch in dough . According to Kusuma et al . (2013) content high amylopectin can increase Power flowers on crackers Because amylopectin can binds water during the gelatinization process .

Treatment P2 (payus fish meat 35 g, flour tapioca 35 g) has ability to expand highest compared to with other treatments, namely 238.81%. This matter allegedly amount flour tapioca and breastfish meat balanced, namely 1:1 so allows water to be released by proteins at times gelanitination Still can retained by amylopectin and produces Power flower tall crackers. Research result This in line with research by Nurul *et al.* (2009), which reveals that comparison fish meat with flour tapioca 1:1 yield fish crackers with Power the best flowers.

Factor others who can influence Power flower shrimp crisp is homogeneity dough. Dough mixed use hand until dough become smooth . Smooth dough be marked with texture the dough is ready No sticky, no There is lump others, texture become more soft, slippery and shiny and things This signify that dough Already mixed evenly. Faridah and Simon (2014) stated homogeneous dough be marked with mixed dough in a way equally so that particle its compiler No Can differentiated One each other. Dough must mixed until homogeneous until possible No There is lump flour or bubble air in the dough . According to (Sa'diyah & Kristiastuti, 2014) there is not enough dough homogeneous can result a decrease in the gelatinization process that causes decreasing Power flowers on crackers. This matter in line with research by Ibrahim *et al*. (2003), that there is other factors can One of them is influencing the expansion volume of fish crackers is homogeneity dough.

Power absorb oil is ability from shrimp crisp in absorb oil at the moment fried. This matter can happen consequence reaction between amylopectin with forming proteins the pores on the crackers at the time frying so that oil can enter to in crackers and make shrimp crisp A little more heavy. This matter can seen from comparison heavy Payus fish crackers raw with heavy shrimp crisp payus ripe. According to Astuti (2017) absorbed oil in shrimp crisp give increase weight on the crackers and make shrimp crisp become ripe.

Power absorb oil on crackers in line with Power flower shrimp crisp. This matter can Look at the power data absorb comparable oil straight with power data flower fish crackers. This matter allegedly at the time frying, fish crackers expand and form cavity air consequence water release and pressure steam so that oil can absorbed by the crackers. Research result in line with Linardi *et al*. (2013), that enhancement Power flower shrimp crisp can increase Power absorb oil on crackers.

Based on research that has been done , obtained water content of payus fish crackers amounting to 1.49 – 4.29%. The water content value can be influenced by quantity flour tapioca and the amount of fish used . Flour tapioca own ability For binds water during the gelatinization process so that if flour added tapioca the more Lots so The water content obtained also increases tall. According to Aristawati et al. (2013), starch own ability For binds water because own amount group very large hydroxyl in molecule starch so that the more big rate added starch then the water is absorbed the more much and improve internal water content product. Beside that, deep breast fish meat there are muscle proteins that have properties functional in binds and holds water so addition fish meat can increase water content. Huff-Lonergan and Lonergan (2005) explain that fish meat can increase water content due to fish meat has muscle protein content, ie actomyosin in myofibrils that have characteristic functional For binds and holds water. Portion largest deep water meat held in the myofibril, between the myofibril with sarcolemma, between cell muscle with group cell muscle.

Test results for the average value of internal water content Payus fish crackers Already fulfil condition quality SNI 2713.1: 2009, namely internal water content maximum fish crackers is 12%. Internal water content Payus fish crackers are also rated more low compared to with water content of crackers commercial according to Huda *et al* . (2010), namely 9.37 – 13.83%.

Based on research that has been done, obtained protein content in payus fish crackers is in the range of 2.26 – 18.78%. Protein content in payus fish crackers generated from addition of whale fish in dough. Payus fish meat own adequate protein levels high , namely 22.58% which can used as source of protein in payus fish crackers and produce Payus fish crackers with high protein content. Zulfahmi *et al*. (2014), also revealed increase fish meat with high protein value can increase protein content in the fish crackers produced.

Protein content in payus fish crackers Already fulfil condition protein content in cooked fish crackers determined by SNI 01.2713: 2009, namely a minimum of 5% and yield study

more tall from commercial fish crackers according to research by Huda *et al* . (2010) which is in the range of 5.53 – 16.17%.

Protein content in the product can determine color, aroma, and taste of Payus fish crackers. Based on Table 3, treatment P3 has mark the lowest appearance, namely 5.95 with specification whitish cream color dull. This matter caused by the reaction that occurs between proteins from fish meat with sugar at times frying and produces melanoidin pigment which is color chocolate. However, additions fish meat too Lots produce high protein content. High protein content can make shrimp crisp more fast ripe so that produce color shrimp crisp more chocolate compared to with treatment other. Color This No can accepted by the panelists. This matter in line with study Laiya *et al.* (2014), that addition fish meat contributes in change color yellow brownish color on the fish crackers produced at the time frying pan. Addition increasingly fish meat Lots cause shrimp crisp more brown and not liked by the panelists.

Based on Table 3, values the best aroma organoleptic found in treatment P2, namely 8.19. The aroma of Payus fish crackers allegedly generated from fish meat. During the cooking process, proteins break down become amino acids in particular glutamic acid can gives a delicious taste and aroma to fish crackers. This matter show that The protein content in fish crackers has an effect of the aroma produced. This matter in line with study Zulfahmi *et al*. (2014), that mark organoleptic smell fish crackers increased along with addition fish meat in batter. However , in study This P3 treatment with addition more payus meat tall compared to treatment P2 received mark organoleptic more smell low. This matter allegedly addition high payus meat can make more fish crackers fast ripe as well as produce impressive smell scorched so that Power accept panelist reduce. This matter in line with study Rahardjo & Haryadi (1997), that the more Lots added during manufacture fish crackers can make fish crackers have more color chocolate and have impressive taste scorched.

Based on Table 3, values highest organoleptic taste found in treatment P2, namely 7.94. The taste of fish crackers is produced from use fish meat, salt, sugar and onions white. Payus fish meat own various type amino acids in the protein, with rate highest in lysine and alanine. Content lysine and alanine can produces a delicious taste in food . According to Sobri *et al*. (2017), content Alanine in fish flesh produces a sweet and nutritious taste lysine according to Winarno (2008) can produces a delicious taste in food. Besides So , adding salt works as gives a salty taste to fish crackers. This matter because element main The components of salt are sodium and chlorine which is produced from the process of evaporation and crystallization of sea water (Yansa *et al*., 2015). Adding sugar to cooking produces a sweet taste. Sweetness from sugar obtained from metabolism carbohydrates that produce glucose (Nisak & Huda, 2023). Onion white added to in making Fish crackers also work For add taste because own content organosulfur compounds in the form of allicin . According to Moulia *et al*. (2018), onions white own content compound allicin which appeared at the time onion white smoothed. Besides own characteristic antibacterial, compound this is also responsible answer for the distinctive taste of onions white .

Different with organoleptic test results, the fat content test was obtained The highest fat content in Payus fish crackers P3 treatment, ie of 2.48%. His height fat content in P3 treatment can caused Because use more payus meat tall compared to with other treatments, namely 50 g. Different with treatment P0 (control) with No There is addition breast fish meat produce the lowest fat content, namely 1.11%. Viewed from Table 2, fat content of breast fish crackers for each treatment increase along with addition fish meat . This matter show that use breast fish meat can increase Fat content in fish crackers . Research result This in line with study Zulfahmi *et al*. (2014), that The fat content in fish crackers increases in line with amount fish meat used.

Based on results research that has been done, rate carbohydrate Payus fish crackers is in the range of 51.60 – 66.58% which is still equivalent with fish content in crackers commercial according to Huda *et al* . (2010), namely 50-80%. Carbohydrate content in crackers influenced

by quantity flour tapioca used. This matter because flour tapioca own content high carbohydrates, namely 88.2 %. Carbohydrate content in payus fish crackers highest found in treatment P0, namely 66.58%. This matter because treatment P0 is treatment with 70 g flour tapioca without addition payus meat . which was high in the P0 treatment . Different with treatment others who can seen in Table 8 which uses addition breast fish meat as well as subtraction amount flour tapioca produce rate more carbohydrates A little . Research result This in line with study Zulfahmi *et al*. (2014), viz rate the highest carbohydrates in fish crackers produced by treatment P0 (control) as well decline rate carbohydrates also go hand in hand with addition fish meat in batter shrimp crisp.

Research result utilization breast fish meat as material base in making fish crackers seen from characteristic physical, nature chemistry, and organoleptics show that treatment P2 (35 g breastfish, flour tapioca 35 g) yield treatment Payus fish crackers are the best and can be accepted by the panelists.

CONCLUSION

Based on results research conducted about utilization Payus fish meat (*Elops hawaiensis*) as material base making fish crackers can concluded that whale fish can utilized as material base in making fish crackers with optimal number of whale fish for making Payus fish crackers is 35 g which yields ability to expand and power absorb oil on crackers better compared to with commercial fish crackers, as well fulfil condition quality fish crackers based on Indonesian National Standard (SNI).

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