

Diversification, Organoleptic and Chemical Quality Characteristics of Processed Products Based on Thorn Fish (*Hexanematichthys sagor*) Smoke

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ABSTRACT

The potential of Rupert Island's marine natural resources can be seen from the diversity of its marine and mangrove ecosystems. This coastal area has natural resource potential, both marine products and no less important is its marine ecotourism area. The marine tourism area is found at Pesona Beach, Lampin Beach, Ketapang Beach, Makeruh Beach, and Putri Sembilan Beach which have an important role in increasing regional income. The aim of the research is to increase the potential of processed fishery products as souvenirs and tourism. The research method is an experiment using a completely randomized design, with treatments MS0 (smoked fish control), MS1 (smoked fish rendang) and MS2 (smoked fish rendang) and MS3 (Flossed fish). smoke) repeated 3 times. The parameters analyzed are organoleptic (appearance, texture, aroma, taste). The results of the research showed that the best treatment was MS2 (Smoked fish sorondeng) which was liked by the panelists which had the characteristics of a bright yellow color, the aroma of burnt coconut, the texture of mersik was not hard and crunchy, and the taste was savory, with a taste score of 8.6, aroma 8.4, appearance 8.8, texture 8.5. This product has the characteristics of a bright brownish yellow color, a non-fishy aroma, a smooth texture and a very savory taste (umami). From the results of the threshold test on functional flavor powder, the threshold value was obtained, namely at a concentration of 9% with a taste value of 8.6, aroma 8.4, appearance 8.8, texture 8.5. This product has the characteristics of a bright yellowish white color, a non-fishy aroma, a smooth texture and a very savory taste (umami)

Keywords: Diversification, Healthy, Ecowisata, Nutrition, Profile.

INTRODUCTION

Rupert Island which is located in Bengkalis Regency is an archipelago and has a coastline reaching 11 kilometers and a width of 30 meters, the geographical location of Rupert Island is also very strategic and is around the coast of the Malacca Strait and is traversed by the international shipping route and is also included in one of the Indonesian programs Malaysia Singapore Growth Triangle (IMSGT) and Indonesia Malaysia Thailand Growth Triangle (IMT-GT). The potential of Rupert Island of the Natural Resources can be seen from the diversity of marine ecosystems and its mangroves. This coastal area has the potential of natural resources both marine products. Denasti Wisata Baharnya is found on Pesona Beach, Lampin Beach, Ketapang Beach, Makeruh Beach, and Putri Sembilan Beach which has an important role in increasing regional income. Specifically Rupert and North Rupert sub -districts have enormous marine tourism potential in Riau and even national provinces¹. The potential of natural resources and marine fisheries commodities is a marine tourist attraction that can be developed into a superior product that is competitive².

As a regional area, of course Rupert Island also has a fairly large marine fisheries potential, especially the Special Capture Fisheries of the Rupert and North Rupert in 2019, its production reached 6126.11 tons, in 2020 (7145.12 tons), and in 2021 it reached

8696, 4 tons³. Fisheries commodities that have high potential to be further developed are fish -based processed products as a more highly competitive product, this product has the potential for MSMEs to become the Rupert Island marine tourism souvenir business. Then innovation and technology are needed for fishery products into the best quality processed fish and culinary products as is known that fishery products have advantages, especially protein content, 68%BB, calcium and phosphorus are 364 mg and 258 mg, this is very good for growth⁴.

Seeing the development of the Rupert Island tourism industry sector, it is hoped that the emergence of industrial business opportunities, one of which is the souvenir business. With this potential, Rupert Island has advantages in fishery and marine tourism products, this maritime wealth is undoubtedly the beauty and uniqueness, especially in the Denasty of Maritime Tourism on Pesona Beach, Lampin Beach, Ketapang Beach, Makeruh Beach, and Putri Sembilan Beach which has a distinctive beauty each. But the Rupert Island Denasty Tourism has not been maximally developed into a superior product of competitiveness. Factors that support these developments include the availability of souvenirs and culinary based on fishery products to attract tourists, but this is still the lack of fishery products that are used as souvenirs and culinary-culinary⁵.

The problems faced today are that processed fishery commodities are still limited, namely salted fish and fish crackers, even though fish production is high

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enough, therefore it is necessary Aesthetics and dancing to be made into souvenirs, a good appearance is needed by packaging it with environmentally friendly packaging, in order to maintain cleanliness and environmental environment. Environmentally friendly packaging is a way to overcome the problem of environmental pollution using this packaging is considered effective to reduce waste that is difficult to decompose, in general environmentally friendly packaging are packaging that is made using natural materials that are easily decomposed, besides this product can be founded Repeat and not harmful to the environment and human health, to achieve this requires appropriate innovation and technology in order to obtain processed fish-based processed products ⁶.

Innovation and technology are needed for increasing the added value of fishery products to support marine tourism, therefore it can be done in the form of processed products which also open business opportunities for both MSMEs and the local community. This study has an important urgency, namely: (a) for resilience and independence of food based on fisheries resources and marine ecotourism maximally in helping the district, provincial and national governments; (b) Increasing the economic value and welfare of the fishery community and tourism industry through the diveiance and fortification of fishery products into derivative products; (c) Assisting government programs in Gemarikan and a thousand products (D) helping in reducing environmental pollution by plastic waste considering that Indonesia is currently one of the countries contributing plastic waste to the third largest sea in the world after India and China ⁷.

Furthermore, various research results show that the manufacture of processed fishery products can increase diversification and consumer interest in the products produced ⁸, and become nutritious food products as superior products of the local wisdom of the coastal area of Riau Province. Based on these thoughts the researcher views research on technology innovation and environmentally friendly packaging design of fish -based processed products as the potential for marine tourism souvenirs in Rupert Island, Bengkalis Regency, Riau Province. Research aims to determine diversification products and organoleptic quality characteristics, chemistry of smoked fish -based processed products as a marine tourism souvenir of Rupert Island Regency, Riau Province. The benefits of this research are for food resilience and independence based on fisheries resources, increasing the economic value and welfare of the fisheries community, assisting government programs in the diversity of smoked fish products.

MATERIALS AND METHODS

Raw and Tools

This research material includes smoked thorns obtained from UMKM Rupert Bengkalis Regency, and ingredients for product processing and analytical ingredients for proximate and amino acid content.

Equipment needed in this study includes processing equipment, namely: sterofom containers, coolbox, basin, tray, cutting board, knives, presto devices, gas stove devices, booths, grilling ovens, molds and packaging containers for products. Other equipment is related to organoleptic test equipment, peroxima analysis equipment (water content, protein, fat, ash, carbohydrates) and amino acid content.

Research methods

The experimental method using a complete random design, with the treatment of MS0 (smoked fish control), MS1 (smoked fish rendang) and MS2 (serondeng smoked fish) and MS3 (shredded smoked fish) repeated 3 times. The parameters that are analyzed are organoleptic quality (appearance, texture, aroma, taste), proximates (water content, ash content, protein content, fat content, and carbohydrate levels, and amino acid content.

The process in research and analysis procedures includes:

1. The procedure for processing smoked fish products is smoked fish rendang, smoked fish seondeng, shredded smoked fish with formulation modification ⁹.
2. Procedures In the quality characteristics of fish -based processed products, the data obtained are analyzed against organoleptic quality (SNI) ¹⁰, physical properties, chemicals (water, protein, fat, ash, and carbohydrate).

Procedure Analyze

Parameter

The parameters used in this study include observations, organoleptic quality characteristics, proximate levels and amino acid content of the product.

Data analyze

The data obtained are then analyzed in accordance with the objectives of each research, in general data analysis consists of: Analysis of Variance (ANOVA) according to procedure ¹¹ and to determine differences between treatments are analyzed by further tests.

RESULT

Organoleptic

Organoleptic assessment is carried out using 25 panelists somewhat trained. In this quality test the panelists are asked to provide an assessment of which includes appearance, texture, aroma and taste, for the quality test obtained as follows.

In Table 1 it can be seen that the highest average organoleptic value is found in the rendang of smoked thorns (MS3) 8.37 with the characteristics of blackish brown color, rendang aroma, the lowest value is in the treatment of intact smoked fish (M0) which is 6.50. with dull, less attractive, hard testing characteristics. Variance analysis results, it can be explained that the diversification that is carried out has a significant effect on organoleptic values, where Fcount (512.69) > Ftable (4.07) at a 95%confidence level, based on results Further Test Different Honest Differences (BNJ) shows that the organoleptic value of smoke thorns that is diversified into rendang, seondeng and shredded are at a 95%confidence level. Based on the results of the study, it can be determined that the best treatment is found in M2 (rendang fish thorns) and in M3 (shredded smoke thorns).

Proximate

The results of the research that have been carried out obtained organoleptic values, proximate for (protein content, water, fat, ash and carbohydrates) and amino acid content in processed products based on smoke as souvenirs of marine tourism souvenirs in Rupert Island, Bengkalis Regency, Riau Province. The results of the analysis of these parameters are explained in Table 2.

There is Table 2, it can be seen that the proximate value of each product resulting from the diversified smoke thorn is different, in terms of the highest protein content found in the smoke thorn and the lowest is found in the intact smoke thorns (M0), the diversification aimed at meet the needs of animal protein,. The results of different diversification of smoke thorns show that the value of protein levels has increased. The value of protein content is getting higher with the variety of spices used in product formulations. Furthermore, according to ¹² protein is a major component in healthy food ingredients affecting the texture, appearance and taste in food.

Table 1. Average Organoleptic Value of Smoked Thorn fish diversification products.

Treatments	Organoleptic			Appearance
	Taste	Odor	texture	
MS0	6.04 ^a	6.31 ^a	6.76 ^a	6.87 ^a
MS1	8.20 ^c	8.34 ^c	8.16 ^d	8.10 ^c
MS2	7.12 ^b	7.82 ^b	7.74 ^b	7.81 ^b
MS3	8.56 ^d	8.27 ^c	8.32 ^d	8.33 ^d

Description: MS0 (smoke thorn), MS1 (rendang fish spines), MS2 (serondeng) and MS3 (Abon Fish of Smoke Thorns).

Different notation show significantly ($p < 0.05$)

Table 2. The average value of proximatic processed products based on smoked fish.

Treatments	Composition (%)				
	Proteins	Mositure	Fat	Ash	Carbohydrate
MS0	20.70±0.01 ^b	18.15±0.02 ^d	10.80±0.01 ^f	3.70±0.01 ^b	5.65±0.02 ^c
MS1	22.20±0.01 ^c	15.70±0.01 ^c	17.47±0.01 ^c	10.90±0.01 ^d	5.60±0.03 ^d
MS2	28.99±0.01 ^a	15.50±0.01 ^f	20.30±0.01 ^e	11.20±0.02 ^c	3.91±0.02 ^f
MS3	23.40±0.01 ^f	13.20±0.02 ^e	17.80±0.02 ^a	11.12±0.02 ^a	9.48±0.03 ^a

Description: MS0 (smoked fish control), MS1 (smoked fish rendang) and MS2 (sorendeng smoked fish) and MS3 (shredded smoked fish). Different notation show significantly ($p < 0.05$).

Table 3. Content of Amino Acids Processed Products Based on Smoke .

No	Amino Acids	MS0	MS1	S2	MS3
		%	%	%	%
1	Aspartate acids	4.73	2.89	0.85	4.3
2	Glutamate acids	8.73	5.19	1.82	7.84
3	Serine	2.33	1.15	0.42	1.67
4	Histidine	2.34	0.93	0.59	1.28
5	Glisine	6.61	1.99	0.59	2.58
6	Treonine	2.57	1.29	0.44	1.94
7	Arginine	4.56	2.38	0.95	3.15
8	Alanine	4.16	1.79	0.54	2.59
9	Tirosine	1.23	0.76	0.18	1.17
10	Metionine	0.89	0.67	0.09	0.94
11	Valine	2.55	1.42	0.5	2.13
12	Penilalanine	2.17	1.17	0.38	1.67
13	I-Leuosine	2.25	1.29	0.43	1.99
14	Leusine	3.93	2.25	0.65	3.35
15	Lisine	4.35	2.38	0.55	3.34

Profil Amino acids

The result showed that amino acid content of smoked thorns (M0) products is lower than the diversification products both based on the amount for each type and total. The cause of this difference is due to the time during the fumigation process, biological protein decomposition occurs into simpler compounds, namely amino acids in a controlled state and the longer the smoking process continues, there will be a reduction in the amount of amino acids (Table 3). Differences in the content of amino acids in products can occur due to differences in processing, catching seasons and stages in the life cycle of organisms. The results of research on the product, are known to be 15 types of amino acids, consisting of 5 types of non essential amino acids, namely aspartic acid, glutamic acid, serine, glycine, tyrosine and 10 types of essential amino acids namely histidine, arginine, treonine, valine, alanine, methionine, isoleusine, leusine, phenylalanine and lysine. In accordance with the results of research ¹², that most of the amino acids are detected in fisheries commodities.

According to ¹², that the bioactive peptide of fish plays an important role in the development of food products that are rich in protein, but

in its application there are several obstacles, because the bitter taste caused by the peptide formation has a low molecular weight, which consists of 2-23 acids Amino with a dominant 500-3000 molecular weight consisting of composed hydrophobic amino acids. According to ¹³, that amino acids are extractive compounds with low molecular heavy water soluble and are the main flavor in fishery products. Also explained by ^{14,15} that free amino acids are nonvolatile compounds that provide flavor to goldfish and further explained, that flavor is a complex component, because it can be in the form of non-volatile extractive components containing nitrogen such as free amino acids which will play a role in giving flavors. According to ¹⁶, that every essential amino acid has a special function, namely as a cell forming and can also be useful as a provider of flavors ¹⁷.

DISCUSSION

According to ¹⁸, organoleptic values play a very important role in the presentation of a food product, especially food . In the form of an organoleptic parameter that is important because it is the first factor seen by consumers when they see a product and generally consumers tend to see a product that has an intact, non -disabled, brilliant color. Rendang and shredded products of smoke thorns have a high organoleptic value because of their distinctive color and aroma, this is in line with the research of ^{19,20} which states that, increasing the density of the color of the products produced due to the Maillard reaction. Maillard or browning reactions occur due to a reaction between reducing sugar and the amen group free of amino acids or protein. This reaction occurs a lot in food products that are usually consuming everyday. Maillard reactions in food can function to produce flavor and aroma.

Texture is one of the factors that influence consumer choices for a food product. The texture produced in each product is different and this is caused by a different lower process because this is very dependent on the physical characteristics of the product, according to ^{21,22}, the water content is closely related to texture. The lower the water content, the texture produced will be harder. The texture of food products is very dependent on the ingredients used, especially the protein content. According to ¹², it states that the smell/aroma is one component of taste in food. With the aroma or odor, it can be seen the taste of these foods. The aroma has its own charm, therefore in the food industry, a test of aroma is considered important because it quickly responds to the products produced ¹¹. According to ¹⁸, the aroma of food products can be influenced by the materials used and their processing.

The taste is the second factor that determines the taste of food after the appearance of the food itself. According to ^{23,24}, taste is influenced by several factors, namely chemical compounds, temperature, concentration and interaction with other flavor components. Based on the results of the analysis of variance with the hydrolysis of rebon shrimp hydrolysis is very significant in the value of the taste, this is due to the differences in different fans. The higher the product formulation in the processing of rendang, seondeng and shredded smoke thorns. This is in line with ¹³, which says that changes in the taste of food are caused by the decomposition of protein, fat, carbohydrates through chemical processes that occur due to enzymatic reactions, and microbial activity and increased water content.

The water content of the product is in the range below the SNI requirement (max 8%), it can be said that the water content of dry sago noodles with different shrimp protein hydrolyzate fortification meets the SNI quality requirements of dry sago noodles. This ash content is caused by the addition of compounds that can form salt during processing. The addition of NaOH and HCl compounds to adjust the optimum pH condition causes the formation of mineral salts. According ²⁵, stated that the mixing of acid and alkaline compounds in a protein hydrolyzate solution will cause the formation of salt compounds, so as to increase ash levels in protein hydrolysis and this element makes ash levels in sago noodle products increase.

Fat is one of the important elements in food that functions as a source of energy. Fat content should be low so that it is not easy to occur oxidation so that it has a long durability. The fat content in the product is an important component. Low fat spines with low fat content generally have a more stable and durable quality value when compared to products that have high fat content^{15,26}.

According to^{18,19}, that the discharge of water from food causes protein to be more concentrated compared to others so that the amino acid content is better. That is, such as histidine, treonine, arginine, methionine, valns, phenylalanine, isoleusin, leusin, and lysine and lysine and lysine glutamic acid. Glutamic acid is a non -essential amino acid contained in processed rebon shrimp products, in a high enough amount (Table 3), the use of amino acids can be seen from the characteristics of the taste, some amino acids have a sweet taste, bitter taste, and some have no taste. Glycine, proline, alanine, hydroxyproline, valine and serine have a sweet taste. Isoleusine and arginine have a bitter taste. Glutamate has a savory taste while leusin does not have a taste¹¹.

CONCLUSION

Based on the results of the study conducted, it can be concluded that the diversion of smoked thorn fish products namely rendang, seondeng and shredded affect the organoleptic value (appearance, aroma, taste), proximate levels (water content, ash content, fat content, protein content) and the composition of the amino acid. Based on organoleptic values the best treatment is the treatment of M3 sago noodles (rendang of smoke thorns) includes appearance (brownish yellow, attractive, intact, crispy), texture (dry, compact), specific aroma, very tasty and proxymatic value is protein 23, 40%, M water content is 13.20%, ash content 11.12%, fat content of 17.80% and total amino acids are 39.94%.

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