

Characterization of Chili Sauce Smoked Tuna Fish (Thannus Sp.)

Nurlaeli Fattah^{1*}, Andi Santi², Agussalim Matti³

State Agricultural Polytechnic of Pangkajene Islands, Pangkep, Indonesia

email: nurlaelifattah@polipangkep.ac.id

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Abstract

The purpose of this study was to determine the shelf life of smoked fish chili sauce and the characterization of smoked tuna chili sauce. Proximate analysis data are presented in the form of tables and bar charts. Quantitative data generated from organoleptic testing were processed using Microsoft Excel and SPSS. Organoleptic test data is presented in the form of a bar chart. Quantitative data from the results of the TPC (Total Plate Count) test were processed using Microsoft Excel and presented in graphical form. Data analysis was carried out descriptively. From the process of making smoked tuna chili sauce, the results are obtained; Guava wood which is used in the smoking process as a source of smoke in tuna, affects the texture, aroma and taste, the characteristics of hard guava wood give a longer burning effect so that it affects the water content of smoked tuna, smoked tuna chili sauce from wood sources different influences on the levels of proximate composition in smoked tuna chili sauce.

Keywords: Chili Sauce, Smoked Fish, Tuna Fish

Introduction

The fisheries sub-sector has an important role as a protein contributor for the Indonesian people. The need for protein in Indonesian territory has not been fulfilled because the availability of fish per capita has not been distributed evenly. Processing can make fish last longer and allow it to be distributed from production centers to consumer centers. Processing is one of the steps to increase product durability so that the distribution chain is getting longer.

Fish Processing Units (UPI) in Indonesia in 2016 totaled 61,603 units. The number of processing units that produce smoked fish is 69 units and some are frozen fish, fresh fish, canned fish and others. (DKP 2017). The high level of production of traditional processed products because modern processing requires requirements that are difficult to fulfill by small-scale fisheries, namely the supply of high-quality raw materials in uniform sizes, in sufficient quantities according to industrial capacity. This condition illustrates that traditional processing still has prospects to be developed.

The need for food in the modern era is changing natural ingredients into processed food products that can be served quickly but are still safe and nutritious. The trend of increasing demand for ready-to-eat processed by consumers is a prospect for the development of processed fishery products (Talib 2018).

Smoked fish is one of the traditional processed fishery products that is very popular with the people of Indonesia. Traditional smoking business is a business that is often carried out by the community, using simple equipment. Traditional preparations are unique compared to other preparations because of their unique nature and processing method. In addition, fish that are processed by smoking have a distinctive taste. The relatively good developments in the processing of smoked fish indicate that there are profitable opportunities if smoked fish is made into instant processed products while still paying attention to its nutritional quality. Food diversity or

diversification food is something that needs to be done to protect Tuna fish is one of the mainstay commodities of fisheries in South Sulawesi.

Based on data for 2017, the total production of tuna in South Sulawesi reached 7.976 tons. The average volume of tuna produced per fishing boat at Tuna Production locations, namely Makassar 0.086 tons, Barru 0.097 tons, Bulukumba 0.246 tons, Sinjai 0.619 tons, Bone 0.520 tons, Luwu 0.523 tons (Sudirman, et al., 2020). With the high production of tuna in South Sulawesi, it can support the "GEMARIKAN (Gemar to Promote Eating Fish)" program issued by the Ministry of Maritime Affairs and Fisheries.

GEMARIKAN (Fond of Promoting Eating Fish) as a form of program to improve nutrition from an early age. (KKP, 2018). Fish can be processed to improve the taste and quality. Fish can be processed into smoked fish.

Smoked fish is a processed fish product that is popular with the public (Dotulong et al, 2018). Smoked fish can be processed into chili sauce. The addition of chili sauce aims to improve the taste and quality of smoked fish. Good developments in the processing of smoked tuna indicate the potential to be used as an instant processed product that has high nutritional quality.

One way to process smoked fish into food products that can meet today's instant food needs is to make it into chili sauce. Chili sauce chili is a type of seasoning that is widely consumed. Chili sauce is generally known as a spicy sauce made from chili which is crushed so that it contains chili juice and added other ingredients such as salt or other fillings. Chili sauce has flavors that vary according to the level of spiciness and the additional ingredients in it. Smoked tuna fish chili sauce is a product that can last a long time if it is produced properly. Besides being able to provide an alternative choice of food availability, it can also contribute to meeting the protein needs of fish.

Research Method

This research will be carried out from August to November 2020 at the Fisheries Product Processing Workshop of the Pangkep State Agricultural Polytechnic and Testing will be carried out at the Pangkep State Agricultural Polytechnic and the Biochemistry laboratory of Unhas Makassar.

The materials used to make smoked fish are tuna, salt, coconut shells, bamboo wood, and dried guava wood. The ingredients used to make smoked fish chili sauce are smoked tuna, large chili, curly chili, small chili, onion, garlic, salt, tomato, sugar, oil.

Organoleptic testing (hedonic test) involved 30 panelists with score sheet aids according to SNI 01-2346-2011. Research consists of 2 stages, namely; 1. Manufacture of smoked tuna; 2. Making Chili Sauce Tuna Fish.

1. Making Smoked Tuna

The production of smoked tuna is carried out in Sinjai Regency, using raw materials for tuna originating from fish canning shops in Sinjai Regency. The size of the Tuna used is 3 kg – 7 kg/head. Tuna fish cut into pieces, gutted, cleaned, and soaked in salt water 15 minutes, drained, laid out on the grates. Then furnace 1 (40 cm) is smoked at 60 °C – 50 °C for 6 hours.

In the manufacture of smoked tuna there are 3 types of wood materials used namely

- a. Coconut shell and coconut belt
- b. Bamboo

c. Guava wood

The results of the tuna smoking process will be used as smoked tuna chili sauce

2. Making Smoked Fish Chili Sauce (Supit et al, 2015)

Smoked tuna fish chili sauce is made in 5 stages. The first stage is Washing. The formulation of the ingredients in the chili sauce are large red chilies as much as 39.21%, bird's eye chilies 3.92%, shallots 9.80%, garlic 3.92%, tomatoes 19.60%, sugar 2.35%, salt 1.56% and oil 19.60% in running water.

The second stage is grinding all the spices that have been washed with the specified spice weight formulation until smooth ± 7 minutes. The third stage is sautéing the blended spices in a cauldron that has been filled with palm oil until the color becomes dark red or until chili sauce for ± 30 minutes. The fourth stage is separating the smoked fish meat and bones and mixing the smoked fish meat according to the treatment, namely (1) smoked fish from coconut shells (2). Smoked fish from burning bamboo wood (3). Smoked fish from Guava wood. Making tuna chili sauce is done differently for each Smoked Tuna, which is different from the type of wood material used, with details:

- a. Chili sauce Tuna fish from Smoked Tuna made from coconut shell wood and coconut belt
- b. Chili sauce Tuna from Tuna Asasa from Bamboo wood
- c. Chili sauce tuna made from smoked tuna made from guava wood

The treatment process was carried out with 2 repetitions

The parameters observed in the proximate test were moisture content, ash content, protein content, fat content, carbohydrate content and ash content and TPC (Total Plate Count). Organoleptic/sensory testing is a way of testing using the human senses to assess product quality which includes quality specifications for appearance, smell, taste, and consistency/texture as well as several other factors needed to assess the product. Proximate analysis data are presented in the form of tables and bar charts.

Quantitative data generated from organoleptic testing were processed using Microsoft Excel and SPSS. Organoleptic test data is presented in the form of a bar chart. Quantitative data from the results of the TPC (Total Plate Count) test were processed using Microsoft Excel and presented in graphical form. Data analysis was carried out descriptively.

Results and Discussion

The smoking process can stop the activity of spoilage microbes and damaging enzymes in fish meat so that the process of fish damage can be prevented. This is because smoke contains compounds that have preserving properties, such as Penol compounds, formaldehyde and others that are bactericidal (kill bacteria). In principle, the fumigation technique is the process of drawing water by various compounds from smoke. Smoke Formed due to incomplete combustion, which is combustion with a limited amount of oxygen. The durability of smoke is very limited, which depends on the length and thickness of the smoke.

Smoked fish is fish that undergoes weeding, washing with or without soaking in saline solution, slicing, with or without spices and hot smoking carried out in a smoking chamber using wood, coir or coconut shell. Fish smoking is one of the traditional methods of fish processing.

Characteristics of Chili sauce Smoked Tuna

The ingredients used to make chili sauce are red chilies, bird's eye chilies, shallots, garlic,

tomatoes, sugar, salt and oil. The water content of fresh red chili (*Capsicum annum* L.) was 90.9%, 1% protein, 0.3% fat and 7.3% carbohydrates. Shallots contain 88% water, 1.5% protein and 0.3% fat. Garlic with a water content of 66.2-71%, 7% protein and 0.3% fat (Depkes 1979). Cayenne pepper has a water content of 71.2%, 4.7% protein, 2.4% fat and 19.9% carbohydrates (Depkes 1981).

Smoked tuna fish chili sauce is a mixture of chili sauce and fish that has undergone a smoking process. The mixing of the two is done after the chili sauce has been cooked for + 6 hours (until cooked). The nutritional content in smoked fish chili sauce is influenced by the fish content in it. The type of fish and fish content in chili sauce greatly affect the nutritional characteristics of smoked fish chili sauce (Saputri et al 2016). Smoked fish chili sauce has a distinctive taste. The distinctive taste comes from the fish which is processed by the smoking method, thus making the chili sauce taste more preferable (Swastawati et al. 2013). The chemical composition of smoked fish chili sauce with different treatments can be seen in Figure 1.

Table 1. Average Tilapia Chemical Composition of Smoked Tuna Sambel (Source: Fattah, et al (2020).

No	Sample Type	Water Content (%)	Ash content (%)	Crude Protein (%)	Crude Fiber (%)	Carbohydrates (%)	Fat (%)
1	A	37,00	1,98	14,99	5,05	7,26	33,73
2	B	39,18	2.05	17,25	6,46	11,16	23,91
3	B	34,56	2,46	13,76	2,54	28,51	20,15

Remarks: A (chili sauce smoked tuna from coconut shell) B (chili sauce smoked tuna from Bamboo, C (chili sauce smoked tuna wood guava).

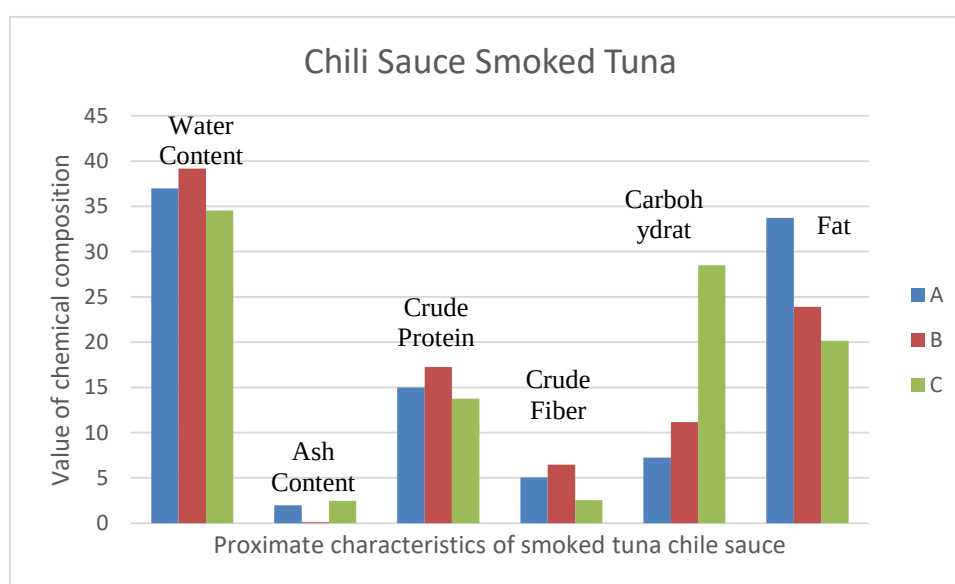


Figure 1. Proximate Value Chili sauce Smoked Tuna

a. Water Content

Proximate Analysis Water content is an important parameter to determine the quality of

smoked fish produced. The water content contained in smoked fish meat affects the shelf life of smoked fish. According to Wibowo (2000), changes in water content in the smoking process are caused by heat and withdrawal of water from fish body tissues by the absorption of various chemical compounds from smoke. The water content in chili sauce smoked tuna obtained from the three treatments ranged from 34.56.7%-39.18%. The lowest water content in chili sauce smoked tuna from treatment C, which comes from chili sauce with smoked tuna from guava wood, followed by chile sauce from bambo wood smoked tuna and finally chili sauce from smoked tuna from coconut shells.

The moisture content in a material indicates the water content per unit weight of the material. Water content is very influential on the quality of food so that in the process of processing and storing foodstuffs, water needs to be removed, one of which is by drying (Tahir et al. 2014). The results showed that there was an influence of smoke sources from burning wood.

b. Ash content

Ash content is a parameter of the nutritional value of a food ingredient produced from inorganic substances contained in smoked tuna chile sauce. Ash content is related to the mineral content of a material (Sudarmadji 2003).

Data from studies in the Biochemical laboratory show that the ash content in chili sauce smoked tuna. From the test results of the samples, the ash content value of the three types of smoked tuna smb al ranged from 1.98% –2.46%. The mineral content in smoked tuna chile sauce is obtained from the mineral content contained in fish meat, salt and other spices used in the ingredients of smoked tuna chile sauce used.

c. Protein Chili sauce Smoked Tuna

Protein is one of the components in the body that functions to form new tissues and existing tissues. This is because protein is the basic building block of all body tissues formed by Saputri et al. (2016). The results showed that there were different protein levels in smoked tuna chili sauce from the use of wood as a different smoke source. Protein content in smoked tuna chile sauce ranges from 13.76%-17.25. According to Heruwati (2002) the quality of protein in smoked tuna chile sauce will be reduced due to the reaction between lysine and carbonyl compounds, therefore smoking carried out before being used as raw material for smoked tuna chile sauce, must be done at the lowest possible smoke concentration. Changes in protein values in fish due to processing using high temperatures will cause protein denaturation. Denatured proteins coagulate when heated to 50°C or more (Ghozali et al.2004).

d. Crude Fiber

The difference in fiber percentage in smoked tuna chile sauce is likely due to the length of soaking with salt water and lime before the tuna is smoked. . Trimirasti (2016) said some fiber is soluble in water and some are insoluble in water. In general, fish has low fiber, in contrast to other foods such as vegetables and fruits. But that doesn't mean it doesn't exist. Crude fiber is commonly used in proximate analysis of foodstuffs. Crude fiber is the part of food that cannot be hydrolyzed by the chemicals used to determine crude fiber, namely sulfuric acid (H₂SO₄, 25%) and sodium hydroxide (NaOH, 25%). The quality of fiber can be seen from the composition of dietary fiber components, where the dietary fiber component consists of water-soluble components (Soluble Dietary Fiber, SDF), and water-insoluble components (Insoluble Dietary Fiber, IDF).

The crude fiber content in smoked tuna chile sauce ranges from 2.54%-6.47%. It is likely that the fiber content in chili sauce comes from the ingredients used such as tomatoes, large

lombok, large chilies and onions. So that high fiber content is obtained. Fiber content in tomatoes in 100 grams of tomato content, there are 1.5 grams of fiber in it. Most of the fiber (87%) in tomatoes is hemicellulose, cellulose, and lignin which can be beneficial in helping lower the risk of diabetes. The fiber-rich foods in tomatoes help in managing insulin levels.

e. Carbohydrates

Carbohydrates are the main source of energy availability for our body. Not only rice that contains carbohydrates, with the selling price of smoked tuna chili sauce contained carbohydrates where every 1 gram of carbohydrates can provide calories ranging from 4 calories. Carbohydrate also functions as fuel and body building material as well as a source of food reserves for our bodies. carbohydrate levels in chili sauce smoked tuna ranges from 7.26% -28.51%.

Kerbohydrate is an important food ingredient and is a source of energy found in plant and animal meat. In addition, carbohydrates are also an important structural component in living things in the form of fiber, such as cellulose, pectin, and lignin. Carbohydrates provide the basic needs that the body needs. The body uses carbohydrates just like a car engine uses gasoline as fuel. glucose, the simplest carbohydrate flows in the bloodstream so that it is available to all body cells. These body cells absorb glucose and convert it into energy to run body cells.

f. Fats

Fats contained in food have different contents. Animal fats contain a lot of sterols called cholesterol, while vegetable fats contain unsaturated fatty acids so they are generally liquid. The function of fat in the body is to regulate body temperature, regulate digestion in the body, form cell membranes, form hormones, and as a solvent for vitamins A, D, E, and K Saputri et al. (2016). The test results showed the fat content in smoked tuna chili sauce which ranged from 20.15% - 33.73%.

g. Sensory Value Chili Sauce Smoked Tuna

Organoleptic / sensory testing according to BSN (2006) is a way of testing using human senses as the main tool to assess product quality. The main principle in carrying out organoleptic/sensory tests is to use human senses as the main tool to assess the quality of fishery products. Assessment using this sensory tool includes quality specifications of appearance, smell, taste, and consistency / texture as well as several other factors needed to assess the product. This organoleptic testing has an important role as an initial synthesis in assessing quality to determine deviations and changes in the product. Hedonic test is a test method to measure the level of liking for products using assessment sheets.

Appearance is the overall condition of the product that is seen visually through the sense of sight. The most accepted treatment of chili sauce for smoked tuna was smoked tuna chili sauce from smoked tuna with guava wood as the smoke source. . Based on the smoked fish chili sauce hedonic test chart, it can be seen that the difference in wood sources may have an effect on the color of the smoked tuna produced. With Guava wood, the color of smoked tuna is cleaner, golden yellow and has a distinctive aroma.

The color of smoked fish chili sauce is red-brown. The color in chili sauce is influenced by anthocyanin dyes (Komariah 2011). The brownish color of the chili sauce is due to a reaction between the phenol components in the smoke and the protein and sugar components in the meat. In addition, a Maillard reaction occurs between amino groups and sugar in fish meat due to heating during smoking (Siswina 2011). Color change can be determined by changes in chemicals and enzymatic breakdown into pigments, changes from brown pigments by proteolytic activity and production by microorganisms. Color can also come from the main ingredients, namely meat,

fillers, binders and added ingredients (Soeparno 1994). The average color of the tuna chili sauce that the panelists liked was smoked tuna chili sauce from Guava wood. Guava wood is almost the same as the texture of mangrove wood, namely color, hardness and cleaner smoke.

Aroma is an attribute that comes out due to the presence of volatile compounds that easily evaporate and can be felt by the sense of smell. Smoke components such as phenol groups such as quauakol, syringol, and pyrocatecol are easily soluble in fat, so the more fat content in food, the more delicious the aroma of the smoke you get. Smoked fish has a distinctive aroma. The phenol content in smoked fish plays an important role in forming the distinctive taste and aroma of smoked products (Swastawati et al. 2013). The most acceptable smoked fish chili sauce treatment is the smoked tuna chili sauce treatment from guava wood as a source of smoke.

The taste of food is a very important indicator in determining the level of consumer acceptance of a food product. The taste of food is a component of food dissolved in saliva during food is digested mechanically in the mouth (Tahir et al. 2014). Factors that affect taste are chemical compounds, temperature, concentration and interaction with other flavor components. Taste consists of salty, sweet, bitter, and sour flavors. The taste of smoked tuna chili sauce that tends to be much liked is chili sauce Smoked tuna from Guava Wood.

h. Microbiology Test of Total Plate Count (TPC) During Storage

The shelf life of tuna chili sauce until December still shows no signs of change in smell, taste and aroma.

Conclusion

From the process of making smoked tuna chili sauce obtained the following results:

1. Guava wood is used in the smoking process as a source of smoke in tuna, affecting texture, aroma, taste and smell.
2. The characteristics of hard guava wood provide a longer burning effect so that it affects the water content of smoked tuna
3. Chili sauce Smoked tuna that comes from different wood sources affects the level of proximate composition in smoked tuna sambat.

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