



Review Article "SHAVING SMOKED WOOD FISH"

By

Junianto¹, Widia Rusyani² and Aulia Putri Kapsari Hafel²

- 1) Lecturer Staff of the Department of Fisheries, Padjadjaran University, Bandung-Indonesia**
- 2) Students of Fisheries Undergraduate Study Program, Universitas Padjadjaran, Bandung-Indonesia**

Abstract

Processed products of traditional Indonesian fish that are exported one of them is shaving smoked wood fish. This article aims to review shaving smoked wood fish products in terms of manufacturing process and quality standards. Based on the results of the literature study, information was obtained that the manufacture of shaving smoked wood fish consists of weeding and cutting, boiling, first fumigation, patching, fumigation of the second stage, drying, sealing, and fermentation. The quality standard of shaving smoked wood fish produced in Indonesia refers to the quality standard of smoked fish, namely SNI 2691-2017.

Keywords : Skipjack fish, fermentation, wrinkles, quality, katsuobushi.

INTRODUCTION

Indonesia has a fairly high potential for fish resources, both in terms of number and in terms of type. Fish resources, especially from the fish group, krustaceans and smoothness are easily rotten. The decay is caused by the activity of microbes and enzymes. Therefore, it is very important to carry out the preservation and processing of the fish resources.

The fish resources of the fish group whose catch production is quite large in Indonesia is skipjack fish (*Katsuwonus pelamis*). The production or fishing of

skipjack fish in Indonesia is carried out throughout the year. The presence of skipjack fish in Indonesian marine waters spreads in the waters of Nusa Tenggara, The Indonesian Ocean, the west coast of Sumatra, South Java, Bali, as well as the waters of Eastern Indonesia which include the Banda Sea, Flores Sea, Maluku Sea, and Makassar Sea.

Skipjack production in Indonesia in the period 2010 - 2018 experienced a significant increase. Based on a report from One Marine and Fisheries Data, skipjack production continues to increase. In 2010 skipjack production amounted to 329,949 tons to 510,245.31 tons in 2018, with the average annual production growth of 6.05%. Although production had decreased in 2015 due to the illegal fishing policy, production continued to increase again until 2018 with an average annual growth of 7.13%.

Efforts to process skipjack fish in order to inhibit the process of decay after capture and increase added value carried out in Indonesia is processed into shaving smoked wood fish. This article aims to review shaved smoked wood fish products in terms of manufacturing process and quality standards.

Shaving smoked wood fish

Shaving smoked wood fish is included in the fumigation processed products, which are carried out gradually. Smoked wood fish processing is a combination of two processes, namely the process of smoking and drying. Smoked wood fish weighs about 20-30% of the raw materials, with a moisture content of 15–17% due to the fumigation / drying process. Smoked wood fish has a hard meat structure making this product durable (Zuraidah, 2014). Wood fish in Indonesia is known for its processed fish products traditionally produce processed products from various regions such as in North Sulawesi, South Sulawesi, Aceh and several other regions (Sitepu *et al.* 2021).

In the processing of this drawstring wood fish product using a type of skipjack fish. This shaving smoked wood fish made from skipjack fish in international trade is known as Katsubushi. Katsubushi is a durable food made from skipjack fish (*katsuo*) that is smoked and then thinly wrinkled. Katsubushi is wrinkled into like a wood shavings to pick up broth which is the basic ingredient of Japanese cuisine,

sprinkled on food as a flavoring, or simply eaten as a friend to eat rice (Wada et al, 2006).



Figure 1. Shaving Smoked Wood Fish

Katsuobushi which has been thinly wrinkled, light brown to slightly clear pink is generally sold in plastic packaging. Katsuobushi as a food flavoring is usually sprinkled on hiyayako (cold tofu), okonomiyaki and takoyaki. Katsuobushi who has been wrinkled is called kezuribushi.

The technique of preserving fish into katsuobushi has been known in Japan since before the Edo period. Katsuobushi is a type of wood fish that has long been known to have good flavor quality, which is commonly used in traditional Japanese cuisine. This flavor is formed through a fairly unique process stage and allows fish meat that becomes hard like wood fish so that arabushi is often called wood fish (Ardianto et al, 2014). The following is conveyed a description of skipjack fish as a raw material for Katsubushi.

Skipjack Fish (*Katsuwonus pelamis*).

A good raw material for use in the processing of katsuobushi or shaving wood fish is skipjack fish. Skipjack has a low fat content so that it will affect the taste and aroma of the wood fish produced. In addition, skipjack imported from Indonesia is the raw material with the best quality for the manufacture of wood fish (Tanabe, 1998).

Skipjack is often called *skipjack tuna* with the local name skipjack skipjack. This name is taken from English, while the scientific name is called *Katsuwonus pelamis* taken from Japanese which means hard fish (Limu, 2013).

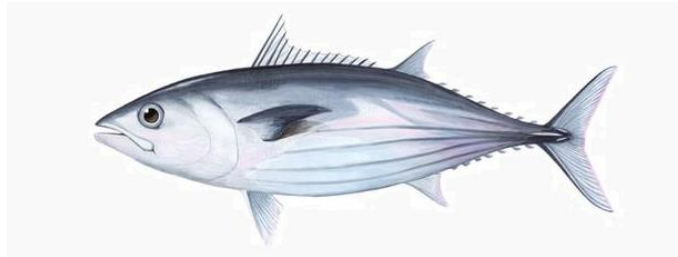


Figure 2. Skipjack Fish

The following is the accessibility of skipjack fish according to Saanin (1983) is as follows :

Phylum : Chordata
Grade : Actinopterygii
Ordo : Perciformes
Famili : Scombridae
Genus : Katsuwonus
Species : *Katsuwonus pelamis*

Skipjack belongs to a type of tuna in the family *Scombridae*, species *Katsuwonus pelamis*. Collete (1983) explained the morphological characteristics of skipjack, namely the body is fusiform, elongated and slightly round, gill rakes (*gill rakes*) numbering 53-63 on the first strand. It has two separate dorsal fins.

In the first dorsal fin there are 14-16 hard fingers, weak fingers on the second dorsal fin followed by 7-9 *finlets*. The pectoral fin is short, there are two *flops* between the abdominal fins. Anal fins are followed by 7-8 *finlets*. The body is not scaly except on the new body (*corselets*) and *lateral line* there are small dots. The back is blue-black (dark) on the lower side and 6 silvery abdomens, with 4-6 pieces of black stripes extending on the side of the body.

Skipjacks include fast swimmer fish and have voracious feeding properties. This type of fish often clustered which almost simultaneously do ruaya around the island and long distances and happy to go against the current. This fish usually swarms in pelagic waters to a depth of 200 m and forages based on vision so that it is greedy for its prey. The spread of skipjack fish can be divided into two parts, namely horizontal spread or spread according to the geographical location of the waters and vertical spread or spread according to the depth of the waters (Nakamura, 1969). The vertical spread of skipjack (depth strata) starts from the surface to a depth of 260 m during the day, while at night it tends to the surface.

Skipjack rarely appears to the surface of the water when the waters are cloudy, because its vision power is greatly reduced when the water is cloudy. Skipjack fish can dive to a depth of 40 meters in the tropics, due to the high level of transparency of seawater and temperature changes that are not too large (Simbolon, 2011).

Furthermore, Uktolseja (1987), explained that skipjack supplies in the waters of the Eastern Indonesia Region (KTI) are available throughout the year, especially in the Maluku Sea, Banda Sea, Seram Sea, and Sulawesi Sea. Skipjack populations found in the waters of Eastern Indonesia mostly come from the Pacific Ocean which enters these waters with the flow. Indonesian waters are geographically located between the Pacific ocean and the Indian Ocean. Therefore, most types of fish in both oceans are also found in Indonesia. The stock contained in KTI waters is suspected to come from the western Pacific Ocean which seeks from the east of the Philippines and north of Papua New Guinea. The fish then ventured into the waters of KTI from the western Pacific Ocean, namely to the waters of Zamboanga and north of Papua New Guinea (Suhendrata, 1987 in Simbolon, 2003). However, some skipjack fish, especially those found in various areas of the KTI islands, are likely "local stocks" that are spawned in Indonesian waters. The geographical spread and abundance of skipjack fish is influenced by the availability of food as desired in the right amount and time. Even skipjack fish migrate in search of new areas rich in food sources.

The distribution of skipjack fish is determined by internal factors as well as external factors from the aquatic environment. Internal factors include type (genetics), age and size, and behavior (*behavior*). These genetic differences lead to differences in morphology, physiological response and adaptability to the environment. External factors are environmental factors, among which are oseographic parameters such as temperature, salinity, depth, and current.

Indonesia plays an important role in tuna, cob and skipjack fisheries in the world. Indonesia has supplied more than 16% of the world's tuna, cob and skipjack production. The fishing location of skipjack (*Katsuwonus pelamis*) is determined by different seasons for each water. Skipjack fishing (*Katsuwonus pelamis*) can generally be done throughout the year. The results obtained differ from season to

season and vary by location of arrest. The season of more results than usual is called the peak season and the season of catching the catch is slightly called the lean season (Nikijuluw, 2002). According to KKP statistics, skipjack fish production in 2020 reached 112.228,00.

Shaving Wood Smoked Fish Making

According to Nasren and Irianto (1987) in Giyatmi (1998), the stages of making katsuobushi include weeding and cutting, boiling, first smoking, patching, fumigation of the second stage, drying, wrinkle, and fermentation. Meanwhile, according to Giyatmi (2000), the process of making katsuobushi that has been modified consists of fish weeding, steaming, smoking, drying, and mushroom fermentation. Here are the stages in the process of making katsuobushi:

- The weeding stage of the fish is that the head and stomach contents of the fish are discarded, then the fish is profiled and washed with running water and then twisted. Next is the steaming stage.
- The steaming stage is carried out in the dandang with a temperature of 90-95 °C for 1 hour. Then the fish is removed and twisted for 15 minutes. After cooling, the small thorns of the fish that are still attached to the meat are cleaned using tweezers and then smoking.
- Next is the fumigation stage. Smoking is one way of preserving fish to be durable, in addition to cooking also drying fish and giving a distinctive taste to smoked fish (Irawan, 1995). The type of smoking used is liquid smoking. Fish is soaked in a liquid smoke solution with a concentration of 6% 1 liter of water for 60 minutes. Then the fish is twisted for 15 and arranged on an oven dryer rack.
- The drying stage is carried out using an oven with a temperature of 40-50 °C, 65-75 °C and 90-100 °C.
- Furthermore, the fish is scraped or wrinkled to remove the black part so that the surface is smooth, so that arabushi products are produced. Furthermore, arabushi is included in 3 jars based on the length of drying. Jars A, B, and C are stored for 21 days at a temperature of approximately 30°C for fermentation by spraying strater *Aspergillus oryzae* on the surface

of the fillet, it is expected to grow mold (especially *Aspergillus* and *Panecilium*).

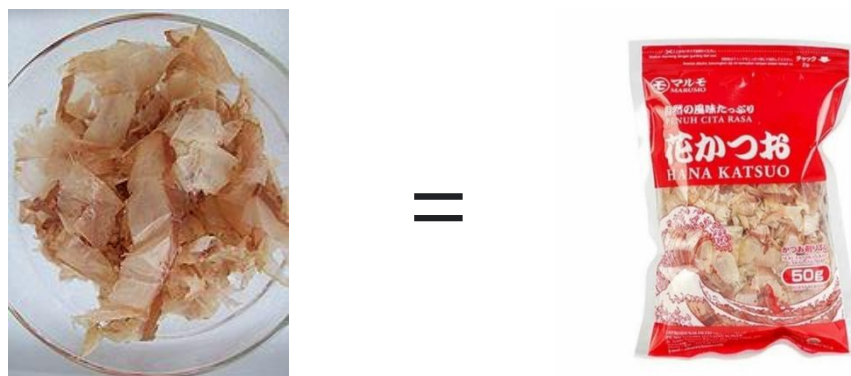


Figure 3. Shaving Smoked Wood Fish Packaging

Product Quality According to National Standards

The quality standards of smoked fish including this wood fish inInnesia are regulated nationally through a body called the National Standardization Agency (BSN). According to BSN, stadart quality of smoked fish as found in Table 1.

Table 1. Smoked Fish Safety and Quality Requirements (SNI 2691-2017)

Parameter	Unit	Requirement			
a. Sensors		Min. 7,0*			
b. Chemistry: - Air Up - Histamine	% mg/kg	Max. 20 Max. 100			
c. Metal Spruce: - Cadmium (Cd) - Mercury (Hg) - Lead (Pb)	mg/ kg	Max. 0,5			
d. Microbial Contamination: - OLD - <i>Escherichia coli</i> - <i>Salmonella</i>	Colony/g Colony/g Per 25 g	n	c	M	M
		5	2	10 ⁵	10 ⁶
		5	1	< 3	3,6
		5	0	Negative	Td
e. Chemical Spruce: - <i>Benzoapiren</i>	µg/kg	Max. 5			
NOTE					
*	For each sensory parameter				
N	Number of test				
C	examples				

	2 sampling classes:	The maximum number of examples allowed exceeds the maximum requirements limit listed on m
	3 sampling classes:	The maximum number of examples whose requirements are between m and M and not one instance exceeds the maximum requirement limit listed on M and the other example must be less than the value of m
m	2 sampling classes: 3 sampling classes: Not enforced	Maximum requirements limit
M	Maximum Minimum	Minimum requirements limit
Td		
Max		
Min		

Based on Table 1 above, the main parameters used as standards in the assessment of the quality of smoked fish are sensory, chemical, metal spruce, microbial spruce and chemical contamination. Sensory parameters are assessed based on the scoring test, the standard brick is a minimum of 7. Chemical parameters are assessed by water content and histamine content. This histamine content is very important to limit because in certain amounts it can cause poisoning in humans.

The production of wood smoked fish from various studies in Indonesia has met quality standards. The results of Syahputra research (2018) obtained katsuobushi skipjack fish obtained get a protein content of 77.57%, water content 11.10%, total phenol content 0.0061%, a display value of 7.67%, and aroma value of 7.53-7.67%. These results have met the quality standards of wood fish.

Conclusion

Based on the results of the literature study, information was obtained that the manufacture of shaving smoked wood fish consists of weeding and cutting, boiling,

first fumigation, patching, fumigation of the second stage, drying, sealing, and fermentation. The quality standard of shaving smoked wood fish produced in Indonesia refers to the quality standard of smoked fish, namely SNI 2691-2017.

BIBLIOGRAPHY

- Bar, E. S. (2015). A case study of obstacles and enablers for green innovation within the fish pro-cessing equipment industry. *Journal of Cleaner Production*, 90, 234– 243.<https://doi.org/10.1016/j.jclepro.2014.11.055>.
- Collete dan Nauen. 1983. *FAO Species Catalogue. Scombrids of the world. An. Annotated and Illustrated Catalogue Of Tunas, Mackerels, Bonitos and Related species known to date. FAO Fish. Synops. (125). Vol 2:137p*
- Doi, M., M. Ninomiya, dan M. Matsui. 1989a. Degradation and o-methylation of phenols among volatile flavor components of dried bonito (katsuobushi) by *Aspergillus* species. *Agric. Biol. Chem.*, 53(4):1051-1055.
- Doi, M., M. Matsui, Y. Shuto, dan Y. Kinoshita. 1989b. 0-methylation of phenols by *Aspergillus repens* MAO197. *Agric. Biol. Chem.*, 53(11):3031 - 3032.
- Doi, M., M. Matsui, Y. Shuto, dan Y. Kinoshita. 1990. Biological isomerization of cyclohexanols by *Aspergillus repens* MAO197). *Agric. Biol. Chem.*, 54(5): 1177- 1181.
- Ekawati, P. Martini and Yuliawati. 2005. *Staphylococcus aureus* contamination in Smoked Fish at the Producer and Seller Level in Semarang. *Indonesian Journal of Public Health. Vol. 2 No. 2. Pp. 70 – 76.*
- Hanafiah, T.A.R., B.I. Winarso and H. Marasabessy. 1984. Observations on the process of making skipjack wood fish (Katsuwonw pelamis). *Wipe. Fisheries Technology Research. Fisheries Technology Research Center, Ministry of Agriculture, Jakarta.*
- Heruwati, E. S. (2002). Traditional Fish Processing: Prospects and Development Opportunities. *Journal of Agricultural Development Research*, Vol. 21 (3): 92-99.
- Muratore G, Licciardello F (2005) Effect of vacuum and modified atmosphere Packaging on the shelf- life of liquid -smoked swordfish (*Xiphias gladius*) slices. *J Food Sci* 70: 359-363.
- Nakamura H. 1969. *Tuna Distribution and Migration. Fishing News (Books) LtdLondon.*

- Nastiti, D. 2006. Study of Improving the Quality of Grilled Mayung Arius Thalassinus Fish Products in Semarang City. Thesis. Semarang: Diponegoro University.
- Nikijuluw VPH. 2002. Fisheries Resource Management Regime. Regional Empowerment and Development Center (P3R) with PT. Cidesindo. Jakarta Library.
- Karseno, Darmadji P, Rahayu K (2002) The inhibitory power of rubber wood liquid smoke against latex and ribbed smoke sheettamiing bacteria. *Agritech* 21(1): 10-15.
- Kunimoto, M., Y. Kaminishi, K. Minami, dan M. Matano. 1996. Lipase and phospholipase production by *Aspergillus repens*- utilized in molding of Katsuobushi processing. *Fisheries Science*, 62 (4):594 - 599.
- Riyanto, S., Fadjar, H.M. 2018. Development of Fisheries Processing Industry in Local Economic Development. *Journal of R&D* Vol. XIV, No. 2: 107-118.
- Saanin H. 1983. Taxonomy and Fish Identification Key. Volumes 1 and 2. Binacipta. Bogor. 245 things.
- Sakinah, E. 2019. Effect of Pengeringanoven Temperature on the Quality of Skipjack Fish Katsuobushi (*Katsuwonus pelamis*). University of Riau Pekanbaru.
- Sakakibara, H., Hosokawa M., Yajima I. 1990. Flavor constituents of dried bonito (katsuobushi). *Food Reviews International*. 6:553-572.
- Symbol d. 2003. Sustainable Development of Pole and line Fisheries in Sorong Waters A System Approach. Dissertation (unpublished) Postgraduate Program of Bogor Agricultural University.
- Symbolon D. 2011. Bioecology and Dynamics of Fishing Grounds. Department of Fisheries Resources Utilization. Faculty of Fisheries and Marine Affairs, IPB.
- Sitepu, Albert R. Reo, Daisy M. Makapedua, Helen J. Lohoo, Bertie E. Kaseger, Verly Dotulong. 2021. Quality Study of Shaved Wood Fish Packed With Nitrogen and No Nitrogen. *Fisheries Products Technology Media*. 9(1): 8-13.
- Sjef van Eys. 1983. Katsuobushi-a Japanese speciality. *Infotish Marketing Digest*, Kualalumpur.

- Sulistijowati, R. S., Otong Suhara Djunaedi., Jetty Nurhajati., Eddy Afrianto., Zalinar Udin. 2011. *Fish Smoking Mechanism*. Unpad Press. Bandung.
- Susanto, E. 2014. Studying the Performance of Cabinet Type Fish Smoking Tools and Their Effect on The Quality of Smoked Fish. *IHP* 31(1), p:32-38
- Indonesian National Standard (SNI). 2017. *WoodFish*. SNI 2691:2017. Jakarta.
- Sumaryanto H., Santoso, J. and Muhandiri, T. 2010. Development of Efficient Fish Smoking Technology Using Local And Market-Oriented Raw Materials With SMEs As Development Centers. www.elib.pdii.lipi.go.id/katalog/index.php/sear_chkatalog/byId/270175. Retrieved July 6, 2011.
- Suter, I. 2000. Study of Food Technology Applications in An Effort to Produce Quality Products. Yogyakarta: Gadjah Mada Press University.
- Syahputra, A. 2018. The Long-Standing Effect of Steaming on the Quality of Skipjack Fish *Katsuobushi (Katsuwonus pelamis)*. University of Riau Pekanbaru.
- Uktolseja J.C.B. 1987. Estimation of Some Population Parameters of Skipjack, *Katsuwonus pelamis*, in the Waters Adjacent to Sorong, Irian Jaya, Particularly from the Length Frequency Data. Thesis Fisheries Aqua and Pathology Univ. of Rhode Island. Kingston, USA. 58 p (unpublished).
- Yang, Z., Li, S., Chen, B., Kang, H., Huang, M. (2016). China's Aquatic product Processing Industry : Policy Evolution and Economic Performance. *Trends in Food Science & Technology*, 8, 149 – 154. <https://doi.org/10.1016/j.tifs.2016.09.004>.