

Original Research Article

Improvement of Fish Smoking Tools and Smoked Fish Packaging and Digitalization of Marketing of Smoked Fish Products in Prigi, Trenggalek

ABSTRACT

Indonesia has great potential in the maritime and fisheries sector. One of the areas that has great potential in the field of fisheries is the Prigi Trenggalek Waters. Prigi Trenggalek waters are one of the waters located in the southern route of Java Island and have a large fishing port in East Java. Fish products in the form of smoked fish are one of the mainstay products from Prigi. However, prigi people still rely on traditional smoking tools and packaging using newspapers and plastic bags. In addition, the conventional marketing strategy makes many smoked fish producers have a limited target market so that the profits produced are not optimal. Therefore, activities were carried out to improve fish smoking equipment, socialization of packaging designs, and digital marketing counseling to improve the quality and sales of smoked fish in Prigi Village. The socialization was attended by the Prigi community, especially smoked fish SMEs in the Pasir Putih Prigi Beach area and its surroundings. Repair of fish smoking tools is carried out by replacing the charcoal used into several types of charcoal, then for smoked fish packaging it is replaced with a *plastic vacuum*. Then, the digitization of smoked fish marketing is carried out by counseling the public about the use of several social media and *e-commerce* platforms to increase the sales scale of these SMEs.

Comment [WU1]: It's okay for abstract

Keywords: Fish Smoker; Digitalization of Marketing; Smoked Fish; Packaging; Prigi

1. INTRODUCTION

Indonesia is a maritime country which means a country with a wider water area than the land area. Therefore, Indonesia has great potential in the maritime and fisheries sector. The Gross Domestic Product (GDP) of fisheries in the first quarter of 2019 reached 62.31 trillion. This value is not in line with the welfare of fishermen who mostly live on the poverty line. Therefore, the government strives to continuously improve the welfare of fishermen. The government continues to encourage fishermen to diversify fishery products and improve technical capabilities for marine and fisheries business communities. The policy is carried out to empower fishermen so that the welfare of fishermen can increase. In the national program, the fisheries sector is one of the sectors that can help improve the welfare of fishermen and encourage economic growth in an area. The fisheries sector, especially in

districts/cities, has an important role in reducing unemployment, supporting national food security, and as a source of state foreign exchange.

One of the areas that has great potential in the field of fisheries is the Prigi Trenggalek Waters. Prigi Trenggalek waters are one of the waters located in the southern route of Java Island and have a large fishing port in East Java, namely the Nusantara Fishing Port (PPN) Prigi. PPN Prigi has a fairly large catch of fish, especially tuna, cobs, and skipjack fish. According to the 2018 Prigi VAT Statistics Report, there are several types of tuna fish that are landed in PPN Prigi, namely *Madidihang* (*Yellowfin Tuna*), *Big Eye Tuna* (*Bigeye Tuna*), and *Albakkor*. *Madidihang* species is included in the 10 dominant fish catches with a production volume in 2018 of 237,526 kg. Marketing of fishery products from PPN Prigi in the form of fresh fish products and processed fish such as frozen fish, smoked fish, pindang fish, and other processed fish which are then distributed to local areas and several cities in East Java (Ariadi *et al.* 2019).

Comment [WU2]: literature needs to be improved and adapted for this discussion topic

Fish products in the form of smoked fish are one of the mainstay products from Prigi. The average smoking of fish in the Prigi area reaches approximately 40 heads / day. Currently in the process of producing smoked fish, the people of Prigi still rely on traditional smoking tools and packaging using newspapers and plastic bags because the price is relatively cheap, easy to get, and there is still no education related to the good smoked fish production process. In addition, the smoking process carried out by the Prigi community can cause health problems because the open smoking process causes respiratory problems due to the smoke produced (Ariadi *et al.* 2019). This problem causes the low welfare of smoked fish business actors due to suboptimal sales of smoked fish.

In addition to the fumigation process, the packaging of smoked fish is also an important process. Good packaging can prevent or reduce damage, protect the product from extinguishing, and increase the economic value of the product (Potter & Hotchkiss, 2012). According to Azhari (2016), packaging is one of the visual communication designs that has technical, creative, communicative, and marketing demands that must be realized in visual language. To survive in market competition, manufacturers must provide good and attractive packaging in order to attract the attention of their consumers. In addition, the packaging used should be strong packaging so that it can maintain the hygiene of smoked fish. Currently, many smoked fish traders only use old newsprint and plastic bags as packaging for their products. Packaging using waste newsprint has an impact on health because the ink can cause cancer and indigestion. In addition, poor packaging also makes the selling price and quality of smoked fish low (Wafi *et al.* 2021).

In addition, one of the important factors in doing business is the marketing strategy. According to Ariyanto (2021), marketing strategies are systematically and thoroughly prepared plans that are used as a guide to carry out marketing activities in order to achieve the company's goals, namely making a profit. The marketing strategy that is still conventional makes many smoked fish producers have a limited target market so that the profits produced are not optimal. The rapid advancement of information technology needs to be followed by an increase in the ability of manufacturers to keep up with the development of information technology (Ariadi *et al.* 2020). Producers must improve their marketing strategies in accordance with technological developments so that the target market for their products becomes wider. Marketing carried out using *online* buying and selling platforms can save costs and provide benefits to producers because the target market reached becomes unlimited (Madusari *et al.* 2022). However, nowadays there are still many smoked fish traders who only use traditional methods so that smoked fish consumers are limited to residents and visitors who can go to the market. In addition, the weather that is often erratic

makes the number of consumers who visit the market less and less so that the profits obtained are less.

Therefore, it is necessary to repair the smoking device so that the smoked fish products produced are more durable and have an attractive color. In addition, it is necessary to update the packaging of smoked fish in order to attract the attention of consumers and be able to maintain the quality of smoked fish longer. Digitalization of marketing is also needed in order to keep up with the improvements that have been made before so that Prigi acid fish products can reach a wider market.

2. MATERIAL AND METHODS

This activity was carried out in the Pasir Putih Beach Tourism Area, Prigi Village, Watulimo District, Trenggalek Regency, East Java. This activity is expected to increase the ability to improve the welfare of coastal communities, especially smoked fish producers. Partners will be provided with training and socialization. Socialization and training are provided to people who are interested in developing the quality of human resources or people who have a desire to improve welfare. Assistance to partners will be carried out to monitor the development of the quality of human resources owned by the community and so that the process of improving community welfare can be carried out smoothly and successfully. The activity is divided into 3 (three) parts, including:

1. Smoke Tool Repair Activities

This activity is carried out by repairing smoked fish tools and testing of repaired fish smoke tools which are carried out on 5 to 10 smoked fish producers. Then compile and make a fumigation cabinet then a trial of smoking fish caught by fishermen is carried out to check whether the smoked fish already has a golden yellow color and has optimal durability. If the smoked fish has met the criteria above, socialization of smoked fish traders in the Prigi Village area is carried out as a whole. Socialization is carried out to introduce an effective smoking device and is able to produce golden yellow smoked fish with optimal durability.

2. Socialization and Training on Smoked Fish Packaging Design

Socialization is carried out to provide basic to in-depth knowledge about the types of packaging that can be used as packaging materials for smoked fish. Partners will be taught about issues related to the manufacture of packaging designs. Partners who have understood this knowledge are expected to be able to combine the type of packaging that best suits the packaging design they want. Then an evaluation and supervision is carried out to review the consumer response. After this socialization, it is hoped that MSME smoked fish products from Prigi can enter the retail market and online market.

3. Digital Marketing Counseling

Counseling activities regarding digital marketing are carried out in coordination with the Center for Research and Community Service related to permit documents for activities to carry out community service activities. Then carry out counseling activities on digitalization-based marketing strategies as a tool for marketing products to support the business to continue running. In addition, providing assistance to implement digital marketing by handing over laptops and printers to facilitate *online* sales.

The stages that will be carried out are presented in *the following flowchart*.

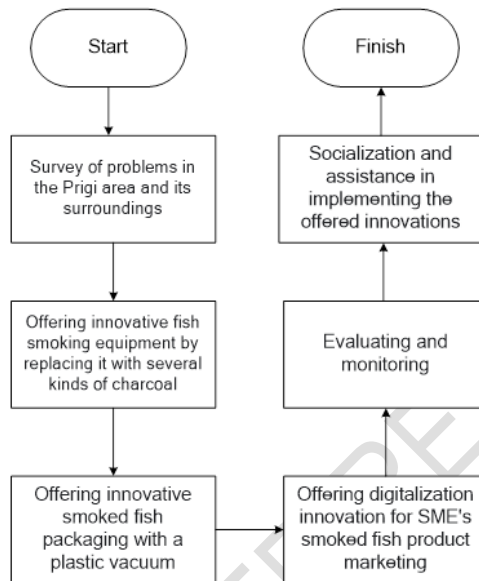


Figure 1

The above activities were followed up with socialization and training activities related to the processing of smoked fish products to their packaging, as well as digitalization of marketing to the community, especially SMEs in Pasir Putih Prigi Beach and its surroundings. In this activity, a teaching module was formed to support the achievement of the objectives of the socialization and training. The design of the content of the teaching module is as follows.

1. Material on appropriate technology, namely the improvement of effective and efficient fish smoking devices.
2. Material about the right packaging design so that smoked fish products are more durable.

Material on digital marketing as a movement for the digitalization revolution of marketing so that consumer reach is wider and processes are more efficient.

3. RESULTS AND DISCUSSION

3.1 Repair Of The Smoking Device

The first solution offered is to make modifications to the combustion device from the previous one in the hope of being able to produce a better product. The selection of a *stainless steel tray* can store the heat obtained from the heat source and distribute the heat to the fish that is placed attached to the *tray* so that the maturity of the product will be more evenly distributed and the time needed for the roasting product to mature will be faster so that one of the problems of business owners who only rely on the arrival of tourists is

resolved because when tourists come, Business owners are able to provide smoked fish products quickly and deliciously because of their proper and even maturity.



Figure 2. **Tray**

Comment [WU3]: give critical opinion

Furthermore, a solution is offered by modifying the partner's smoked fish products through the use of different fuels. This is because fish from burning or roasting has distinctive characteristics in the form of aroma and taste that are formed naturally in the product through the source of combustion used. In this discussion, the types of combustion materials offered are wood charcoal, coconut husk charcoal and briquette charcoal. Charcoal briquettes are a type of charcoal produced from several types of materials such as rice husks, wood, sawdust, and coconut shells. It looks more attractive and modern, and has a higher heat resistance than wood charcoal and coconut husk charcoal. In addition, charcoal briquettes also have a natural aroma that is fresh, odorless, clean because it does not produce residue and is durable. The following is a picture of wood charcoal, coconut husk charcoal, and briquette charcoal as a solution to the problems faced by the two SMEs.

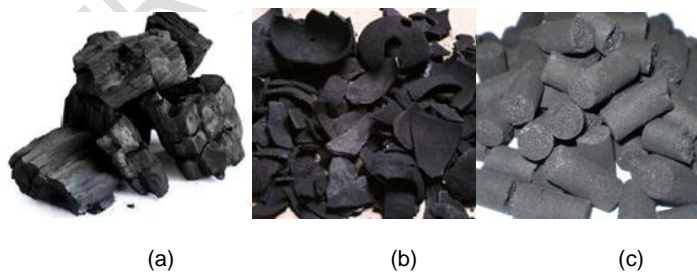


Figure 3. (a) Wood Charcoal; (b) Coconut Husk Charcoal; (c) Charcoal Briquettes

Comment [WU4]: give critical opinion

Based on the results of observations in the field, several problems were found in the smoking device. MSME owners state that the smoking device they are currently using produces smoke that greatly interferes with vision and breathing during the roasting process.

This is because the smoke emitted by burning firewood does not lead out towards the chimney. Then, business owners want the fish roasting process to run shorter so that it can maximize time. The final result of the grilled fish you want to get is the distinctive taste of grilled fish with good quality and has good resistance. The design of the grill must also be adjusted to the environmental conditions around the stall in the form of a coast.

Based on the problems found, the solution found was to put a cover on the grill (Ariadi and Abidin, 2019). The purpose of adding a cover to the grill is to close the smoke exit through the front so that smoke will escape through the chimney above the grill. When smoke escapes through the chimney, visual and respiratory impairment at the time of grilling the fish can be avoided. In addition, the provision of an exhaust fan to the chimney to remove hot air from combustion. Technology-based grills will help make human work easier. The use of control with microcontroller innovations can be an alternative so that fish roasting runs more effectively and efficiently. Microcontroller is a tool system that is able to control remote jarrah using the ATMEGA 8535 type control center. The microcontroller is assisted by a remote so that it can be controlled remotely using radio frequencies as a medium for sending data to the receiver which will receive commands automatically. The purpose of implementing microcontroller technology is expected that business owners do not need to flip the fish manually.

The building material for the grill tool used by business owners comes from the arrangement of bricks combined with pieces of iron plate on the side of the grill tool. Based on the results of observations and literature studies, the construction material for the transportation equipment that best suits the needs and the surrounding environment is galvanized steel. Galvanized steel is a zinc material with a high purity concentration level of 99.7%. This material is used to coat iron, mild steel, and pure steel so that it will be protected by corrosion and rusting. To prevent from corrosion, galvanized steel pieces can be minimized with anti-rust coatings.

A new innovation of the fish grill by adding a lid so that it has a closed system like an oven. The application of a smoking device with a closed system is expected to be able to produce fish products that ripen faster. This is because the more collected heat is absorbed by the fish so that the fish will quickly cook evenly. The cover is designed to have a transparent part to make it easier to control during the roasting process.

3.2 Improvement of Packaging Materials and Smoked Fish

Packaging improvements aim to attract customers or make customers memorable because products purchased from partners have a different look when compared to grilled fish products or smoked fish products sold by other business owners. Previously, partners used one sheet of newsprint to wrap one fish purchased by tourists for takeout which was considered very unattractive, unhygienic and unhealthy due to the presence of ink on newsprint which is carcinogenic which could be immigration into a product that if ingested by consumers will cause cancer as a negative impact on health in the long term so that *corrugated flute* material is offered as a substitute for newsprint for packaging products. *Corrugated flute* material is considered safer and hygienic because it has been widely used by various food industries, does not contain ink and its sturdy structure so that it is efficient in keeping the product in it if the product is to be traded online or taken home (Muqsith *et al.* 2021). Then to increase the safety of the product so that it is not easily damaged due to time or distance from the business owner's place to the destination, the grilled fish and smoked fish products that have just been cooked are cooled and packaged using plastic which is then *vacuumed*. Previously, business owners told that the product only lasts a maximum of two days but with *vacuum*, it is expected that the product is still in a safe condition for

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consumption even though it is on a five-day trip (Ariadi and Mujtahidah, 2022). Finally, to add to the attractiveness of the product, a *sticker* is added which is also a medium for information related to the product in the packaging.



Figure 4. Smoked Fish Packaging With Plastic *Vacuum*

3.3 Online Store Creation

With the pandemic, the number of people who buy smoked fish products, especially in the Prigi area, has been drastically reduced due to limited activities and community mobilization. The proposed solution to reduce the impact of the decline in sales of smoked fish is *the training of online marketing* of smoked fish products. The creation of this *online store* aims to expand the reach of marketing to people outside their location, by utilizing several *marketplaces*, namely *Tokopedia* and *Shopee*. The result of the achievement in creating this *online store* is in the form of an online store account as a facility or container for partners to upload and sell their products. However, the progress to date is that stores in both marketplaces have not had product updates from their sellers. The creation of this social media account is carried out for one day with a day of counseling time. This counseling is carried out to provide accounts to business owners so that they can operate the social media. In addition, knowledge is also provided regarding how to use several features contained in Instagram social media and the *marketplace*. Here is a screenshot of the MSME marketplace account in the form of *shopee* and *tokopedia*.

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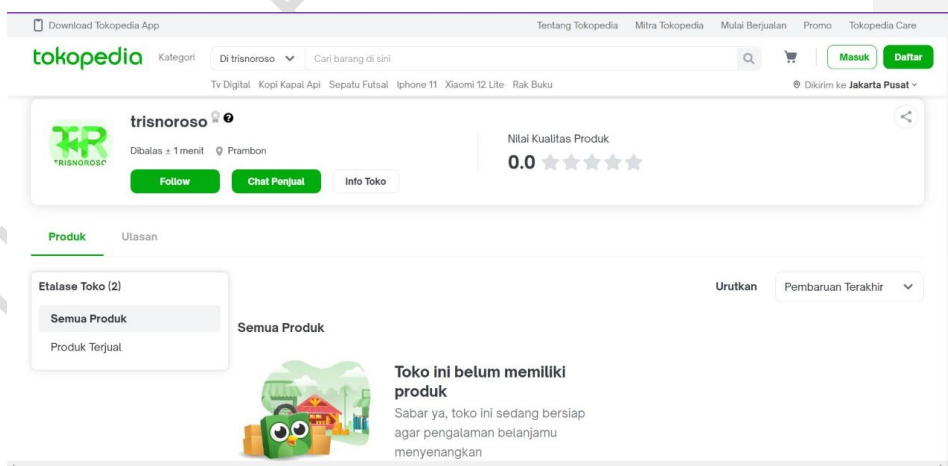




Figure 5. Tokopedia marketplace and Shopee UMK

3.4 Instagram Social Media Account Creation

Instagram is one of the social media used in terms of uploading product images where it can attract consumers to buy. In addition, with several features contained in *the instagram* such as *feeds*, *stories*, and *mentions* or *hashtags*, it can increase promotional activities, so that by doing so, partner smoked fish businesses can be more widely known by the wider community. Here is a screenshot of the social media accounts of the partners.

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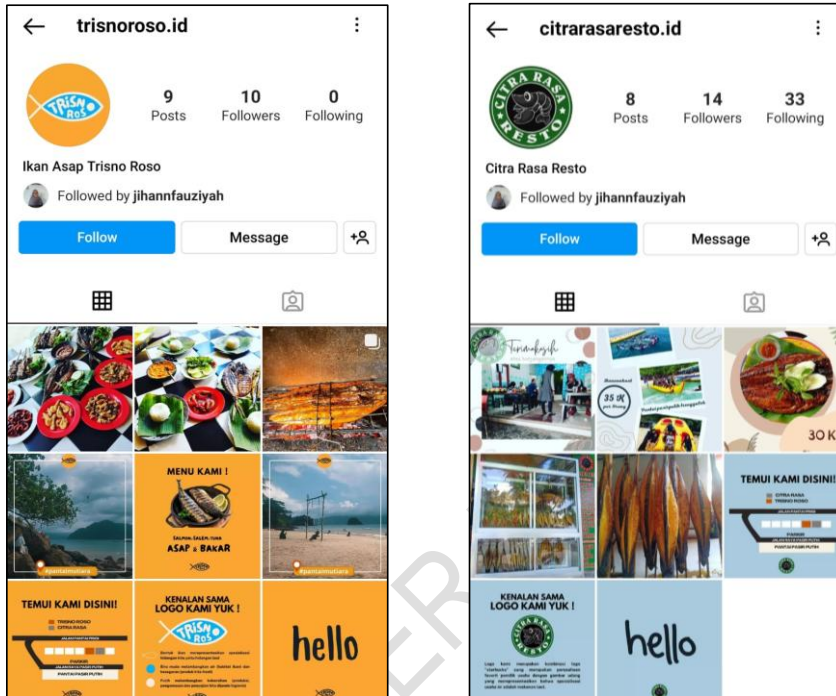


Figure 6. Partner's Instagram account

The *Instagram* account that the team has created for partners who currently have several followers and has begun to see their development on the part of the restaurant owner has also begun to continue uploading images on the account (can be seen in the top three uploads) by uploading some photos of smoked fish, product catalogs sold, and photos of visitors.

Comment [WU12]: add opinions from the results of this research study

3.5 Canva Premium Account Purchases

To support the design, the team used *Canva* as a platform for *content editing*, and in order to access all premium features on *Canva*, the team *subscribed to Canva Premium* by buying it through *shopee* so that the price paid was cheaper, which was Rp.15,000/account. The advantages obtained when we *subscribe* purchased through *shopee* are *lifetime*, which means we benefit from a *premium canva* account for good.

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4. CONCLUSION

In general, it can be concluded that:

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1. The activities that have been carried out in this service program include a program to improve fish smoking devices and smoked fish packaging, as well as creating ways to increase SME sales through digital marketing. As far as has been done, the community is open to receive suggestions and input from the service team in order to produce higher quality smoked fish products and there is an increase in the scale of sales of smoked fish products.
2. This service program has completed several things, including:
 - 1) Already made modifications to the combustion device.
 - 2) It has modified smoked fish products , especially those owned by SME Trisno Roso Resto and Citra Rasa Resto through the use of different fuels.
 - 3) Have made changes to the packaging of grilled fish products or smoked fish sold.
 - 4) They have expanded their marketing reach to people outside their location, by utilizing several *marketplaces*, namely the creation of *Tokopedia* and *Shopee*, Instagram social media, premium *canva* accounts, and location pins on *google maps*.
3. Part of the activities of the service program is and will be carried out to support the success of this doctoral service program both to the local community and to readers.

Suggestions that can be compiled based on the results of devotion regarding smoked fish at Pasir Putih Prigi Beach, include:

1. Conducting comprehensive socialization and *controlling* in the improvement of fish smoking devices and smoked fish packaging as a whole in the Pasir Putih Prigi Beach area.
2. Conducting synergistic counseling to the local community to jointly contribute to the progress of smoked fish production in the Pasir Putih Prigi Beach area.

COMPETING INTERESTS DISCLAIMER:

Authors have declared that they have no known competing financial interests OR non-financial interests OR personal relationships that could have appeared to influence the work reported in this paper.

REFERENCES

- Ariyanto, A. (2021). MSME Marketing Strategy During the Pandemic. West Sumatra: CV Insan Cendekia Mandiri.
- Ariadi, H., Abidin, Z. (2019). Study Of Partnership Pattern Among Farmers Of Tilapia Fish (*Oreochromis niloticus*) And Fish Breeding Centre Klemunan In Wlingi Of Blitar Regency. *ECOSOFIM: Economic and Social of Fisheries and Marine Journal*, 6(02), 194-201.
- Ariadi, H., Fadjar, M., Mahmudi, M. (2019). The relationships between water quality parameters and the growth rate of white shrimp (*Litopenaeus vannamei*) in intensive ponds. *Aquaculture, Aquarium, Conservation & Legislation*, 12(6), 2103-2116.
- Ariadi, H., Mahmudi, M., Fadjar, M. (2019). Correlation between density of vibrio bacteria with *Oscillatoria* sp. abundance on intensive *Litopenaeus vannamei* shrimp ponds. *Research Journal of Life Science*, 6(2), 114-129.
- Ariadi, H., Pandaingan, I.A.H., Soeprijanto, A., Maemunah, Y., Wafi, A. (2020). Effectiveness of Using Pakcoy (*Brassica rapa* L.) and Kailan (*Brassica oleracea*) Plants as Vegetable Media for Aquaponic Culture of Tilapia (*Oreochromis* sp.). *Journal of Aquaculture Development and Environment*, 3(2), 156-162.
- Ariadi, H., Muhtahidah, T. (2022). analisis Permodelan Dinamis Kelimpahan Bakteri *Vibrio* sp. Pada Budidaya Udang Vaname, *Litopenaeus vannamei*. *Jurnal Riset Akuakultur*, 16(4), 255-262. (in Indonesian).
- Azhari, Amri. (2015). Visual Communication Design Research Model. Bekasi: PT. Chakra Press.
- Kotler, Philip. (2003). Marketing Management. Engelwood Cliffs: Prentice Hall International Inc. A Division of Simon and Scuster.
- Madusari, B.D., Ariadi, H., Mardhiyana, D. (2022). Effect Of The Feeding Rate Practice On The White Shrimp (*Litopenaeus vannamei*) Cultivation Activities. *Aquaculture, Aquarium, Conservation & Legislation-International Journal Of The Bioflux Society*, 15(1), 473-479.
- Muqsith, A., Ariadi, H., Wafi, A. (2021). Financial Feasibility Analysis And Business Sensitivity Level On Intensive Aquaculture Of Vaname Shrimp (*Litopenaeus vannamei*). *ECOSOFIM (Economic And Social Of Fisheries And Marine Journal)*, 8(2), 268-279.
- Potter, N. N. & Hotchkiss, J. H. (2012). Food Science. Springer Science & Business Media.
- Sirait, J. & Saputra, S. H. (2020). Fish Smoking Equipment Technology and Smoked Fish Quality. *Journal of Industrial Technology Research*, 14 (2), 220 – 229.
- Sulistijowati, R. (2018). Fish smoking mechanism. *SNI*, 9(240).
- Utomo, Good. (2012). Liquid smoke how to make and its application in the processing of smoked fish. Jakarta: Self-help spreader. p.5-7,14-16.

Wafi, A., Ariadi, H., Muqsith, A., Mahmudi, M., Fadjar, M. (2021). Oxygen Consumption Of *Litopenaeus vannamei* In Intensive Ponds Based On The Dynamic Modeling System. *Journal Of Aquaculture And Fish Health*, 10(1), 17-24

Yusuf, M., Aprilla, Y., Mardotillah, I., & Saputra, A. D. (2018). Design and Build a Fish Smoker. *Agrotechnics*, 1 (1), 21 – 30.

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