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Analysis of Processing Characteristics of Pepetek Salted Fish, Case Study at Mr. Suwono's Home Industry, Batukaras, Pangandaran, Indonesia

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ABSTRACT

Traditional salted fish processing is still a major practice in various coastal areas of Indonesia, including Batukaras Village, Pangandaran Regency. This practice has been passed down from generation to generation and is an important part of the economic life of the local community. This study aims to analyze the characteristics of the salted fish processing process in Mr. Suwono's home industry. The method used is qualitative, with a case study approach carried out through direct observation techniques, in-depth interviews, and documentation. The results showed that the processing process includes cleaning the fish, cutting the fish using the butterfly fillet technique, soaking in salt solution for one night, washing, drying in the open air, and packaging using simple plastic. Based on these results, although the salted fish processing method used is still traditional, this process is considered effective enough to meet the needs of the local market and maintain the distinctive taste of the product. However, in terms of hygiene and selling value, this method still has limitations and has not been able to compete in a wider market. This shows the importance of innovation in the production process, especially in the aspects of sanitation and packaging, to improve the quality and competitiveness of local processed fish products.

***Keywords*:** Dried salted fish, fishery product processing, traditional, food sanitation, micro-enterprise.

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1. INTRODUCTION

Indonesia is a maritime country with abundant marine and fisheries resources. This potential is not only seen from the high volume of fish catches but also from the diversity of seafood processing practices that have developed in various regions. One form of utilization of fishery products that is quite popular in the community is salted fish processing. Fish contains high amounts of protein, with amino acid levels varying between 1 to 29% (Husain et al. 2017). Salted fish is a processed product of marine fish preserved using traditional methods. The purpose of this preservation is to reduce the water content in the fish body so that bacteria do not have favorable conditions to grow. In order to obtain high quality preserved products, it is important to pay attention to hygiene during the preservation process, such as ensuring tools and materials remain hygienic, using fresh fish, and choosing clean salt (Sari 2011). Salted fish products are one of the preparations that are favored by the Indonesian people because of their unique taste and long durability. Salted fish processing is generally carried out by traditional methods involving salting and drying processes, with the aim of extending shelf life and improving taste.

Pepetek fish (*Leiognathus equulus*) is a demersal fish species that lives in coastal waters, bays, lagoons, river estuaries, and fresh waters. This species is able to live in various salinity conditions, ranging from sea water, brackish, to some in fresh water. Pepetek fish are usually found at depths between 10 to 60 meters and often live in large groups. It is commonly caught using bottom fishing gear such as arad, cantrang, and other gears (Wedjatmiko et al. 2007). Despite its relatively low economic value, this fish is often utilized as salted fish by the community, especially Batukaras.

In the southern coastal region of West Java, especially in Batukaras, Pangandaran Regency, there are a number of home industries that process salted pepetek fish. Fisheries processing is one of the sources of income for the Pangandaran community. Fish processing in Pangandaran is still small-scale in the form of fish processing groups and community activity bonds (Andhikawati and Permana 2024). Despite its small scale, this industry has an important role in absorbing local labor and supporting community food security. However, variations in techniques, tools and the quality of raw materials used often affect the final quality of the product.

Therefore, it is important to analyze the characteristics of pepetek salted fish processing in this region to find out the stages, techniques, and challenges faced by industry players. This study aims to deeply analyze the characteristics of the pepetek salted fish processing process in one of the household industries in Batukaras, Pangandaran Regency. The main focus of this research is on the processing stages, techniques used. The results of this study are expected to be the basis for efforts to improve product quality, process efficiency, and development of processing technology in accordance with local conditions.

2. METHODS

This research uses a qualitative method with a case study approach conducted at Mr. Suwono's pepetek salted fish home industry. The qualitative descriptive method was chosen because it aims to describe a condition in depth and objectively by utilizing data that is collected, analyzed, and presented systematically.

As revealed by Ramdhan (2021), a qualitative descriptive approach allows researchers to obtain a complete picture of the phenomenon under study through the interpretation of data obtained directly from the field. The data in this study were obtained through direct interviews with home industry business owners, namely Mr. Suwono, as well as field observations made by visiting the location of the pepetek salted fish processing business located in Batukaras, Pangandaran, Indonesia.

3. RESULTS AND DISCUSSION

This section presents the results and discussions obtained through field observations, interviews, and documentation of salted pepetek fish processing businesses in Batukaras, Pangandaran Regency. The results are analyzed and discussed in depth with reference to appropriate theories and supported by various previous research results in order to provide a comprehensive understanding of the pepetek salted fish processing process carried out by Mr. Suwono and the potential for sustainable development of salted fish processing businesses.

3.1. Business Profile

Figure 1. Ikan Asin Pepetek.

Mr. Suwono and Ms. Nur are a married couple who have been running a traditional salted fish processing and sales business for more than three decades. They operate their business in Sanghyang Kalang, Batukaras, Pangandaran Regency. With approximately 30 years of experience, they are one of the local businesses that play an important role in maintaining traditional culinary heritage while supporting the local economy.

The business run by Mr. Suwono and Mrs. Nur is a form of home-based business that belongs to the micro business category, characterized by a limited scale of production and the use of traditional methods in the entire processing process (Susanto and Imaningati 2014).

In practice, they produce salted fish without using modern equipment or technology but still rely on conventional techniques that have been passed down from generation to generation, such as sun drying and manual salting. Although this business is run on a micro scale with limited capital and without the use of modern technology. This business remains economically viable and shows efforts to preserve local wisdom in processing fishery products, which, until now, remains the main source of livelihood for the community in the Batukaras coastal environment (Kusmawanti et al. 2024).

3.2. Tools Used

In the process of processing pepetek salted fish, the equipment used is generally simple and privately owned by the producers. this makes them not need to rent additional tools to run a salted fish processing business. some types of equipment used in this production process include the following:

- **Knife**

This tool is used to split and cut the fish before salting. The process of splitting the fish is done carefully to ensure a neat and even cut. A good cut allows the salt to fully penetrate into the fish flesh, thus improving the quality of the final product. The knives used in this process are usually made of stainless steel to prevent rust and maintain hygiene during the production process. Producers routinely sharpen the knives to ensure their sharpness remains optimal, as efficiency in fish cutting is highly dependent on the quality of the knives (Sari 2011).

- **Soaking Bucket and Container**

The bucket is used for washing the fish. Then, the soaking container is used to soak the fish that has been filled with salt solution water. After the washing process, the fish is immersed in a special container containing the salt solution. These containers are usually made of durable plastic or other materials that do not react with salt. The soaking process is done to ensure that every part of the fish meat is evenly exposed to the salt solution. The duration of soaking is customized according to the type of fish and the size of the piece, usually lasting for a few hours to one night, depending on production needs.

- **Drying Net**

Used as a base in the process of drying fish so that it does not come into direct contact with the ground. The drying process is carried out in an open area exposed to direct sunlight. The drying net allows air to flow evenly around the fish, speeding up the drying process and reducing the risk of the fish becoming damp. To maintain hygiene, these nets are cleaned regularly, especially after each use, so that no salt residue or fish debris remains (Indrastuti et al. 2019).

- **Woven Bamboo**

Used to hold fish that have been dried in the sun, the bamboo matting allows excess water or salt solution to drain out during the drying process, keeping the fish dry and not moist. It also makes it easier for producers to move fish from one place to another, such as from the drying area to the packaging room.

- **Plastic**

Used to wrap fish for marketing or as packaging, good plastic packaging ensures that salted fish remains fresh until it reaches the consumer. In addition, the use of plastic makes product distribution and storage easier, especially if the salted fish is marketed to areas far from the production site.

- **Scales**

Used to weigh fish for precise measurements, the scales used are usually digital or mechanical, depending on the scale of production and the preference of the producer. The accuracy of scales is very important, especially in determining the selling price of products based on weight. By using scales, producers can ensure transparency in the sales process and build consumer confidence.

3.3. Main and Additional Ingredients

In this pepetek salted fish processing activity, the main raw material used is fresh pepetek fish obtained directly from its own catch. The selection of raw materials in the form of fresh fish is a very important first step because the quality of salted fish produced is strongly influenced by the freshness of the raw materials. As explained by Sari (2011), the availability of fresh fish is the main factor that determines the final quality of the product, including taste, texture, and shelf life. The type of fish used in the processing of salted fish in this home industry is pepetek fish. Each type of fish has its own characteristics that affect the processing process and the final product.

Apart from fish, another key raw material that is equally important in the processing of salted fish is salt. Salt plays an important role as an effective natural preservative. With sufficient salt content, the growth of bacteria and microorganisms that cause spoilage can be significantly inhibited, thus extending the shelf life of the product (Nurfitriyani et al. 2024). In practice, 15 kilograms of salt is used for every 50 kilograms of fish to be processed. This dosage has been adjusted through years of experience to ensure that the salted fish produced has a balanced taste between salty and savory, without reducing the textural quality of the fish meat. The use of fresh fish as the main raw material has various advantages. In addition to ensuring a delicious flavor and good texture, fresh fish is also able to increase the shelf life of the final product. With the combination of quality raw materials, namely fresh fish and natural salt, this salted fish processing industry is able to produce products that not only meet local needs but also have the potential to be marketed more widely.

3.4. Stages of Processing

Mr. Suwono's salted fish processing business is carried out naturally/traditionally by utilizing sunlight as the main source in the drying process. Based on the Indonesian National Standard (SNI) 2721.3:2009 on the handling and processing of dried salted fish, Mr. Suwono's traditional methods, especially in terms of hygiene and sanitation during the handling and processing process, need to be ensured to meet the requirements listed in the standard to ensure the safety and quality of the final product.

The stages in the process of making salted fish can be described as follows:

- **Raw Materials and Preparation**

The fish used as raw material is pepetek fish. But actually the fish that can be salted is very diverse depending on the region, and most of them are received in frozen conditions (Indrastuti et al. 2019). Common types of fish processed into salted fish include anchovies, jambal roti fish, mackerel (Hadi et al. 2022), sea cork fish, mackerel, and emprit fish (Kusmawati et al. 2024). In this processing, usually the amount of pepetek fish used depends on the catch, usually around 50 kilograms. In addition to fish, the raw material that is prepared is salt, usually 15 kilograms of salt is used for 50 kilograms of pepetek fish (30% of the total weight of the fish). In line with the requirements of Indonesian National Standard (SNI) 2721.2:2009 regarding raw materials for dried salted fish, the pepetek fish used in this study are assumed to meet the freshness, cleanliness and health standards set before the salting process is carried out.

- **Fish Cleaning**

The first process generally involves cleaning the fish, including removal of scales (Kusmawati et al. 2024). Large fish are gutted and scales removed, then cut open using the butterfly fillet technique. The weeding method that is widely practiced in several regions sometimes differs, but in general the difference is not much (Nurfitriyani et al. 2024). Washing with clean water is done to remove traces of blood, scales and other impurities..

- **Fish Salting**

Salting is the core of salted fish processing, using crystal salt (Indrastuti et al. 2019). The purpose of salting is to preserve the fish (Ihwan et al. 2022). The commonly used salting method is combined salting (pickling), but there are also dry and wet salting. Salting done in this home industry is still traditionally done by sprinkling salt crystals on the surface of the fish or brushing it with salt solution or a mixture of salt crystals and salt solution. The salt used is 30% of the total weight of the fish. In relation to SNI 01-4435-2000 regarding consumption salt, the crystal salt used in the processing of salted fish is assumed to have met the quality requirements set out in the standard.

- **Drying**

After salting is complete, the fish is dried by drying in direct sunlight. According to Adeyeye (2019), drying fish involves removing air content from the fish through the movement of heat. The reduction of air activity is very important because microorganisms such as bacteria and fungi need air to grow. At air content of about 40% or aw below 0.7, microbial activity is severely inhibited or even unable to grow (Sroy et al. 2023). So that the reduction of moisture content during the drying process can extend the durability of fish (Imbir et al. 2015). The length of time for drying or drying pepetek salted fish is carried out for 1-3 days. The length of time is in accordance with the research of Rani et al. (2022), which states that drying salted fish for more than 12 hours in the sun will produce an acceptable product, while drying under 8 hours will produce an unacceptable dry product.

When compared to the Indonesian National Standard (SNI) 2721.1:2009 on dried salted fish, the natural sun drying method applied in this study is one of the recognized traditional methods, although the SNI may include mechanical drying methods to achieve the required moisture content. Once drying is considered optimal, the salted pepetek fish is then packaged and ready for distribution to various markets.

Figure 2. Drying Process of Salted Fish.

- **Final Product**

The result of this process is pepetek salted fish, a processed product preserved by the addition of salt (Maylivia et al. 2023). Thus producing fish that has uniqueness such as appearance, odor, taste, and texture that is unique to each individual type and has a long shelf life (Kapoh et al. 2022). The final quality of salted fish is strongly influenced by the quality of raw materials and processing technology used, which varies greatly between processors (Indrastuti et al. 2019).

3.5. Packaging

The process of packaging pepetek salted fish products carried out by Mr. Suwono and Mrs. Nur is still manual and traditional, where the processed products are wrapped directly using ordinary clear plastic, which is generally used for food. This method reflects the limited access to modern packaging technology and limited capital to innovate in the packaging aspect. Nevertheless, manual and traditional packaging methods are still considered practical and efficient by salted fish business actors in meeting local market needs (Srifa et al. 2018). However, in terms of added value and product attractiveness, this traditional packaging has not been able to provide a competitive advantage in the wider market, especially in the midst of increasing consumer demand for hygienic, attractive, and industry-standard packaging (Izzhati et al. 2017). In relation to the packaging requirements listed in SNI 2721.3:2009, the packaging method using ordinary clear plastic needs to be further evaluated to ensure that the packaging material used is safe for food products and can protect the product from contamination and damage during storage and distribution, as mandated in the standard.

Figure 3. Salted Fish Packaging Process.

3.6. Discussion

Traditional salted fish processing in Batukaras is one form of economic activity of coastal communities that still relies on local wisdom. In general, the stages of the salted fish processing process carried out by Mr. Suwono in Batukaras are the same as the methods still widely used by coastal communities. The butterfly fillet technique allows the fish to open wide, making it easier to absorb salt and speed up the drying process. Soaking for one night with a salt ratio of about 30% of the total fish weight is effective in creating a distinctive salty flavor and extending the product's shelf life, as suggested by Rahayu et al. (2018) in a study on natural fish preservation. Direct drying under the sun for 1-3 days, although simple, is still considered efficient in certain weather conditions but has disadvantages if done without protection from environmental contamination such as dust, insects, or high humidity, which can reduce product quality.

In Erawati and Putri's research (2019), it is emphasized that the principle of preserving salted fish is a combination of salt penetration treatment and drying. The presence of sufficient salt can prevent autolysis, which is damage to fish caused by enzymes contained in fish, and prevent decay by microorganisms. Meanwhile, drying aims to reduce the moisture content of the material to a limit where microorganisms and enzyme activities that can cause decay will stop, so that the material can have a longer shelf life. This shows that the stages of the salted fish processing process carried out by Mr. Suwono are in accordance with the principles of salted fish preservation.

Nevertheless, the traditional methods that are still maintained also show a positive value, namely as a form of preservation of local wisdom that has been passed down from generation to generation and has become an inseparable part of the cultural identity of coastal communities. However, in the midst of increasingly competitive market trends, limitations in the aspects of packaging and product identity become an obstacle in itself. As revealed by Izzhati et al. (2017), processed fishery products with simple packaging are often less able to attract consumer attention in modern markets that demand higher visual quality, hygiene and product durability. This shows that although traditional salted fish businesses have strong cultural values, improvements to the visual aspects and product packaging remain an important step to strengthen the position in the wider market.

4. CONCLUSIONS

Traditional salted fish processing by Mr. Suwono in Batukaras still maintains a hereditary method with stages that include cleaning, cutting butterfly fillets, soaking in salt solution, drying, and simple packaging. This process has proven effective in meeting the needs of the local market and maintaining the product's distinctive flavor. However, from the aspects of hygiene and packaging, this method still has limitations, making it difficult to compete in a wider market. Therefore, innovation is needed in the production process, especially in terms of sanitation and packaging, to improve the quality and competitiveness of traditional salted fish products amid increasingly competitive market demands.

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