Asian Journal of Community Services (AJCS)
Vol. 2, No. 6, 2023: 563-572

Packaging Innovation for Dry Fish Lemuru Products in Perancak Village, Jembrana Regency, Bali

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A R T I C L E I N F O

Keywords: Vacuum Packaging, Increase Quantity, Appropriate Technology

Received : 25, April
Revised : 27, Mei
Accepted: 29, June

A B S T R A C T

Vacuum packaging is one way to extend the shelf life of dry food products. Dry fish lemuru is one of the regional superior products in Jembrana Regency, Bali. Processing of these fishery products has been produced and marketed by them, but not yet intensively, and they want to increase the quantity and quality. This community did not have prior knowledge in the field of business management, so they experienced obstacles in managing production and marketing. Solutions made to solve the problems faced by them were: providing appropriate technology in processing the fish products as well as storing and packaging with vacuum packaging methods including marketing, and business management. The output targets achieved were appropriate technology for traditional fishery processing; increased turnover; increased product quality and quantity.

DOI prefik: https://doi.org/10.55927/ajcs.v2i6.4815
ISSN-E: **2962-1496**
https://journal.formosapublisher.org/index.php/ajcs

INTRODUCTION

Traditional fish processing has better prospects and development opportunities. Traditional fish processing is very complex and based more on conceptions passed down from generation to generation. One of the traditional processed fish products is Dry fish Lemuru or "Pedetan"; it is made of lemuru fish (*Sardinella lemuru*) and it is mostly produced in the coastal areas of Jembrana Regency (Singapurwa *et al*., 2014). "Pedetan" is a food product similar to dried fish with traditional Balinese spices. The traditional fish processing process is heavily influenced by the type and quality of the raw materials, the additional ingredients which vary greatly, environmental conditions which are difficult to control, as well as the uncertain end point of the process. Traditional fishery product technology tends to have an unfavorable image. People tend to think that it is processed with a low level of sanitation and hygiene, uses raw materials with a low level of quality or freshness, has unguaranteed food safety, uses old technology; in addition, the business tends to be a family business with an inadequate level of management ability (Singapurwa *et al*., 2017).

The production fishery products varies in each village, making the producing village has its own characteristics. This also affects the quality and safety of different foods. As a result, there are differences in the quality and quantity of the products produced, with varying shelf life, making it difficult to standardize. Therefore, it is necessary to develop traditional processing with several improvement efforts by applying basic feasibility to food processing. Aspects of quality management and safety of raw materials and products need to be studied for developing a business, and developing the marketing of a product (Setiyadi, 2021). With the problem of various processing processes for lemuru fish "Pedetan", it is necessary to apply packaging using the vacuum packaging method, and good storage system in order to produce consumable high quality "pedetan". Product marketing is closely related to well-designed and attractive packaging. One thing that needs to be considered in food packaging is the selection of packaging materials that must be in accordance with the type of food itself (Danan *et al*., 2021). Vacuum packaging is generally an airtight packaging that aims to prevent the presence of air in the package which can cause the product to become rancid and also prevent the growth of microorganisms (Adawyah *et al*., 2021).

One of the communities in the village of Perancak, Perancak District, Jembrana Regency is the Mina Sari Sejahtera fish processing group. they were chaired by Ni Wayan Darwati. This community was formed in 2019 with the current number of members of 10 people. This group produces an average of 25-50 kg of raw fish per day, with a turnover of Rp. 250,000 – Rp. 500,000 per day. This group already has simple bookkeeping to record the finances and savings and loan activities of group members. Processed fish products that have been produced are usually marketed to markets around the village, up to the Negara sub-district. Fishery product processing activities carried out by the Mina Sari Sejahtera group can be seen in Figure 1.

Figure.1 The Mina Sari Sejahtera group

This community service activity was funded by Warmadewa University. It is hoped that the assisted community in Perancak Village will have the skills and insights in managing local natural resources and have an entrepreneurial spirit, so they could be able to establish any business related to the condition of the Perancak Village area. Furthermore, it is hoped that the community will be able to produce good fishery products processing training activities and better production management. The community was also given knowledge about work management, business management, so they are able to manage time and run the business as well as possible, thereby increasing income and family welfare.

IMPLEMENTATION AND METHODS

Implementation of activities in this program used several methods, they were as follows:

1. Interview and discussion methods to find out the problems experienced by the group.
2. Face-to-face methods and training provision, so that the community gain knowledge of the processing of fishery products, packaging using the vacuum packaging method, storage management, marketing, entrepreneurship and business management.
3. Direct practice by instructors who are competent in their fields, so that the community can apply the technology provided and can handle problems in product processing and business management.
4. Assistance was carried out on an ongoing basis so that the community can continuously improve the quality and quantity of products.

RESULTS AND DISCUSSION

This community service activity has several activities consisting of several stages. In the first stage, the team conducted discussions and analyzed the situation to determine the problems and constraints experienced by the group. The result was there were several problems related to sanitation, hygiene and economic management. After knowing the obstacles experienced by the group, the community service team gave several priority points that needed to be addressed, including providing appropriate technology training in processing, providing packaging knowledge using the vacuum packaging method, sharing knowledge on storage management and marketing strategies, entrepreneurship, and business management.

Furthermore, the assistance covered knowledge sharing about packaging with vacuum packaging methods, storing management, marketing, entrepreneurship, and business management. It was expected that it would be able to provide additional knowledge so that would help the producers to meet the predetermined requirements to produce quality products in accordance with consumer demands. In addition, they were also expected to be able to develop and implement monitoring procedures, monitor, and maintain sanitation conditions and practices independently as stated by Thaheer (2008) and Fidyasari and Raharjo (2020). assistance regarding economic management and bookkeeping was carried out by providing simple bookkeeping training. According to Mulyani (2018) simple bookkeeping in small and medium businesses is necessary for the progress of the business itself as well as stated by Manoppo and Pelleng (2018). In this case the involvement of the group is to directly practice financial recording techniques so that in the future it is hoped that the group will become skilled in administering finances (Endarwati and Desda, 2021).

The team who involved in the Regional Superior Product Development Program also provided innovation for improving the quality of 'pedetan' products from the community. It was the application of packaging techniques using vacuum packaging. Vacuum packaging is a method of packaging products for the purpose of selling or storing a certain product for a longer time (Chenoll *et al*., 2007), (Mills *et al*., 2014). Vacuum packaging is generally an airtight package that aims to prevent the presence of air in the package which can cause the product to go rancid and also prevent the growth of microorganisms (Angiolillo *et al*., 2016). The implementation of packaging activities can be seen in Figure 2.

Figure.2 Assistance for Vacuum Packaging Training

Apart from packaging, the team also provided assistance regarding the importance of labeling on the package. Nice and correct labels make it easier for consumers to choose the product they need (Fadlillah *et al*., 2015). Food product labeling can be used as the main source of information about packaged food. Therefore, the role of labels on food product packaging is very important. Indonesian constitution No. 18 of 2012 concerning Food (article 96 paragraph 1) states that labels function to provide correct and clear information to the public about every packaged food product before buying and/or consuming food (Republic of Indonesia Food and Drug Supervisory Agency, 2018). The labeling aspect is expected to be an effective tool for quality control and food safety (Septian *et al*., 2014), (Mamuaja, 2016).

Figure.3 Results of Assistance on Packaging and Labeling

Packaging is one way to prevent moisture from being absorbed by dry food products. According to Khamidah *et al*. (2019) packaging can also prevent or reduce damage, protect the materials inside from contamination and physical disturbances such as friction, impact and vibration. Packaging factors can affect the growth of microorganisms. Packaging can also protect and prevent food spoilage by blocking the entry of oxygen and air which contain many contaminants (Nofreeana *et al*., 2017). Polypropylene plastic packaging is better at retaining the contents of a product because the permeability of poly prophylene plastic to gases is lower than other packaging (Furqon *et al*., 2016). The absence of oxygen can inhibit the growth of destructive microorganisms and chemical reactions, so as to maintain and extend the shelf life of the packaged (Jay, 2000). The use of polypropylene in vacuum-dried fish packaging is able to slow down the growth of microorganisms because the air that enters the packaging is slow so that microbial growth also slows down (Dewi *et al*., 2021; Erdawati *et al*., 2021; Maharani *et al*., 2022).

According to Grunert & Wills (2007) and Ula et al. (2020), packaging and labeling innovation aims to make products look more attractive so as to increase consumer interest in buying a product; It is hoped that this will also have an impact on the processed products of the Mina Sari Sejahtera Group. In addition, a good packaging process aims to maintain the quality of the product to be distributed (Beitzen-Heineke *et al*., 2017). The community service activity was then continued by conducting discussions regarding issues and obstacles still being faced by the Mina Sari Sejahtera Group in running the processing business. The process of mentoring and training went well. This could be seen from the enthusiasm of the training participants. It is hoped that this activity will have a good impact on the business development of the Mina Sari Sejahtera community. The activities carried out were beneficial to the community as they now have better knowledge and insight on how to produce attractive and products with quality. This also resulted on increasing production and improved the quality of the products as shown in Table 1.

Table.1 Economic and Social Impacts

No	Economic and Social Impacts	Achievement index
1	The community has better understanding and skills on business management and production process	The use of vacuum packaging for lemuru "*pedetan*" products
2	The quality and quantity of the products improve	The quality and quantity of the products improve as a result of the use of modernized technology and the implementation of proper production method
3	Increased group turnover	The communities' turnover increased from IDR 250,000-500,000 per day to IDR 850,000-1,300,000 per day.

The increase in turnover shown in Table 1 by the Mina Sari Sejahtera community was supported by innovative and attractive packaging techniques. In addition, wider marketing was also able to provide increase in turnover for this group, exactly as stated by Kristianto (2021). Marketing, which was initially only done in traditional markets, has now been supported with the use of social media such as Facebook, Instagram and Tiktok. One of many ways of promotion that is easy, fast, cheap and has a wide marketing range is promotion through internet-based social media. it is easy because almost everyone is attached to it. it is fast because the information sent can spread up within a couple minutes. Moreover, it is cheap because the use of social media is generally free of charge. Its range is wide because the penetration of messages conveyed by social media is global (Safira, 2018). Apart from using social media, product marketing is also carried out using the reseller system.

CONCLUSIONS AND RECOMMENDATIONS

The Regional Superior Product Development Program in Perancak Village, Jembrana District, Jembrana Regency, Bali which was carried out was able to cope with the problems faced by the Mina Sari Sejahtera group with appropriate Technology. This program helps them in implementing the use of vacuum packaging innovation, product labeling, marketing, and business management. Vacuum-packaged "pedetan" products can extend the shelf life and improve its quality. With this packaging method, their turnover has increased.

ACKNOWLEDGMENT

Special acknowledgement is addressed to the Chancellor and the Community Service Institute of Warmadewa University, Denpasar, Bali for this program would not have been successfully administered without the financial support, based on the 2023 Annual Activity Plan and Budget.

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