

# Modern Canning Process of Squid Sauce with Ternate City MSMEs

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**Abstract-** Sambel squid is one of the traditional foods of North Maluku made from dried squid. This dish has a spicy and savory taste. So that this activity aims to carry out PKM Sambel Cumi with a Modern Canning Process with Asaompu Production Ternate MSMEs. Squid sambel products made by Asaompu Production Ternate MSMEs have been marketed in the form of bottle packaging and standing pouches. Simple packaging causes sambel squid products to not be stored for a long time. With the implementation of PKM activities, it has an impact on increasing added value and also competitive product innovation and encouraging business actors to develop other traditional food industries with modern canning systems. Squid sambel only lasts for approximately 1 week at room temperature and 1 month if stored in the refrigerator and if packaged in bottles and standing pouches can last 3-4 months. The solution to overcome this problem is to apply canning technology in the packaging of squid sambel. Canning food can extend the shelf life by up to 1 – 2 years. The shelf life of a product greatly affects the amount of production, sales, and distribution of a food product. So far, squid sambel products produced by Asaompu Production Ternate MSMEs can be marketed outside Ternate, increasing production volume, and increasing MSME income.

**Keywords:** Canned Squid Sambel, Canning, MSMEs, Asaompu Production

## 1. INTRODUCTION

Sambel squid is one of the typical foods from Ternate, North Maluku. This food is made from squid that has been dried by first boiling it using salt, then processing, namely by cooking it with spicy spices. Previous research reported that squid sambel is one of the leading processed fishery products in Ternate City in particular and North Maluku in general, because raw materials are imported from outside Ternate City, such as East Halmahera, South Halmahera, and Taliabu Island. Sambel Squid products are ranked fourth below serundeng tuna (first rank), shredded tuna (second rank), anchovy fried sambal (third rank), and suntung garu rica (third rank) [1].

Asaompu Production Ternate MSMEs are one of the MSMEs in Ternate City. These MSMEs produce traditional Ternate food, one of which is sambel squid but is still packaged using bottle packaging and standing pouch. The squid sauce produced by Asaompu Production Ternate MSMEs is made from squid. Squid sauce is one of the priority fishery

commodities in Ternate City [2]. The number of squid on the market is very abundant so to preserve it, fresh squid is processed into dried squid by boiling and adding salt then dried for 2-3 days. Making squid sambel begins by cutting baby squid into 3-4 small pieces. The squid that has been cut into small pieces is then cooked using spicy spices, which are made from curly red chilies, cayenne peppers, onions, garlic, tomatoes, sugar, salt, and flavorings, nutmeg and cloves, as well as cooking oil and then put into a packaging container.

MSMEs have an important and strategic role in Indonesia, namely as a pillar in the economic development of the community. MSMEs are considered to be quite close to the community so that their existence is quite dominant in the development of the Indonesia economy [3]. In its development, MSMEs still have to face various obstacles. The obstacles faced include the fulfillment of raw materials, marketing, production, and capital [4]. Especially for MSMEs engaged in the food industry, the problems faced by many are short

product shelf life, lack of technological touch, and unattractive packaging [5]. This problem is also experienced by Asaompu Production Ternate MSMEs.

The obstacles experienced by Asaompu Production Ternate MSMEs include the first is the undocumented standard recipe for making garu rica fish. Recipe standards are an important document in the food industry. Recipe standards function as uniform instructions, facilitate the procurement of ingredients, facilitate the food processing process, facilitate the control of production quantity, maintain food quality (consistency), and facilitate the calculation of production costs [6]. The second obstacle is the short shelf life of the rake fish. MSMEs Asaompu Production Ternate processes rake rica fish without preservatives and the packaging used is also simple. This causes the produced rake rica fish to not be stored for a long time at room temperature. The short shelf life causes the production amount to be low to avoid losses if the product does not sell. The third obstacle is product marketing that is still limited.

Squid sambel products made by Asaompu Production Ternate MSMEs have great potential to be developed. Raw materials that are not difficult to get are one of the advantages of this product. In addition, this product can also be accepted well in the community and is one of the favorite culinary. To help develop this product, the PKM team provides several solutions to solve the problems experienced by MSMEs. The team considers that the short shelf life of products is the main problem faced by Asaompu Production Ternate MSMEs. The solution provided by the team is to package the rake rica fish in cans to extend the shelf life of the product. Canning is the preservation of food with the hermetic principle in canned containers which are then sterilized. Products packaged in canned packaging can last for a long time at room temperature without experiencing physical, chemical, or biological damage [7].

Labels are an important component of a product's packaging. The label contains information related to the packaged product. One of the important components that must be present in a food label is the nutritional value of the product and its shelf life. Therefore, the PKM team will also test the nutritional content of garu rica fish because MSMEs have never tested the nutritional content of the product. The PKM team will also redesign the packaging label of the garu rica fish to make it more attractive. Attractive labels can be a good promotional medium, because they can attract consumer interest.

The last activity that the team will carry out is the preparation of standard recipe documents and SOPs for canning squid sambel. As mentioned earlier, the standard document of the recipe is very important in the food handling system. Recipe standards will make it easier for business actors to maintain the quality of their products. The SOP document for canning squid sambel is important as a guideline in the packaging process. The canning process will greatly affect the shelf life of the product. To avoid errors in the canning process,

a specific structured canning SOP document is needed for squid sambel products.

The activities planned by the PKM team aim to assist Asaompu Production Ternate MSMEs in resolving the obstacles faced. The PKM team as an extension of the university wants to build a good partnership with MSMEs. This is related to the obligation of the Tri Dharma of Higher Education to practice existing knowledge for the benefit of the wider community. The short-term target of this activity is the formation of a prototype of canned squid sambel products with attractive and informative packaging, as well as the availability of good documentation related to the production process of canned squid sambel. The long-term target of this activity is that it is hoped that the solutions provided can increase MSME income and can advance the business of Asaompu Production Ternate MSMEs.

North Maluku traditional food canning activities have been carried out, namely canning sambel roa with MSME business groups [10]. Canning wax vegetables as a typical food of North Maluku with the characteristics and added value of the product which is a new product and is in great demand by consumers because of its raw materials that are endemic to North Maluku and rarely found in other areas [8] [9].

## **2. METHOD**

PKM activities will be carried out at partner locations, namely in Jambula Village, Ternate Island District, Ternate City and on the Khairun University campus. The location of the partner is ± 3 Km from LPPM Khairun Ternate University. The activity will last for approximately 5-6 months (outside the PKM selection schedule), namely March – August 2024. The activities that will be carried out and have been approved by the partners are:

### *1. Activities for production process troubleshooting*

The main problems of the production process are the short shelf life, the lack of information on the level of product preference, the label design is not attractive and informative, and the sanitary hygiene behavior of food handlers needs to be improved. The first activity that will be carried out is counseling related to product canning procedures and sanitary hygiene for food handlers. This counseling activity will begin with a pre-test to find out the knowledge of employees and PKM participants about canning and sanitary hygiene of food handlers. At the end of the activity, a post test will be carried out to find out whether the material provided can increase participants' knowledge about canning and sanitary hygiene of food handlers.

The second activity is a workshop on making squid sambel and canning. This activity aims to extend the shelf life of products and as a data collection for documentation. The material requirements for the squid sambel canning process can be seen in Table 1. The next activity is an analysis of the level of preference for canned squid sambel products and the shelf life of canned squid sambel products. Nutritional analysis and shelf life will be carried out in a

commercial analysis laboratory. The last activity is the design of the squid sambel packaging label. Labels are designed to be as attractive and informative as possible. The

label will be equipped with the results of the analysis of the nutritional value and expiration date of the product.

Table 1. List of Requirements for Processing and Canning Squid Sambel

No.	Material	Sum	Unit
1.	Dried squid	10	Kg
2.	Spices/Additives	1	parcel
3.	Cooking oil	2	Litre
4.	HBRG Containers (84 mm hood 109 ml)	50	Pieces
5.	HBRG Containers (90 mm hood 320 ml)	50	Pieces
6.	Plastic seal for HBRG Containers (0.025mm (roll))	50	Pieces
7.	Retort pouch (PP 20 x 26 cm hood 1.5 kg)	50	Pieces
8.	Retort pouch (PP 16 x 26 cm hood 1 kg)	50	Pieces
9.	Aluminum (13 x 20.5 mm hood 250 g)	50	Pieces
10.	PET can (size Ø 9x 8.5cm)	50	Pieces
11.	Packaging Label Design	1	parcel

*2. Activities for managerial problem-solving*

Documentation related to the production process is very important for every business actor to have. MSMEs Asaompu Production Ternate do not yet have a clear document about the standard recipe for squid sambel sauce. After completing the squid sambel processing workshop, the PKM team together with partners will develop a standard squid sambel recipe. The recipe standard consists of the specifications of the raw materials for squid sambel squid, the number of ingredients, the tools used, the stages of the processing process, portions, and special instructions if any. Another document that needs to be compiled is the SOP for canning squid sambel. The canning SOP contains about the tools, ingredients, and steps for canning squid sambel. The canning recipe standards and SOPs are carefully and detailed. These documents will be the basis for maintaining good and consistent product quality.

During the activity, the PKM team will collaborate with partners. Partners play an active role in every activity that will be carried out. The following are the contributions of partners in PKM activities:

1. Partners provide information about the obstacles faced. Information related to MSMEs and the product production process is provided during the initial discussion and observation process.
2. Partners allow their employees to participate in counseling activities on canned food, hygiene and sanitation of food handlers, and the application of recipe standards during the production process.
3. Partners actively participated in the processing and canning workshop process together with the PKM team.
4. Partners provide opinions and input during the squid sambel label design process.
5. Partners together with the PKM team compiled recipe standards and SOPs for canning squid sambel.

**3. RESULT AND DISCUSSION**

Community service is one of the important pillars in sustainable development, especially in the context of local economic empowerment. In recent years, canned food making training has become one of the service activities carried out by various institutions, including universities and non-governmental institutions. This activity aims to improve people's skills in processing food into more durable products with high economic value. According to data from the Central Statistics Agency (BPS), the food and beverage sector accounts for around 30% of Indonesia's total gross domestic product (GDP), showing the great potential that can be utilized by the community through food processing.

In the context of community service, training in making canned food also plays an important role in increasing food security. By utilizing local food, people can reduce their dependence on imported products and increase food availability in their area. For example, in coastal areas, this training can teach people to process marine catches into

canned products that have a longer shelf life. This not only increases revenue, but also helps reduce the waste of catches.

Community service activities also provide opportunities for students and professionals to be directly involved in the community empowerment process. Through collaboration between academics and the public, the latest knowledge and technology can be applied directly to improve product quality. For example, the use of proper canning techniques can reduce the risk of contamination and extend the shelf life of the product.

Overall, presented in Figure 1, community service through canned food making training with Ternate City MSME partners has great potential to improve community welfare. By utilizing local resources and applying the right technology, communities can create products that are not only economically valuable, but also support food security. Therefore, collaboration between various parties, including the government, academia, and the community, is urgently needed to achieve this goal.



Figure 1. Socialization of PKM Activities for Making Canned Squid Sambel with Ternate City MSMEs

The involvement of Micro, Small, and Medium Enterprises (MSMEs) in canned food processing is very important to increase the competitiveness of local products in the market. One example of the success of MSMEs in canned food processing is small businesses in coastal areas that produce canned fish. By utilizing local catches, they not only create quality products, but also help increase the income of local fishermen. Training in making canned food such as

sambel squid which is focused on Ternate City MSMEs, namely Asaompu Production Ternate MSMEs, can also help in understanding the marketing and distribution aspects. In today's digital era, product marketing through online platforms is very important. A study by Setiawan (2022) shows that MSMEs that utilize Training not only focus on processing techniques, but also include effective marketing strategies.



Figure 2. Preparation for Training on Making Canned Squid Sambel with Ternate City MSMEs

However, the challenges faced by MSMEs in processing canned food are also quite large. One of them is limited access to adequate capital and technology. Therefore, support from the government and other institutions is urgently needed to help MSMEs overcome this challenge. The right financing and counseling programs can help MSMEs to increase their production capacity and product quality. Thus, the involvement of MSMEs in canned food processing can be a strategic step to improve the local economy and create new jobs. The application of science and technology in PKM activities aims to help solve problems faced by partners. A simple but effective technology to extend the shelf life of rica rake is canning. Canning technology is a preservation technology that has been known for a long time. This technology is considered capable of extending the shelf life up to 1 year or more without damaging the quality of canned products. Canned packaging

can protect products from physical, biological, and microbiological damage. The canning process begins with the production process of garu rica fish. The selection of quality raw materials and good processing must be considered to maintain product quality. During the canning process, the hygiene and sanitation of the equipment and production environment must be maintained. The canning stage must be carried out correctly so that the products produced are of good quality as expected. The stages of canning the product can be seen in Figure 2, Figure 3 and Figure 4 below.

Training in making canned food is a strategic step to improve people's skills and knowledge in processing foodstuffs. This training usually covers various aspects, from raw material selection, processing techniques, to product packaging and marketing.



Figure 3. Exhausting Process, Can Closure and Sterilization of Canned Squid Sambel

One of the techniques taught in this training is a good and correct canning method. This method is very important to ensure that the products produced are safe for consumption and have a long shelf life. Therefore, training must be equipped with knowledge of food safety principles that must be applied in every stage of processing. The canned food making training also provides an opportunity for participants to practice making products directly. For example, in the training on making squid sambel, participants are taught how to choose fresh or dried squid, process it with the right spices, and package it in cans with the right technique.

Overall, canned food making training has a significant positive impact on the community. By improving their skills and knowledge in food processing, communities can create value-added products and contribute to the local economy. Therefore, it is important for various parties to continue to

support and develop this kind of training program so that the benefits can be felt widely.

The manufacture of canned squid sambel is one example of a processed product that has great potential in the market. Squid is one of the seafood products that is in great demand by the public, both as a food ingredient and as a raw material for processed products. In the training on making squid sambel, participants were taught how to choose fresh squid, process it with the right spices, and package it in cans with the right technique. In the process of making squid sambel, the selection of quality raw materials is very important to ensure the taste and quality of the product. Fresh squid has a better texture and better taste than squid that is no longer fresh. Therefore, trainees were taught how to choose good squid, such as paying attention to color, smell, and texture.

After the selection of raw materials, the trainees were also taught how to process squid sambel with the right spices. A good combination of spices will result in a delicious and appetizing squid sambel. In the training, participants were taught a recipe for squid sambel which has been tested and liked by many people. After the processing process is completed, participants are taught good packaging techniques to maintain product quality and safety. Proper packaging is essential to prevent contamination and extend the shelf life of products. In the training, participants were taught how to package squid

sambel in cans using vacuum techniques so that the product remains fresh and safe for consumption.

With the increase in skills in making canned squid sambel, it is hoped that participants can take advantage of existing market opportunities and increase their income. High-quality canned squid sambel products have the potential to be marketed not only in the local market, but also in the export market. Therefore, it is important for participants to continue to innovate and improve product quality in order to compete in an increasingly competitive market.



Figure 4. Precooking and Canned Squid Sambel Products

Canned squid sambel (Figure 4) is one of the processed products that has excellent market potential. With a longer shelf life than fresh sambel, canned squid sambel can be a practical choice for consumers who want to enjoy the taste of squid sambel without having to bother processing it themselves.

Canned squid sambel also has advantages in terms of nutrition. Squid is a high source of protein that is rich in omega-3, vitamin B12, and minerals such as selenium and copper. By processing squid into canned sambel, the nutritional value of the product is maintained. Canned squid sambel produced with good processing techniques has a nutritional content comparable to fresh sambel. This makes canned squid sambel a healthy choice for consumers. In order to increase the competitiveness of canned squid sambel, it is important to innovate in product development. For example, a variety of flavors and attractive packaging can attract consumer interest. Some manufacturers have started to create sambel squid with the addition of local spices or distinctive spices, so that the product has a unique added value.

However, the challenge faced in marketing canned squid sambel is the high competition in the market. Therefore, an effective marketing strategy is indispensable to attract the attention of consumers. The use of social media and e-commerce platforms can be one way to promote canned squid sambel products to a wider range of consumers. MSMEs that use social media to market their products have experienced a significant increase in sales. Overall, canned squid sambel has great potential to become a superior product in the canned food industry. With the support of the right training and innovation, it is hoped that this product can compete in the local and international markets. Therefore, it is important for producers to continue to improve quality and innovate so that canned squid sambel can become the main choice for consumers.

Another important aspect of the production process is the labels on the packaging. Packaging labels should be made as attractive and informative as possible. The label components that are not yet owned by Asaompu Production Ternate MSMEs are the shelf life of the product and the nutritional

value of the product. Therefore, it is necessary to conduct laboratory analysis to determine the shelf life and nutritional value of the product. The results of laboratory analysis are then used to complete the information needed to be listed on the label.

#### 4. CONCLUSION

With the implementation of this PKM activity, it can be concluded that with the implementation of community service activities entitled training and assistance in making canned squid sambel with a modern canning process for Ternate City MSMEs, it will have an impact on increasing added value and also competitive product innovation and encouraging business actors to develop other traditional food industries with a modern canning system. Squid sambel only lasts for approximately 1 week at room temperature and 1 month if stored in the refrigerator and if packaged in bottles and standing pouches can last 3-4 months. The solution to overcome this problem is to apply canning technology in the packaging of squid sambel. Canning food can extend the shelf life by up to 1 – 2 years. The shelf life of a product greatly affects the amount of production, sales, and distribution of a food product. So far, squid sambel products produced by Asaompu Production Ternate MSMEs can be marketed outside Ternate, increasing production volume, and increasing MSME income.

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