

## IMPROVING THE QUALITY AND SAFETY OF PALM SUGAR IN NORTH LOMBOK

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### Abstract

North Lombok is the only underdeveloped district in NTB. Menggala Village in North Lombok is strategically located close to Mataram city center and Gili Trawangan harbor. Menggala Village has the largest palm sugar-producing center in North Lombok. This potential has not been able to increase the economy of palm sugar craftsmen. This is due to the processing of palm sugar which is still very simple both in terms of production and packaging. In addition, marketing that has not been widespread is also an obstacle. For this reason, the objectives of this activity include increasing the knowledge and understanding of palm sugar craftsmen in making high-quality and safe products, increasing understanding of labels and packaging, improving product marketing strategies into superior local products, and knowing the nutritional value contained in products. This activity consists of FGD, training, and advanced mentoring stage. The FGD results show that palm sugar farmers need training on GMP, packaging, and business development. The results of this training were able to significantly increase the partners' knowledge. Partner production facilities become more feasible and hygienic. The results of the product analysis meet the quality requirements of SNI. However, partners still need to develop their business through local marketing in collaboration with gift centers and actively participate in MSME bazaars or exhibitions in the local area.

**Keywords:** GMP, Lombok, Palm Sugar, Safety, Quality.

### INTRODUCTION

Based on the Presidential Regulation (Kemendesa PDTT, 2020), there are 11 underdeveloped regions in Indonesia in 2020-2024 that have less developed areas and communities compared to other regions on a national scale. One of them is the Province of West Nusa Tenggara or NTB, where North Lombok is the only district with an underdeveloped status. Based on BPS data (2019), the percentage of poverty in North Lombok reached 29.03%, about three times the percentage of poor people on a national scale of 9.78% (BPS, 2020). North Lombok has potential in the agricultural sector with an area of food reserves reaching 41,878 hectares. One of the aspirations of the community that was conveyed during the recess, they needed youth training assistance to reduce unemployment by creating a superior agricultural economy (Zulkieflimansyah, 2020).

Administratively, North Lombok Regency is divided into five sub-districts, namely Tanjung, Gangga, Kayangan, Bayan, and Pemenang. Geographically, Pemenang has a strategic location, which is closest to the center of Mataram city and not far from the Gili Trawangan

port. This is the most important factor in order to increase the capacity for economic development. According to BPS (2019), Pemenang has the potential for agricultural development in the plantation sector, one of which is sugar palm. This sub-district produces the largest sugar palm in North Lombok Regency, reaching 284.44 Kg/Ha.

The palm sugar industry center in Pemenang is located in Menggala Village. This village has the most palm sugar business units compared to other villages. In addition, Menggala Village produces the most palm sugar, which is 169.80 Kg from 849 liters of palm sap, while East Pemenang Village produced 23.8 Kg and West Pemenang Village produced 15.8 Kg (Putra, 2017). Pemenang Village is located on the border of Gunung Sari District which is the largest sugar palm producer in West Lombok Regency. Most people process palm sap into palm sugar as shown in Figure 1. Therefore, Menggala Village has the potency to create the largest leading agricultural economy in North Lombok Regency.



**Figure 1. Palm Sugar Production in Menggala Village**

Unfortunately, this potential has not been able to improve the economy of palm sugar craftsmen, even though this work has been done for years. Generally, palm sugar craftsmen in this area have several reasons in producing this palm sugar product, namely inheritance from generation to generation, utilizing abundant raw materials, and having the skills to make palm sugar. Most of the craftsmen have their own palm trees and a few get the raw materials from the palm trees of other people around them. The palm sugar processing business system, which is a home industry, still faces technical and non-technical obstacles, such as low skills, low production yields, and added value. This requires directed guidance through operational steps: (a) technical, management, and market training, (b) provision of processing facilities and infrastructure (Rachman, 2009).

The price of palm sugar is dynamic, ranging from Rp. 8,000 – Rp. 10,000 per piece ( $\pm$  350 grams) and only supported by the weak marketing conditions of the craftsmen (Widyasari et al, 2019). Palm sugar processing does not use modern technology which causes the palm sugar produced still contains impurities such as ants, leaves, and sand. This causes marketing to be limited only to local markets with low prices and non-durable products (Figure 2). In addition, most of these palm sugar products do not have adequate labels so their marketing is limited.



**Figure 2. Palm Sugar Product from Menggala Village**

The Province of West Nusa Tenggara (NTB) is a potential market because it has a variety of beautiful and quite popular tourist destinations. Therefore, this area has the opportunity to become a potential market for various processed palm products if it meets Good manufacturing Practices (GMP) and the right marketing strategy. One of the market opportunities is to support the NTB Provincial Trade Office program which is preparing to fulfill the Mandalika area hotel products. In addition, it has the opportunity to penetrate the global market through importing companies to Qatar who are interested in various agricultural commodities in NTB (Maria, 2021). This can help reduce the risk of unemployment, especially in Menggala Village.

The healthy food trend of world food consumption also affects the majority of foreign tourists who travel to NTB. This is a potential market for palm sugar marketing. When compared to granulated sugar, palm sugar has a lower glycemic index (GI) of 35 while the GI of granulated sugar is 58 (LPPM IPB, 2011). According to experts, this lower GI value makes palm sugar safer for consumption because it does not cause a significant increase in blood sugar levels so it is safe for diabetics. In addition, palm sugar is made more naturally and does not use additives or other chemicals to purify. This is an opportunity for palm sugar craftsmen in Menggala Village to improve product quality and safety through training and mentoring programs so that they can become superior products in North Lombok.

The solutions offered to overcome the problems faced by partners include providing counseling, training and assistance on good manufacturing practices (GMP), starting from raw materials, to processing as well as labels and packaging materials. In addition, partners will also be provided with business development training including effective marketing strategies so that product marketing reach increases. To see the quality of palm sugar produced, palm sugar is analyzed for its nutritional value.

For this reason, the objectives of this activity include: (1) increasing the knowledge and understanding of palm sugar craftsmen to make quality and safe products, (2) increasing understanding of product labels and packaging so that their business can be developed on a wider scale (3) improve product marketing strategies to become superior local products, (4) analyze the nutritional value contained in palm sugar produced.

## **IMPLEMENTATION METHOD**

### **Implementation Stages**

The implementation of this activity is divided into 3 stages, namely the preparation, the training, and the advanced mentoring stage. At the preparation stage, Focus Group Discussions (FGD) was held with several palm sugar farmers in Menggala Village through online media. Furthermore, a site survey was conducted to ensure the training process went well. This preparation stage aims to ensure appropriate training needs for palm sugar farmers and prepare for its implementation in Menggala Village.

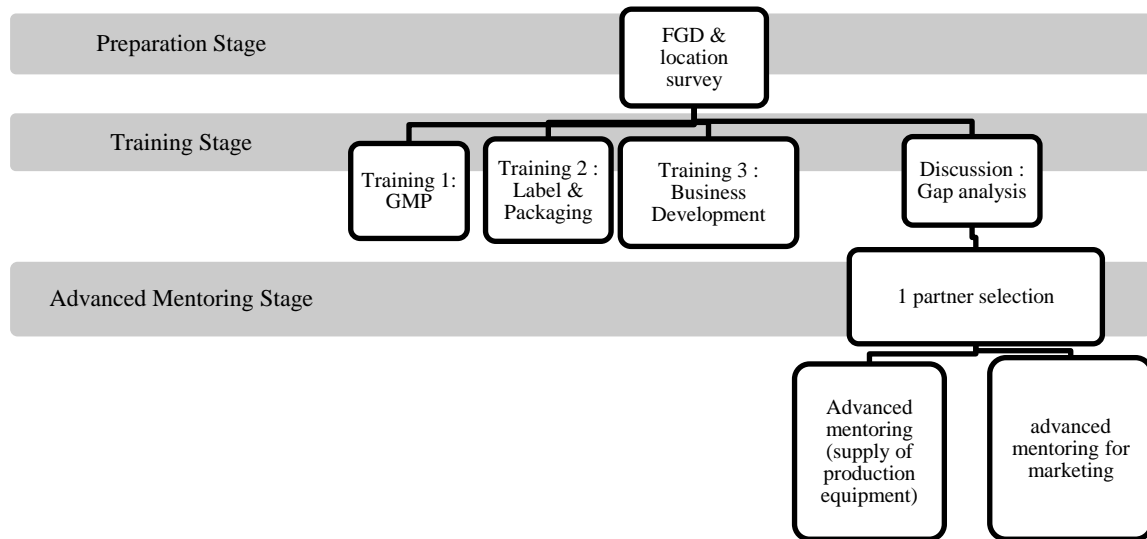
Based on the results of the FGD, the training phase consisted of three stages, namely GMP training, product label, and packaging training as well as business development training. In the GMP training, a gap analysis was carried out between the condition of the palm sugar production house and the requirements for fulfilling the GMP. To see the effectiveness of the training activities, participants were given pre-test and post-test.

In the next stage, the Community Service Team selects a suitable partner for the advanced mentoring stage based on the readiness of the participants. This stage aims to improve the quality of production and monitoring of business developments through online media. The overall activity stages can be seen in Figure 3.

### **Data Analysis**

The method used in data analysis is the Paired Sample T-test method. This method is used to analyze the mean difference between 2 populations that are related. There are 2 cases where the two data are interconnected, namely when conducting repeated measurements using the same group of respondents or when pairing 2 research populations based on certain characteristics (Levine et al, 2020).

In this activity, the Paired Sample T-test method is used to see the effectiveness of the training provided where effectiveness is measured from the difference in the average scores produced before and after the training. The calculation of the Paired Sample T-test was performed using Microsoft Excel. The results obtained are in the form of a table showing the p-value of the results of this study. The p-value is then compared with the significance value used, which is 0.05. If the p-value is greater than 0.05, it means that H<sub>0</sub> will be accepted, the conclusion is that there is no significant difference between the two tests. However, if the p-value is less than 0.05, it means that H<sub>0</sub> will be rejected, so the conclusion is that there is a significant difference between the two tests, namely the post-test average value is much greater than the pre-test average.



**Figure 3. Implementation Stages**

## RESULTS AND DISCUSSION

### Preparation stage

#### *Focus Group Discussion (FGD)*

In the preparation stage, a Focus Group Discussion (FGD) was conducted on approximately 6 palm sugar farmers in Krujuk Hamlet, Menggala Village, North Lombok Regency. The FGD was initially conducted through online media (zoom), but due to bad weather and signals, the FGD was continued with a WhatsApp call. The purpose of this FGD is to formulate training according to the needs of palm sugar farmers and prepare for its implementation in Menggala Village so that the Community Service Activities that will be carried out are more targeted and useful. The results of the FGD, among others:

1. Palm sugar production in Krujuk hamlet is still marketed only to traditional markets and local people, has not entered modern markets or outside the region, and does not have a permit (eg. PIRT number) for its products.
2. Palm sugar trees that are tapped come from the mountains of Krujuk hamlet which are quite far from each other and from the production site.
3. Palm sugar farmers in Krujuk hamlet have never received training on GMP or on food packaging, so knowledge about GMP has not been possessed and applied.
4. The palm sugar farmers are on average 50 years old and over
5. The farmers tap the sap from the palm trees in the morning and evening and directly process it into palm sugar.
6. Palm sugar that is produced does not use chemicals as preservatives, only using *Paket* Wood which is believed to make the sap last longer.
7. Processing of sap into palm sugar is still carried out in a simple way in mountain forests near palm trees and still uses wood for cooking.

The results of the FGD showed that palm sugar farmers in Krujuk Hamlet still need training on GMP, packaging, and business development so that later they can get PIRT permits and expand their palm sugar marketing outside the region.

### **Good Manufacturing Practices Training for Home Industry (GMP)**

GMP is a guideline that explains how to produce quality, safe and suitable food for consumption (BPOM, 2021). This GMP guideline is one of the prerequisites for obtaining permits for food products. Home Industry is a food company that has a place of business in the residence with manual to semi-automatic food processing equipment. This training was conducted on the first day of training with a total of 11 participants (Figure 4). The regulation that underlies this training is Perka BPOM HK.03.1.23.04.12.2206 of 2012 concerning GMP for Home Industries. The participants were given training on how to process good and hygienic food.



**Figure 4. Participants in the Training to Improve the Quality and Safety of Palm Sugar**

At the same time, a discussion session was held on the implementation of GMP in the palm sugar production environment. In this session, participants were also active in asking questions related to GMP and the material that had been delivered. The Community Service team also visited the Palm Sugar production site to see the actual situation. The Community Service team made observations in the field and provided some notes and inputs related to GMP. The discussion of this gap analysis is carried out at the production site as shown in Figure 5.



**Figure 5. Gap Analysis Discussion**

As for the results of the discussion, it was found that the participants had not implemented GMP, including: (1) Production rooms/places were still open, (2) Producers still did not use cleaning tools such as gloves, masks, aprons, safety shoes, (3) There was no pest control in the production room, (4) None closed landfills, (5) Some cooking utensils were still made of wood,

(6) the packaging process was still not hygienic, (7) The practice of hygiene in the production process was still lacking, (8) The cleanliness of employees and equipment was still not paid attention to.

### **Label and Packaging Training**

The palm sugar industry in Menggala Village was still constrained by marketing activities that were not yet optimal, one of which was the unavailability of adequate labels and packaging. So far, palm sugar packaging uses thin clear plastic as the primary packaging as shown in Figure 6. The plastic packaging used has a low density so the product is more easily damaged. This shows the importance of counseling, discussion, and practice regarding the importance of labels and packaging as an effort to provide information to consumers, maintain the quality of palm sugar, extend shelf life and expand marketing.



**Figure 6. Packaging Products before Training**

The participants were introduced to various knowledge related to labeling and also the types of packaging that were suitable for palm sugar products. During the activity, the two-way discussion, both from the participants and the presenters, was quite interactive, which was marked by the questions asked by the participants. Not only delivered through materials but participants were also taught to design product labels by drawing and writing label information in accordance with applicable regulations, as shown in Figure 7.



**Figure 7. Product Label Design Activity**

As a result, some craftsmen found it difficult to design product labels, apart from the age factor, the participants were also not fluent in reading and writing. Therefore, participants who have difficulty are given directions and assistance one by one. However, this did not dampen the enthusiasm of the participants in participating in the training, it was proven that there were two participants who were able to design labels by writing down the correct information. This indicates that the knowledge and skills of the craftsmen increased after being given materials

and practices.

### **Business Development Training**

One of the factors that can hinder the development of the palm sugar industry in Menggala Village is the limited reach of the marketing media. So far, palm sugar is only marketed through local and neighboring markets, if it doesn't sell, the product will be consumed by themselves. This shows the importance of training and discussion on business development and product innovation made from palm sugar so that the products produced have high competitiveness and can reach wider consumers.

The material was delivered by one of the palm sugar producers, Rizani, a native of West Lombok. He produces palm sugar that has received a PIRT certificate under the King Aren brand. The participants were introduced to the technique of reading business opportunities, good and correct sugar processing, critical stages, and other product innovations that can be developed as shown in Figure 8.



**Figure 8. Business Development Training Activity**

During the activity, the discussion between the participants and the presenters was very interactive because the material was delivered using the Sasak language (Lombok native language) so that the participants understood more and it was easy to understand. In addition, the participants and presenters exchanged ideas about the experiences found during the production of palm sugar and the possible solutions. This discussion turned out to be able to increase the enthusiasm of the participants to develop the palm sugar business, as seen from the many questions asked by the participants.

### **The Effectiveness of Training**

To measure the effectiveness of this training, the participants were asked to answer the pre-test before the training took place. After the training, the participants were also asked to do a post-test. The results of the pre-test and post-test were then processed using the Paired Sample T-test method, the results of which can be seen in Table 1.



**Table 1. Paired Sample T-Test Result from Pre-Test and Post-Test**

Variable	Observations	Obs. With missing data	Obs. Without missing data	Minimum	Maximum	Mean	Std. deviation
Pretest	11	0	11	2,000	5,000	3,727	1,104
Posttest	11	0	11	3,000	10,000	7,818	2,316
Difference							
t (Observed value)							-4,091
t (Critical value)							-8,271
DF							-1,812
p-value (one-tailed)							10
alpha							<0,0001
							0,050

This test has two hypotheses, namely H0 and H1. The H0 is the mean difference between the pre-test and post-test equal to 0 (meaning there is no difference) and the H1 is the mean difference between the pre-test and post-test is less than 0 (meaning the post-test score is greater than the pre-test). In Table 1 it can be seen that the mean or average of the post-test scores is higher than the pre-test mean and the p-value is also smaller than 0.05. This shows that this training is able to significantly increase the knowledge of the participants regarding GMP, food labeling and packaging, as well as business development.

The obstacles faced in filling out the pre-test and post-test were that there were still some participants who could not read and write. This is because the participants who took part in the training were aged 50 years and over. However, the Community Service Team was able to handle this well by reading out and assisting in filling out the answers from the pre-test and post-test without any intervention.

### **Advanced Mentoring Evaluation**

Advanced mentoring was carried out for only one partner who has been selected to be facilitated further. The chosen partner was Mr. Syahiruddin. There were several factors in the selection of Mr. Syahiruddin as an advanced mentoring partner. He was very enthusiastic about conducting training, has a daughter who can help continue the business, has online communication media that will be used for further mentoring, and willingness to change and keep learning.

The next mentoring was to make label and packaging designs that are in accordance with the wishes of partners and applicable regulations. The label and packaging designs after discussions with a partner can be seen in Figure 9. The label information listed contains the product name, composition, production code, expired date, production address, net weight, and manufacturer's contact. The plastic used has a high density so the product is more durable and not easily damaged. This label and packaging are expected to become a more attractive branding of palm sugar products with the brand Sasak Aren Pak Syahirudin.



**Figure 9. Packaging and Label Products after Mentoring**

In this stage, the implementation of GMP for Pak Syahiruddin's Palm Sugar products was under control. Partner was given several facilities that can support the implementation of GMP and Hygiene for his production house. Partner seems to have started using various equipment such as the use of gloves, aprons, hair nets, masks, safety shoes, cooking utensils storage areas, hygienic jerry cans, as well as packaging equipment that can be used properly to maintain the hygiene of the finished product (Figure 10).



**Figure 10. Partner's condition (a) before and (b) after mentoring**

The next activity was to expand online marketing media that is easy to use by the partner. The media chosen was Facebook ads. In addition to a wider reach of consumers, another advantage offered is that ads on Facebook can be placed on target consumers based on their demographic conditions. Facebook ads were installed for approximately two weeks in January 2022. The results showed that these ads could reach 19,456 users, 3,945 post interactions located from East Java, West Java, and Jakarta, and 39 message conversations. A summary of ads through Facebook ads can be seen in Figure 11.



**Figure 11. Facebook Ads Achievement Summary**

Unfortunately, there has not been a sale or purchase transaction during the advertisement because the cost of shipping to Java Island is more expensive than the product price itself. Meanwhile, consumers in the areas of Bali and Lombok still rarely access these advertisements compared to consumers in the Java area. In addition, the response speed of partners is still quite slow due to limited signals and other busy activities so it can reduce purchase enthusiasm from consumers. With these obstacles, partners are considered not ready to run online marketing. The next solution is partners can strengthen local marketing in collaboration with gift centers in various tourist places and actively participate in MSME bazaars or exhibitions that take place in the local area.

### **Nutrition Fact Analysis**

The partner's products were analyzed for nutritional values including water, ash, protein, fat, and carbohydrate content. It aims to obtain information about the quality of partner products. The results of the analysis can be seen in Table 2.

Based on the SNI 3742-2021 standard, water content and ash content are components that determine the quality of palm sugar. The ash content of a product is related to the mineral content and cleanliness during the processing. Meanwhile, water content is influenced by environmental factors such as pH and ambient temperature during the process of preparation, cooking, packaging, shipping, and storage. Based on the results of the analysis, the palm sugar produced has met the quality requirements of SNI (BSN, 2021).

**Table 2. Nutrition Fact Analysis of Palm Sugar Produced by Partner**

No	Nutrition content	Results (%)
1	Water	7.41
2	Ash	2.19
3	Protein	1.72
4	Fat	0.14
5	Carbohydrate	88.5

### **CONCLUSION**

Based on the results, palm sugar craftsmen in Menggala Village, North Lombok need to increase their knowledge by participating in a series of training and assistance for GMP, labeling, and packaging as well as business development. The indicator of the success of this activity can be seen from the value of the effectiveness of the training and finding one active and worthy partner to be assisted in the next stage. During the mentoring phase, the partner's production facilities become more feasible and hygienic. Market development towards the online market has not been successful, because shipping costs are still too high, but the partner has the potential to develop business through local marketing in collaboration with gift centers and actively participate in MSME bazaars or exhibitions that take place in the local area. This service activity is expected to be a skill provision for craftsmen to be able to develop palm sugar products to obtain marketing permits with PIRT certification.

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